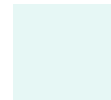


Report: May 2026

Galway Wastewater Strategy

Appendix 1 –
Managing Growth



Tionscaldal Éireann
Project Ireland
2040



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Appendix 1: Managing Growth

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This report has been prepared by Ryan Hanley Stantec on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Ryan Hanley Stantec were appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Ryan Hanley Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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Executive Summary

Since the introduction of the National Spatial Strategy in 2002, Greater Galway has experienced economic success, fuelling population growth, particularly in settlements surrounding Galway City. While Galway City's population has grown in line with the national average over this period (2002-2022) of 1.38% per annum (1.34%), adjacent towns such as Oranmore (6.37%), Clarinbridge (8.63%), and Claregalway (5.47%)¹ have significantly outpaced this growth rate. Although some of this growth reflects changes to agglomeration boundaries, the demand for wastewater infrastructure to support housing, commercial growth, and industrial activity requires upgrading and expansion to keep in line with latest growth projections and understanding.

The Galway Wastewater Strategy (GWS) aims to ensure that there is adequate treatment capacity and capability within the study area to meet anticipated growth demand through to the year 2080.

The study area covers four agglomerations, including Ireland's third largest wastewater treatment plant at 1) Mutton Island (serving Galway City, Oranmore, and Bearna) 2) Claregalway, 3) Athenry and 4) Moycullen (locations detailed in Figure 0-1). Growth forecasts for un-serviced settlements such as Furbogh, Clarinbridge, Kilcolgan, and Craughwell, which are situated outside the study area, have also been considered.



Figure 0-1: Galway Wastewater Strategy Study Area

¹ [Central Statistics Office Data](#)

A high-level assessment, based on Annual Environmental Report² (AER) 2024 data, establishes the current agglomerations within the study area collectively provide a total treatment design capacity³ of 195,000 Population Equivalent (PE), distributed as follows:

- Mutton Island: 170,000 PE
- Athenry: 9,500 PE
- Claregalway: 6,000 PE
- Moycullen: 4,000 PE

An important aspect of the strategy is an evaluation of the current *capacities* of these Wastewater Treatment Plant (WWTP) facilities to identify potential infrastructure risks associated with meeting projected growth demands through to 2080. The strategy assesses anticipated flow and loading requirements at three key design horizons: 2040, 2055, and 2080.

The objective of this report is to evaluate future population equivalent estimates for each agglomeration within the study area. This is to inform subsequent modelling of asset impacts and inform strategy development (discussed further in other appendices). The assessment presented in this report is exclusively based on process capacity and does not consider the potential for existing WWTPs to be optimised to process additional PE (i.e. capability), as this falls within the broader scope of the overall strategy analysis and related appendices.

The report examines whether treatment capacity will be exceeded at any point within the strategic planning horizon, with or without intervention, to support informed decision making going forward.

The methodology details the principal datasets and assumptions employed to forecast population growth across the four agglomerations. These projections were developed to:

- 1) Ensure alignment with Uisce Éireann's Asset Standards and guidance⁴,
- 2) support consistency with both regional and national planning strategies (for example, the National Planning Framework and the Regional Spatial and Economic Strategy); and
- 3) to provide context through comparison with historical growth trends within the region.

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. Methods and sources have been employed to project populations beyond 2040 as detailed throughout this report to create a continuous timeline of projections up to 2080. Throughout the report the baseline year for projections is set at 2022 as that is the date of the

² Annual Environmental Reports (AERs) provide a concise summary of compliance information for the year being reported upon for Wastewater Discharge Licences.

³ Note: this does not consider the treatment capability of these WWTPs at this stage

⁴ Specifically, *IW Asset Planning – Agglomeration Loading Technical Guidance Note*

latest census from the Central Statistics Office. Between 2022 and 2025 regional growth rates are applied to bring projections close to the year of publication of the Strategy.

In Summary, the total PE to be treated is estimated to double to around 383,000 by 2080 (Table 0-1). The expansion will mainly be to the east of Galway City study area.

Table 0-1 Summary of PE per agglomeration and Strategy horizon

Agglomeration	2022 Baseline	2040 Horizon	2055 Horizon	2080 Horizon
Mutton Island	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

Should it be decided to transfer the load into the study area, the four satellite villages - Furbogh, Clarinbridge, Craughwell, and Kilcolgan - are projected to contribute an additional 8,000 PE to the study area.

According to upper bound estimates, the analysis suggests that, in the absence of intervention, 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.

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

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. Many factors can influence population growth, such as national demographics, political stability, global economics and geo-political uncertainty. In line with Strategy recommendations, population projections should be re-visited in line with Strategy revision timeframes (i.e. every 5 years).

1. Purpose of this Report

The objective of this report is to evaluate future population estimates for each agglomeration within the study area, as shown in Figure 1-1. The study area includes the Galway Metropolitan Area, which includes Ireland's third largest wastewater treatment plant (Galway City – Mutton Island). This plant currently treats the population of Galway City, Oranmore, and Bearna. Claregalway is included in the Galway Metropolitan Area Strategic Plan (MASP) but is outside of the Galway City agglomeration boundary. Additionally, serviced towns such as Athenry and Moycullen, which lie outside both the MASP and Galway City agglomeration, are included in the study. Growth projections from several small, currently un-serviced settlements outside the study area (i.e. Furbogh, Clarinbridge, Kilcolgan and Craughwell), have also been considered in development of the Strategy. Although these un-serviced areas do not currently contain UÉ assets, their potential future impact on infrastructure planning has been considered for planning purposes.



Figure 1-1: Galway Wastewater Strategy Study Area

Four separate population projections were completed for three key design horizons of 2040, 2055 and 2080 and were contextualised with historical growth in the region. This was done to understand any future investment needs in terms of potential infrastructure upgrades and to inform modelling undertaken as part of the Galway Wastewater Strategy (GWS). A detailed assessment was carried out to evaluate the current agglomeration and catchment population,

using the 2022 census data⁵ from the Central Statistics Office, along with existing industrial and commercial loadings.

The purpose of this appendix is to:

1. Define the key data sources used in the methodology to understand the growth profiles and headroom allowances for each of the agglomerations and satellite villages analysed.
2. Ensure that these profiles align with national and regional growth strategies (for example, the NPF and the RSES).
3. Visually present the growth demand profile for each of the four study area agglomerations to inform strategy development.
4. Contextualise growth demand against historical growth.

The growth projections within this report have also been spatially applied in the hydraulic models for the purpose of water quality impact modelling, where appropriate.

⁵ <https://data.cso.ie/>

2. Base Year (2022) Wastewater Load Calculation Methodology

Calculations for the “base year” of the study were undertaken in accordance with the IW Asset Planning – Agglomeration Loading Technical Guidance Note. The 2022 Census from the Central Statistics Office was used as the basis for population estimates within the agglomeration boundaries. The base year methodology set the baseline from which future population projections were estimated to inform the basis for strategy development and subsequent modelling activity.

Population Equivalent (PE) is a standard measure used in wastewater and environmental planning to describe the pollution load generated by people and from other commercial and industrial activities that are connected to a sewer system. The PE of an area may be greater than the number of people who live in the area because PE includes loads from industry and commercial activities, as well as households.

A wastewater load is how dirty the wastewater is over a certain time (such as a day). Load informs how much pollution is in the wastewater while flow informs us how much wastewater there is.

The load components, their elements and key data sources are discussed in **Table 2-1**. These were used to calculate the base year and to estimate loads into the future.

Table 2-1: Current Agglomeration Load Summary

Load Component	Elements	Commentary
Domestic Load	Residential Population	The residential load was estimated using Central Statistics Office (CSO) and GeoDirectory data, these were spatially analysed to understand the residential count within each agglomeration. The residential load for each agglomeration was calculated by multiplying the agreed occupancy rate by the number of occupied residential units in that area.
	Student Residential Population	Galway City hosts several universities and colleges, so the student residential load was estimated by counting beds at official and private campus accommodations. Sources used to obtain this information include relevant college websites ⁶ , complex websites, internet searches and local knowledge
	Seasonal (tourism) Population	Seasonal and tourism loads were estimated using available unit counts within the area and existing non-domestic metering data. Information sources included accommodation websites (such as Failte Ireland, Airbnb, Booking.com), online searches, and local knowledge.
Commercial Load	Commercial Premises	The commercial sector includes businesses such as shops, restaurants, and pubs. The commercial loading is

⁶ <https://www.campusaccommodation.ie/students/>;
<https://www.universityofgalway.ie/student-life/accommodation/off-campus/>

Load Component	Elements	Commentary
		<p>set at 16% of domestic loading, based on findings from the National Urban Wastewater Study (NUWWS). This ratio is widely used and accepted in Ireland for flow and load design commercial loading estimates. Data from the following information sources was also reviewed for background information purposes in validating the commercial growth rate:</p> <ul style="list-style-type: none"> • GeoDirectory databases for establishing listed business and commercial premises. • Non-domestic water metering data provided by UÉ for each agglomeration/ settlement • On-line databases and searches
Institutional Load	Educational Establishments	<p>Comprises of creches, primary schools, post primary schools, and higher education institutions. Loading Rates are applied as per the UE Technical Guidance Note and the EPA Wastewater Treatment Manual – Treatment Systems for Small Communities, Business, Leisure Centres and Hotels guidance⁷. Data sources included Tusla’s Early Years Services⁸, the Department of Education⁹ and/or individual school websites. Data for higher education institutions was obtained via their respective websites¹⁰, the Higher Education Authority, and the University of Galway Research Office, specifically regarding student enrolment in full-time and part-time courses. Only students enrolled on full or part-time courses were included; those in remote or online-only programmes were excluded.</p>
	Nursing Homes	<p>Includes nursing home facilities and elderly care locations. The number of residents for the nursing homes within each boundary were obtained from the Health Information and Quality Authority (HIQA) and online websites.</p>
	Hospitals	<p>Includes hospitals and care units. The wastewater loading rate for the Hospitals within the settlements agglomeration was estimated in accordance with the IW Asset Planning – Agglomeration Load Technical Guidance Note based on the number of beds and a peak loading factor.</p>

⁷ [EPA water treatment manual -small-comm business.pdf](#)

⁸ www.tusla.ie

⁹ www.schools.ie and www.education.ie/

¹⁰ www.universityofgalway.ie/ and www.atu.ie/

Load Component	Elements	Commentary
Industrial Load	Licenced Industrial Load	A review of existing Section 16 Licences IPC (Integrated Pollution Control) licences, and IED (Industrial Emissions Directive) licences (including S99E consents) was carried out based on information obtained from UÉ and the EPA website. Furthermore, information from a recent Trade Effluent Estimates study completed by UÉ Wastewater Source Control was also obtained and reviewed. From the information obtained there are 116 licenced premises with permission to discharge to the sewer within the GWS Study Area. Where organic loading was not specified in the licence assumptions were made based on the type of industry.
	Unlicenced Industrial Load	As part of the assessment, a list of potential unlicenced premises within the agglomeration was identified and certain premises were flagged as potentially having a trade discharge based on the nature of their business/ industry. Information and data on standard Emission Limit Values (ELVs) and, organic concentrations based on sector was received from UÉ Wastewater Source Control which was then used to estimate the max organic loading for each flagged industry. To avoid overestimating the future demand attributed to unlicenced loads, and to reflect uncertainty about when these demands would actualize, only 60% of these calculated unlicenced loadings were applied in the estimate for the 2030 horizon, but 100% of the calculated loadings were applied for the 2055 and 2080 horizons.
	Commuter Load	Given the high number of workers commuting into Galway City, an assessment of the domestic element of industrial premises (licenced and unlicenced) from staff/ workers working outside the agglomeration was completed as part of the GWS. An assessment against the unlicenced and licenced Industrial load was undertaken to ensure that there was no double counting of the associated load. For the purposes of assessment, commuter figures from 2022 CSO data ¹¹ were used to establish a net surplus percentage of workers traveling into the city from outside the agglomeration.

¹¹<https://www.cso.ie/en/releasesandpublications/ep/p-cpp7/census2022profile7-employmentoccupationsandcommuting/commutingtowork/>

2.1 Summary

A summary of the base year agglomeration and settlement loadings and their spatial distribution within the study area is presented in Table 2-2.

Table 2-2: Base Year 2022 Load Summary in Population Equivalent (PE)

Load Element	Galway City	Oranmore	Bearna	Athenry	Claregalway	Moycullen	Furbogh	Clarinbridge	Craughwell	Kilcolgan
Domestic	97,260	6,866	1,426	4,919	1,658	2,152	1,180	919	1,081	164
Commercial	14,120	1,014	210	765	249	340	139	145	171	26
Institutional	10,768	521	40	613	734	158	44	129	230	138
Industrial	9,269	2,140	0	259	15	-	-	-	-	-
Total Load (PE)¹²	131,500	10,600	1,700	6,600	2,700	2,700	1,400	1,200	1,500	400

¹² Figures are rounded

3. Growth Methodology

Our growth methodology, projections, and illustrations address three distinct scenarios within this section. Initially, we consider historical growth within the study area and the preceding two decades leading up to our 2022 baseline year to provide essential context for future projections. A lower bound and upper bound estimate of population growth is presented using nationally published projections and growth rates and with alignment with UÉ asset standards. The projections highlight uncertainties inherent in long-term forecasting over a fifty-year period but provided necessary data and context to inform the option development process.

3.1 Unserviced Areas

Several areas on the outskirts of the Study Area, including Furbogh, Clarinbridge, Craughwell, and Kilcolgan, are currently not serviced by UÉ public wastewater collecting and treatment systems. These locations are currently classified under the rural remainders section of the County Development Plan core strategy, which reflects a relatively low growth rate according to existing targets. 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.

3.2 Historical Population Growth

A review of Census data in the two decades since the National Spatial Strategy (from 2002-2022) was undertaken to ascertain the population trends over this period for the agglomerations / settlements within the study area. The results of the analysis are provided in Figure 3-1 and results from the decade (2011-2022) are used to provide context for the growth projection estimates.

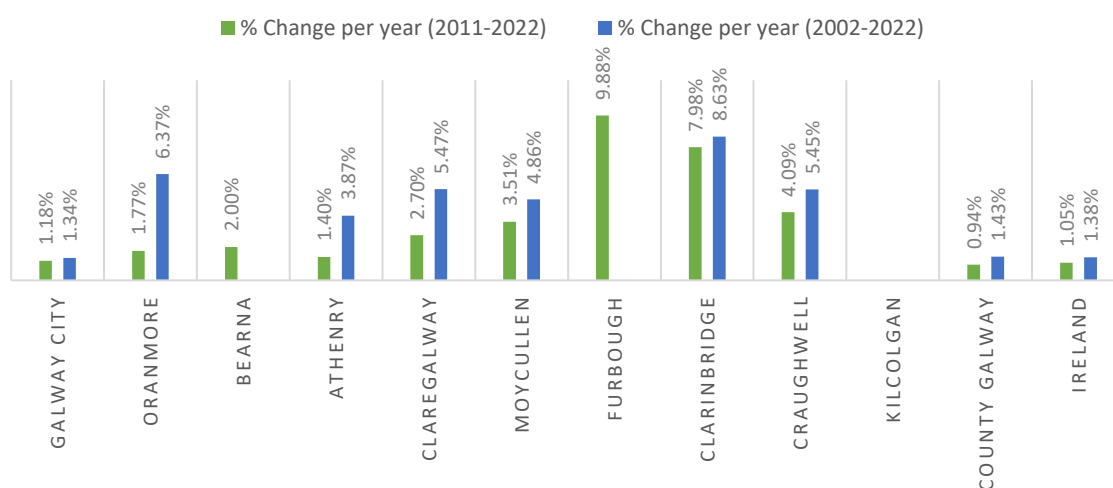


Figure 3-1: Historical Population Growth from CSO Census Data (2002-2022)¹³

¹³ Full period census data was not available for Baerna, Furbough and Kilcolgan.

Since the introduction of the National Spatial Strategy in 2002, Greater Galway has experienced population growth and economic investment, particularly in settlements surrounding Galway City which has outpaced development at a national level. Galway City has grown at a rate that is consistent with national trends during the period.

3.3 Annualised Growth Rate Projections

IW Wastewater Asset Planning – Growth and Headroom Technical Guidance Note stipulates that the growth for an agglomeration should be estimated by applying a percentage uplift to the domestic, commercial, and institutional components of the current agglomeration load. **The growth rate is not applied to the Industrial Load.**

A summary of the selected annualised growth rates for each agglomeration/settlement is presented in Table 3-1 and discussed further within this section.

Table 3-1: Annualised Growth Rates

	Galway City	Oranmore	Bearna	Athenry	Claregalway	Moycullen	Furbogh	Clarinbridge	Craughwell	Kilcolgan
2022 - 2029	3.29%	6.76% ¹⁴	4.75%	4.38%	8.12%	2.02%	0.26%	3.37%	3.37%	3.37%
2029 - 2031	3.29%	2.49%	2.49%	2.49%	2.49%	1.51%	1.51%	1.51%	1.51%	1.51%
2031 - 2040					0.84%					
2040 - 2055					0.73%					
2055 - 2080					0.22%					

Short Term Development (Up to 2031)

Galway City and Galway County Development Plan (DP) targets used to develop growth rates up until the end of the Development Plan periods (i.e. 2029). Urban Framework Plans (UFPs) for the Briarhill and Garraun areas were also considered for these growth projections. These UFPs set out the vision, principles and framework that will guide the orderly and sustainable development of high-quality compact growth in these areas. The allocation for Garraun has been accounted for in the growth rates established for Oranmore, however, it has been assumed that the Briarhill load is already accounted for within the RSES growth rates. Between 2029 and 2031 additional growth was projected to ensure RSES Galway City and Metropolitan area targets up to 2031 were considered. Due to the granularity of the available projections these have been spatially distributed across the study area during this time period.

Short to Medium Term Development (2031-2040)

¹⁴ Allows for the CDP Core Strategy allocation for Garraun

Regional Spatial and Economic Strategy (RSES) and National Planning Framework (NPF) targets up to 2040 were used for this period. Since a large proportion of the study area falls within the Galway Metropolitan Area Strategic Plan (MASP), it was agreed to apply the same growth rate of 0.84% for all areas based on the established city 2040 targets.

Medium to Long Term Development (2040-2055)

During this period, CSO 2051 projections were utilized and extended through to 2055. It should be noted that the rate applied (0.73%) represents the average across six scenarios outlined in the projections, and exceeds the figures provided in Eurostat 2100 projections.

Long Term Development (2055-2080)

During this period, the Eurostat 2100 (2031-2080) projected growth rate of 0.22% was utilized. According to Eurostat 2100, a nationwide population decline is anticipated between 2060 and 2100. This rate is significantly lower than both the historical growth observed to date and the projections for 2025 to 2055. As the projection period comprises a substantial portion of the Strategy's design horizon, it leads to a more gradual plateauing of growth in the latter half of the forecast. The selection of the 2031-2080 timeline from Eurostat serves as a prudent, conservative basis for infrastructure planning. It is important to consider this factor when monitoring the Strategy in the future, given the inherent uncertainty associated with projecting population estimates over such an extended period.

3.4 Upper Bound Estimate - Alignment to National / Regional Growth Strategies and UÉ Asset Standards

This section details the sources and consultation that was undertaken to project the population and loading estimates for each agglomeration up to 2080 design horizon. It should be noted that the **projections were undertaken and consulted in 2024**, therefore do not consider any developments in the interim period.

The growth assessment for the GWS aligns with key policy documents, including:

1. Development plan population targets,
2. NPF¹⁵ and RSES projections¹⁶,
3. Long-term growth forecasts based on Central Statistics Office¹⁷ and Eurostat 2100 projections¹⁸.

Furthermore, consultation was sought with the following key stakeholders and all information obtained was accounted for as part of the growth assessment:

¹⁵ [National Planning Framework 2040](#)

¹⁶ [Regional Spatial and Economic Strategy](#)

¹⁷ [Central Statistics Office Population and Labour Force Projections](#)

¹⁸ [Eurostat Population Projections](#)

- Galway County Council;
- Galway City Council;
- Land Development Agency;
- Health Service Executive (HSE);
- Industrial Development Agency (in relation to significant industrial development);
- Higher education institutions.

A substantial body of additional sources were examined in relation to:

- Development trends, as may be influenced by Regional Spatial and Economic Strategies (RSES);
- Population projections (Central Statistics Office) and Economic and Social Research Institute (ESRI);
- Development Plans aligning with RSES population targets;
- Eurostat 2100 Projections for Ireland;
- National Planning Framework (NPF) projections.

Estimates were guided by development policies, zoning maps, land use plans, masterplans, and other provisions outlined in the Galway City and County Council Development Plans. The projected loadings have been spatially distributed across the Study Area for each time horizon,

Given the inherent uncertainties in growth projections, these forecasts will be periodically reviewed as part of the GWS monitoring programme and updated as needed. For instance, changes in policy documents may necessitate changes in the projected loadings which cannot be reasonably foreseen at this stage.

All recommended network infrastructure will be designed to be flexible and adaptable to potential variations in growth and corresponding flow rates. Furthermore, the selection of infrastructure such as WWTP sites will involve separate, detailed appraisals to identify suitable locations that support modular expansion or capacity reduction as appropriate, in line with strategy recommendations. This approach ensures adaptability to any changes in growth projections identified through the ongoing strategy monitoring programme.

3.5 Lower Bound Estimate – CSO and Eurostat Projections

For each agglomeration a lower bound estimate was used (0.86%) based on CSO 2057 projections up to the year 2055. From this year onwards the same Eurostat projection for the upper bound estimates (0.22%) for 2031-2080 period was used.

3.6 Industrial Development Agency (IDA) Strategic Sites

Within the 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 estimated future wastewater loading expressed as PE at each IDA site is listed in Table 3-2, with these loadings incorporated into the current Mutton Island projections for the purpose of developing strategic options. The

future wastewater loads were calculated by assuming full build out of zoned industrial land and applying the existing PE loads for those areas.

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.

A segment of the Athenry IDA site has recently undergone development by a major multinational corporation, and the permitted load from this facility is accounted for in Athenry projections cothrough to 2040.

The effects of the IDA-related loadings are summarized and presented both separately and graphically in Section 0, providing clear differentiation of their potential impacts from those associated with population, commercial, and institutional growth, including relevant headroom allowances within the respective agglomerations.

Table 3-2: IDA Load Summary

Site	PE
Parkmore	3,870
Oranmore	24,030
Athenry	31,710
Total	59,610

3.7 Headroom for Wastewater Treatment Plant 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. This approach was adopted due to the extended projection period to ensure there will be adequate resilience in the WWTPs over the horizon of the Strategy.

Future horizon projections include a headroom of 15% for WwTPs outside of the Galway City agglomeration and 20% for the WwTP within Galway City. 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.

The consideration of headroom is important because it provides long-term resilience capability for the following reasons:

- **Compliance protection** — more headroom means the plant can absorb some unexpected variations in load, storm flows or seasonal peaks and achieve license requirements.
- **Growth planning** — utilities can use headroom to facilitate some of the inherent uncertainty associated with growth projections.

- **Operational resilience** — low headroom means the plant is running close to its operational limit, thereby reducing downtime for service and maintenance, which raises the risk of plant outages.
- **Investment planning** — when headroom approaches zero capacity, upgrades (aeration, tanks, media, process changes) are usually required.

It should be noted that this headroom allowance has been applied to domestic, institutional, and commercial wastewater loads projected at the key strategy horizon of 2040, with industrial loads excluded from headroom allowances. Prior to 2040, certain agglomerations may experience a reduction in headroom capacity until strategy recommendations have been fully implemented.

3.8 Short Term Considerations

An assessment of new dwellings constructed between the time of the last census (2022) and the time of writing the strategy was completed to determine if the projections allowed for in the Strategy are on track with expectations, albeit at least in the very short term. To facilitate this assessment, the Housing Delivery Tracker¹⁹ published by the Department of Housing, Local Government and Heritage as well as quarterly statistics / interactive mapping on new dwelling completions in 2024 as published by the Central Statistics Office²⁰ were primarily used.

The increase in population per year using the annualised growth rates detailed within this section is substantially higher than the figures detailed from recently newly completed housing developments. Therefore, it has been determined that **no additional population loading** is required to be added to future loadings to account for these new dwellings and that the upper bound estimate and lower bound estimates are reasonable.

¹⁹ ([Housing Delivery Tracker \(arcgis.com\)](#))

²⁰ (<https://www.cso.ie/en/releasesandpublications/ep/p-ndc/newdwellingcompletionsq12024/>)

4. Growth Estimate Results

Throughout this section we will present and discuss a series of figures that represent the growth projection estimates for the agglomerations within the study area. The following colour coding is used to represent the methodology discussed in the previous section:

- Green Line - historical growth rate from 2011 to the 2022 base year
- Yellow Line – the lower bound estimate using the CSO 2057 and Eurostat precautionary projections
- Blue Lines – a series of graduated blue lines (from dark to light) represent the upper bound estimate with the relevant offsets to represent the introduction of headroom and IDA at the envisaged time horizon. As the IDA has only been applied to the Mutton Island agglomeration it only appears on this agglomerations figure.

4.1 Mutton Island (Galway City) Projection Estimate

Mutton Island treats the wastewater from Galway city and outlying areas within Galway County, including the villages of Oranmore to the east and Bearna to the west. Wastewater is conveyed to Mutton Island WWTP which is accessed via a manmade causeway which extends 900m from the mainland. The WWTP collects and treats domestic and commercial sewage as well as surface water from both combined and separated sewer systems. The primary discharge from the WWTP is to the Corrib Estuary, approximately 400 metres south of the WWTP Site via a sea outfall.

Mutton Island WwTP was constructed and commissioned in the second half of 2003 with a capacity of 91,600PE. The plant was then upgraded in 2016 to treat a peak loading of 170,000PE.

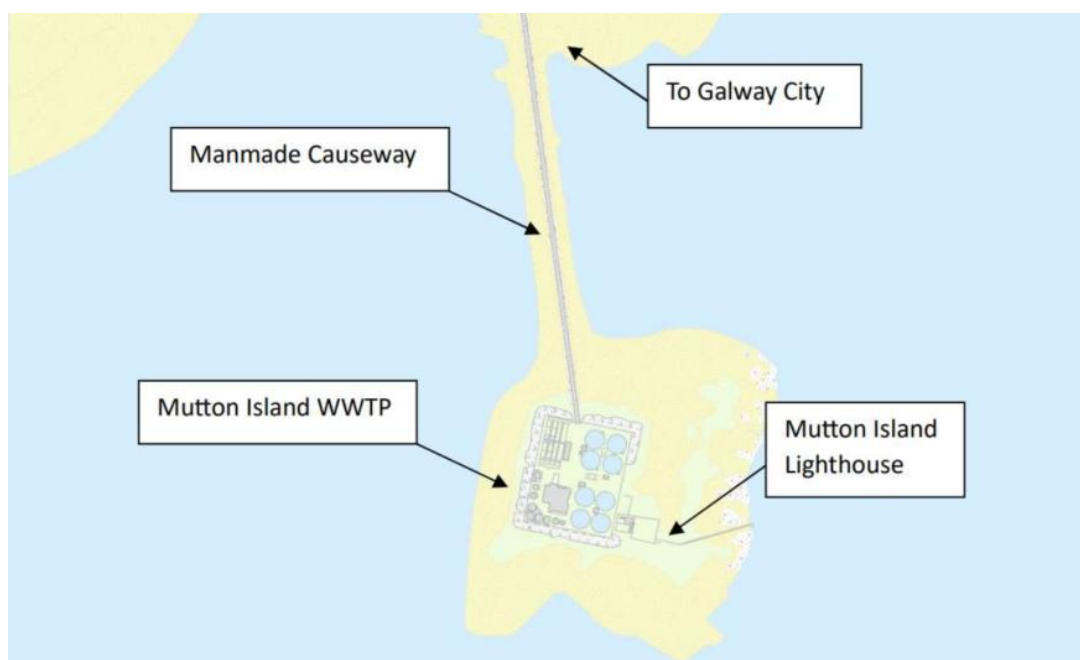


Figure 4-1 Mutton Island Wastewater Treatment Plant Location

The latest Annual Environmental Report (AER) at the time of writing was the 2024 Report²¹ for Galway City (D0050-01) indicates that the peak load collected was 142,911 PE.

Table 4-1 AER Report Summary - Galway WWTP

Galway WWTP	
Organic Capacity (PE) – As Constructed	170,000
Organic Capacity (PE) – As Collected Load (peak week)	142,911
Organic Capacity (PE) - Remaining	27,089
Will the capacity be exceeded in the next three years? (Yes/No)	No

Figure 4-2 illustrates the future population estimate for the Mutton Island agglomeration as described in the methodology section.

Short Term (2040)

The analysis indicates that the population in the GWS (at the time of writing the report) aligns with the lower bound estimate. The population projections from the 2022 baseline were cross checked against the Annual Environmental Report (AER) data from 2024, and further reviewed against completed dwelling assessments from 2024¹⁹. Furthermore, it suggests that, in the absence of a capacity upgrade, Mutton Island WWTP is projected to reach its operational limit by 2040. If housing development accelerates over the next 15 years at the rate specified in the RSES, the facility's capacity may be exceeded before 2040 unless capital investment is undertaken.

Should the projected IDA load (which would be additional to the projected population growth) be connected prior to 2040, it would place considerable strain on the treatment capacity at the WWTP unless appropriate measures are implemented to minimise the impact.

Medium to Long Term (2040 onwards)

Based on upper bound projections, the estimated growth for this agglomeration from 2022 to 2080 indicates an increase of over 200,000 PE, equating to a nearly 240% rise in capacity. Considering available headroom and IDA projections, by 2080 the wastewater treatment plant (WWTP) may exceed its design capacity by approximately 200% (180,000 PE) in the absence of Strategy intervention.

Even without IDA loading and only considering headroom allowance, by 2080, the wastewater treatment plant (WWTP) may exceed its design capacity by approximately 170% (120,000 PE).

Growth forecasts for Galway City through 2080 suggest continued expansion, with Oranmore and Bearna also projected to grow as a result of increased residential development, economic activity, and enhanced transport links. Should growth exceed expectations, the total wastewater generated across these settlements will place greater demand on the existing collection and treatment infrastructure.

²¹ [Annual Environmental Report 2024 Galway City](#)

The projected growth for Mutton Island highlights a considerable investment requirement and emphasizes the need for timely action within the Strategy's option development process.

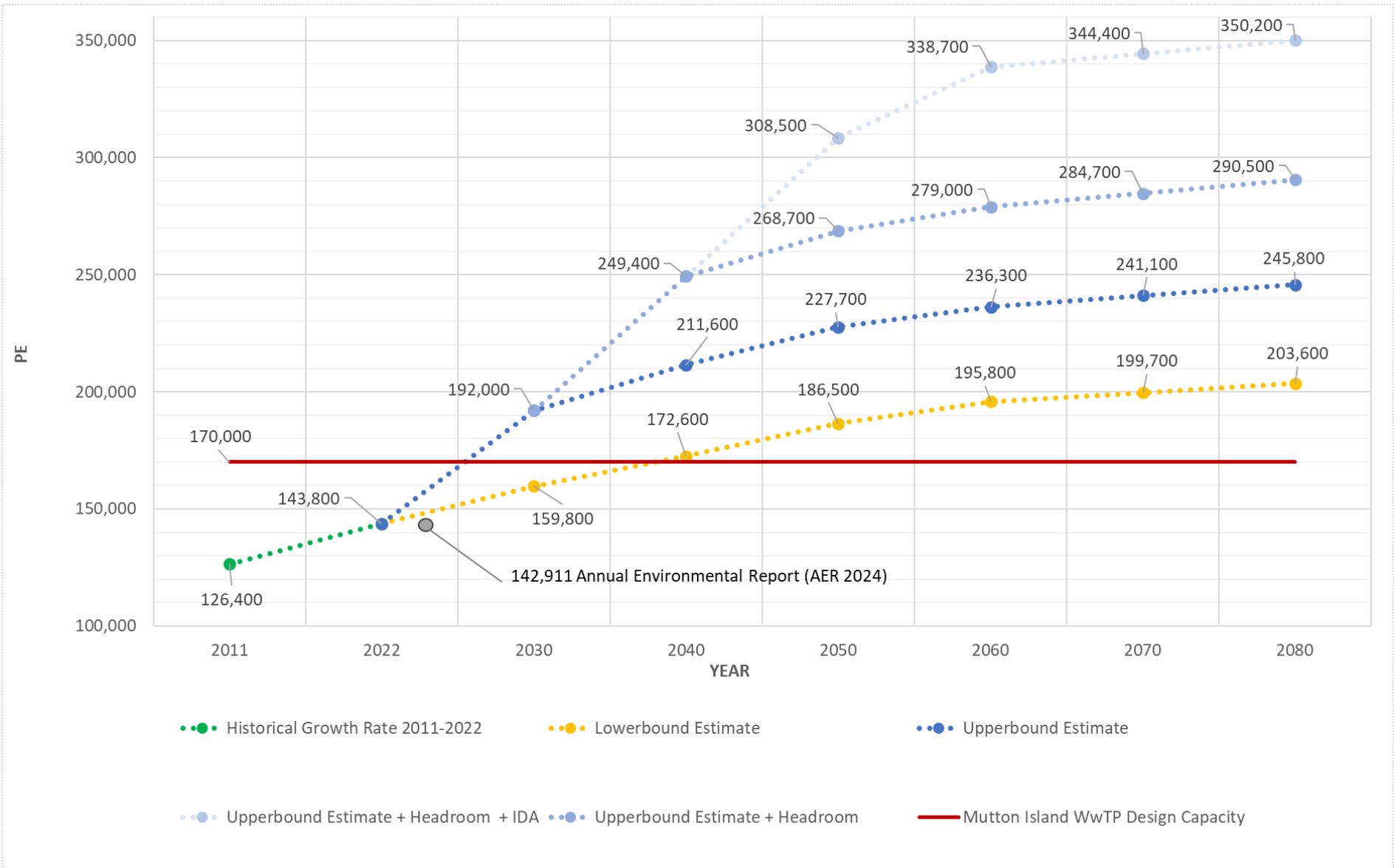


Figure 4-2 Mutton Island WWTP (Galway City, Oranmore and Bearnra) PE Projection

4.2 Athenry Projection Estimate

Athenry is a town located approximately 22km east of Galway City and situated on the River Clarin. The WWTP discharges effluent to the adjacent River Clarin. The original WWTP consisted of a single wastewater treatment stream which was designed to cater for a maximum design PE of 2,500. Upgrades were completed in 2005 which increased the capacity up to approximately 3,500PE, a second stream was installed in November 2009 that increased the total capacity to 6,000PE and finally, a third stream was installed in 2019 and included construction of new activated sludge process stream increasing the plant capacity up to 9,500PE.

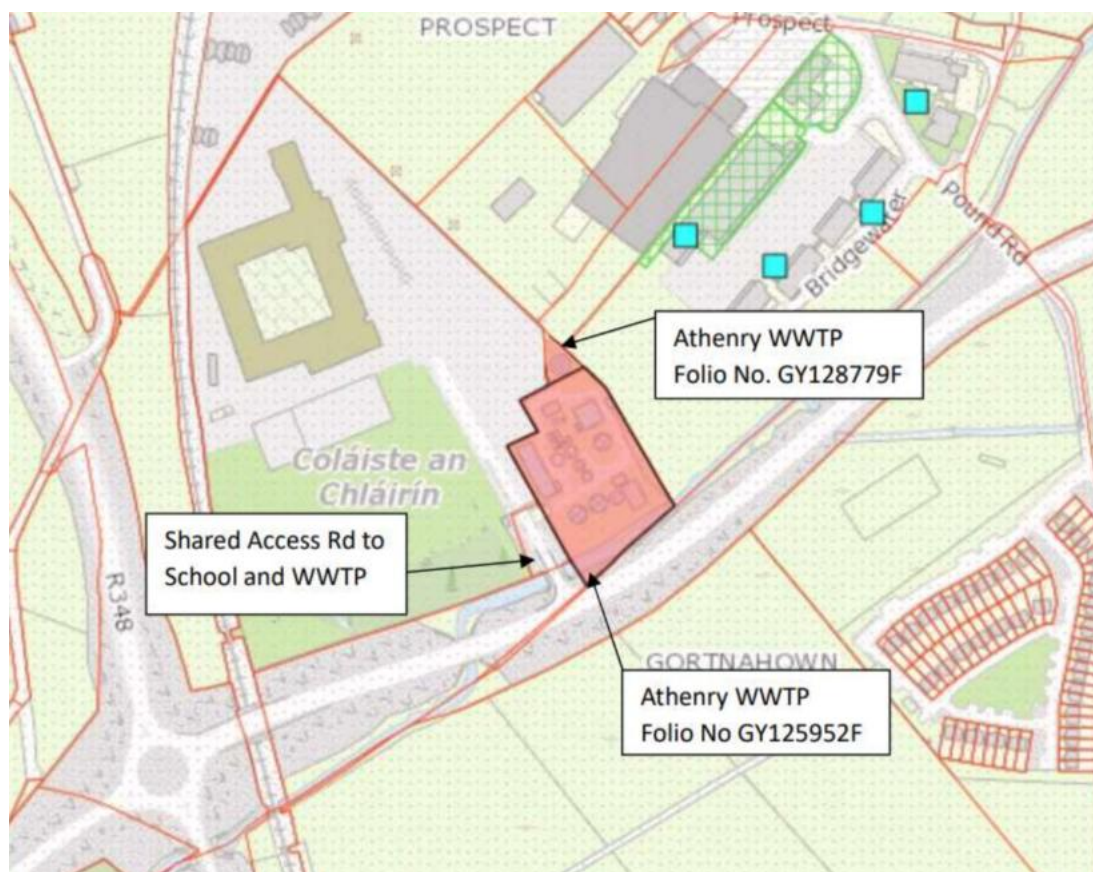


Figure 4-3 Athenry WWTP Site Location

The latest Annual Environmental Report (AER) at the time of writing was the 2024 Report²² for Athenry (D0193-01) indicates that the peak load collected was 6,206 PE.

Table 4-2 AER Report Summary - Athenry WWTP

Athenry WWTP	
Organic Capacity (PE) – As Constructed	9,500
Organic Capacity (PE) – As Collected Load (peak week)	6,206
Organic Capacity (PE) - Remaining	3,294
Will the capacity be exceeded in the next three years? (Yes/No)	No

²² [Annual Environmental Report 2024 Athenry](#)

Figure 4-4 illustrates the future population estimate for the Athenry agglomeration as described in the methodology section.

Short Term (2040)

The analysis highlights that the current population, based on the AER data and recent completed dwellings assessment, is tracking along the lower bound estimate also. However, should housing development accelerate within the next 15 years at the rate outlined within the RSES, Athenry's capacity may be exceeded before 2040 without some form of capital intervention.

Medium to Long Term (2040 onwards)

Based on the lower bound estimate, Athenry is unlikely to exceed its capacity if this trend continues until 2060. However, since this estimate does not factor in headroom allowance, a more cautious evaluation would suggest that capacity issues may arise between 2030 and 2060 unless capital investment is undertaken.

Based on upper bound projections, the estimated growth for this agglomeration from 2022 to 2080 indicates an increase of approximately 7,200 PE, equating to more than 200% rise in capacity. Considering available headroom, by 2080 the wastewater treatment plant (WWTP) may exceed its design capacity by approximately 45% (4,300 PE) in the absence of strategy intervention.

The anticipated IDA load at Athenry is assessed as being directed to the Mutton Island network. Should the projected load of approximately 30,000 PE materialize, this would necessitate nearly a threefold expansion of the current Athenry WWTP capacity if routed to the existing network. Given the sensitivity of the receiving watercourse, it was considered advisable to exclude the IDA projections from the Athenry agglomeration planning.

The anticipated growth in Athenry, alongside the environmental sensitivity of the receiving watercourse, underscores a pressing requirement for substantial consideration within the Strategy's option development process.

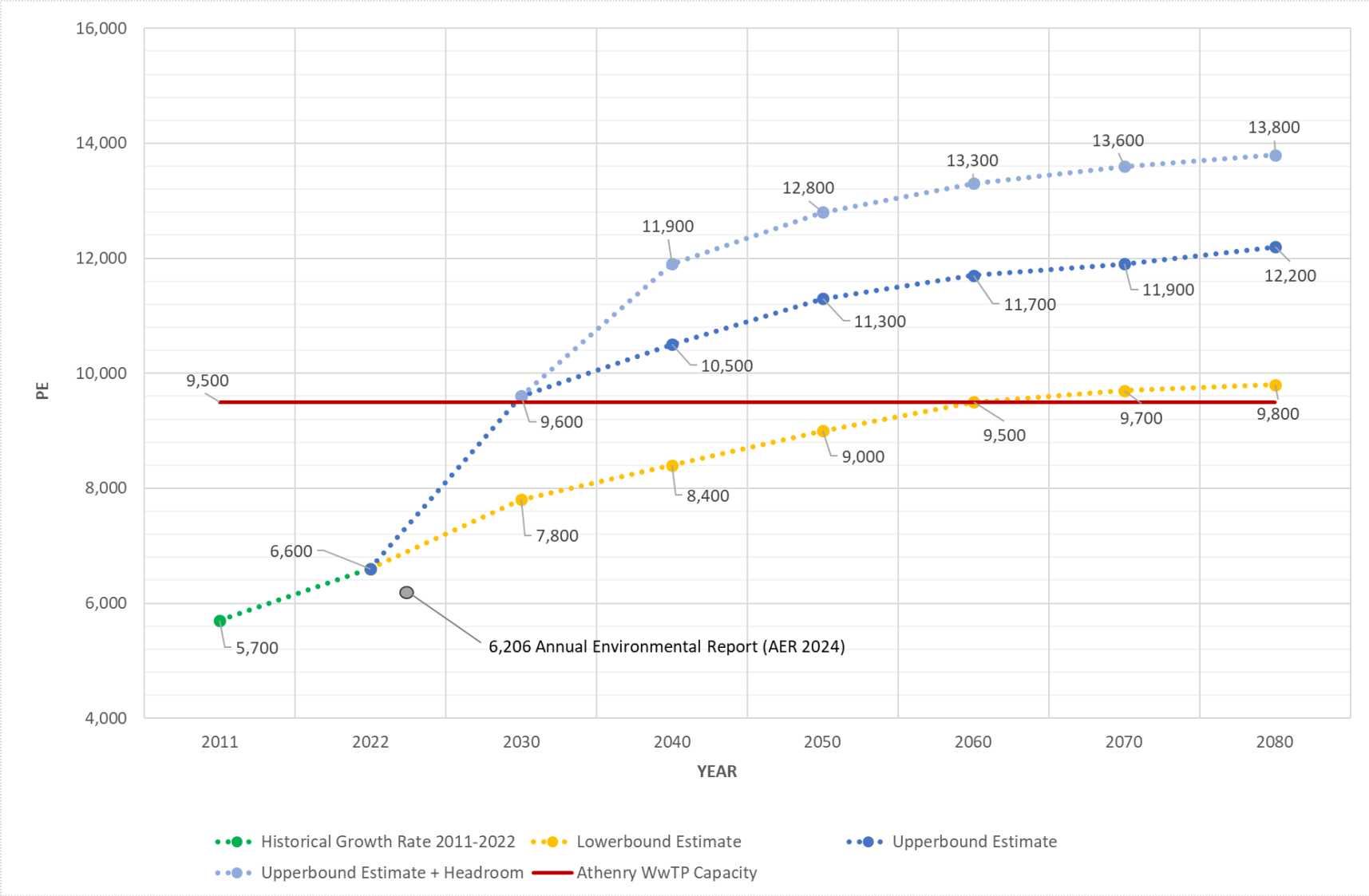


Figure 4-4 Atherny PE projection

4.3 Moycullen Projection Estimate

Moycullen is a village located approximately 10 km northwest of Galway City. The Moycullen WWTP is situated to the east of the village and treats domestic and commercial wastewater, as well as surface water from a combined sewerage system. The original WWTP was commissioned in 1986 with a design capacity of 500 PE. Subsequent upgrades carried out in 1999 and 2002 increased the plant’s capacity to 4,000 PE.

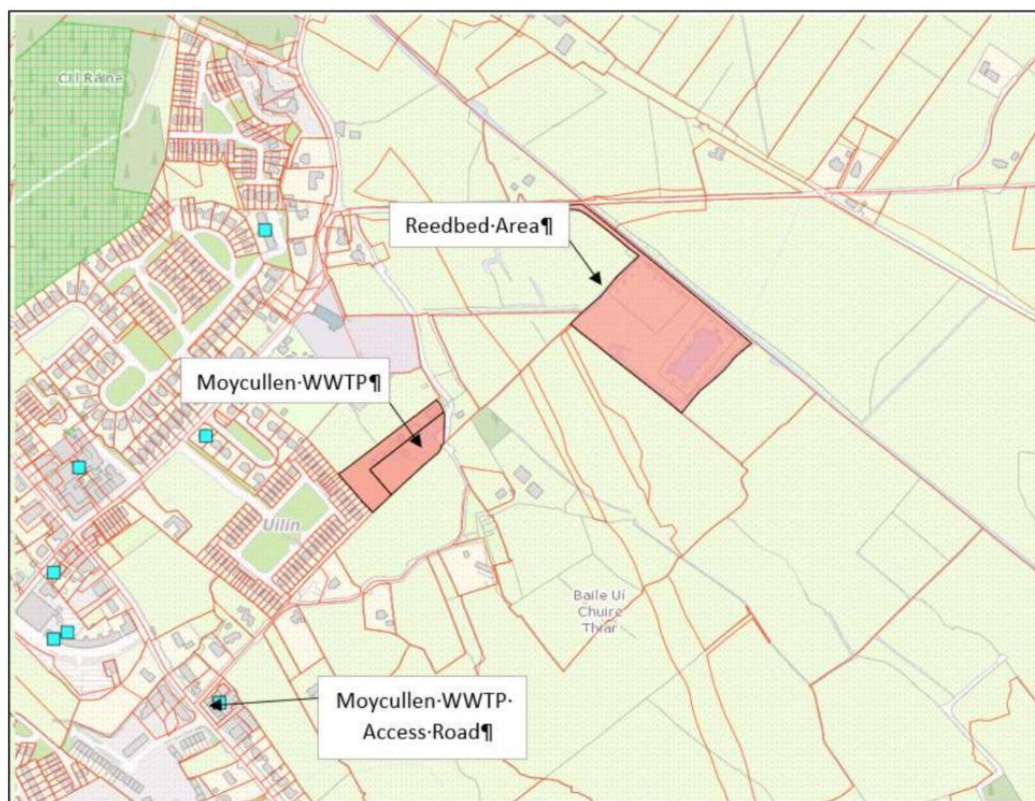


Figure 4-5 Moycullen WWTP site

The latest Annual Environmental Report (AER) at the time of writing was the 2024 Report²³ for Moycullen (D0191-01) indicates that the peak load collected was 2,490 PE.

Table 4-3 Treatment Capacity Report Summary - Moycullen WWTP

Moycullen WWTP	
Organic Capacity (PE) – As Constructed	4,000
Organic Capacity (PE) – As Collected Load (peak week)	2,490
Organic Capacity (PE) - Remaining	1,510
Will the capacity be exceeded in the next three years? (Yes/No)	No

²³ [Annual Environmental Report 2024 Moycullen](#)

Figure 4-6 illustrates the future population estimate for the Moycullen agglomeration as described in the methodology section.

Short Term (2040)

The analysis indicates that the current population, according to AER data and the recently completed dwellings assessment, is approximately 10% lower than the desktop estimates. Projections show there will be sufficient capacity at the WWTP through 2040, including allowances for headroom within this period.

Medium to Long Term (2040 onwards)

Taking both the upper and lower bound estimates into account, the existing WWTP is projected to have sufficient capacity through to the 2080 design horizon. The headroom allowance for this agglomeration has been conservatively set at 15%, indicating that without capital investment at the WWTP, capacity constraints may arise after 2040.

Based on upper bound projections, the estimated growth for this agglomeration from 2022 to 2080 indicates an increase of approximately 2,000 PE, equating to a nearly 170% rise in capacity. Considering available headroom, by 2080 the wastewater treatment plant (WWTP) may exceed its design capacity by 15% in the absence of strategy intervention.

While this projection does not indicate an immediate need for investment, it should nonetheless be taken into account during the development of options within the Strategy.

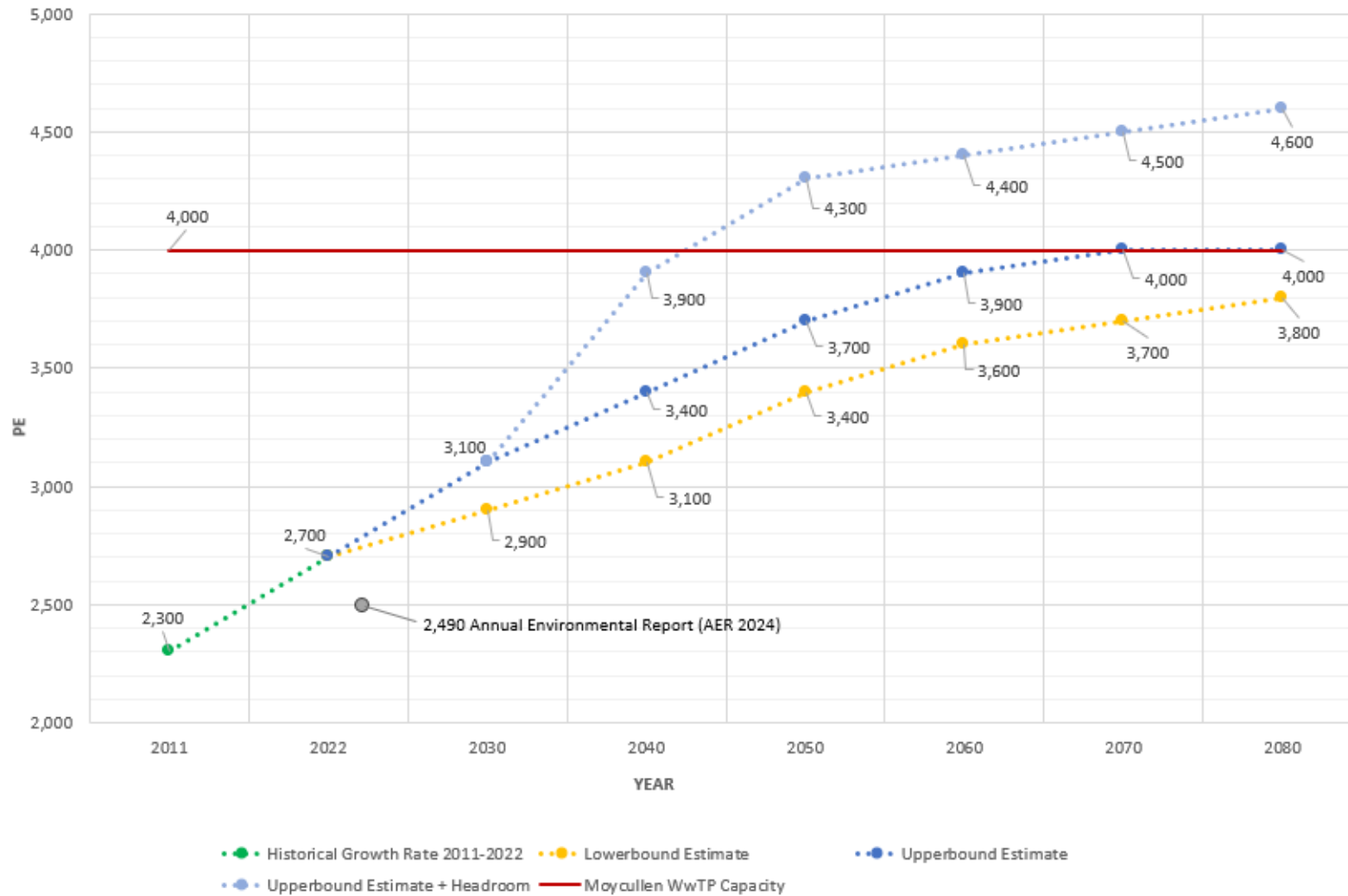


Figure 4-6 Moycullen PE projection

4.4 Claregalway Projection Estimate

Claregalway is a village located approximately 10 km northeast of Galway City, situated along the River Clare. The Claregalway WWTP serves domestic and commercial wastewater and is located west of the village. The facility was constructed in 2016 with a design capacity of 6,000 PE.



Figure 4-7 Claregalway WWTP site

The latest Annual Environmental Report (AER) at the time of writing was the 2024 Report²⁴ for Claregalway (D0543-01) indicates that the peak load collected was 2,408 PE.

Table 4-4 Treatment Capacity Report Summary - Claregalway WWTP

Claregalway WWTP	
Organic Capacity (PE) – As Constructed	6,000
Organic Capacity (PE) – As Collected Load (peak week)	2,408
Organic Capacity (PE) - Remaining	3,592
Will the capacity be exceeded in the next three years? (Yes/No)	No

Figure 4-8 illustrates the future population estimate for the Claregalway agglomeration as described in the methodology section.

Short Term (2040)

The analysis indicates that the current population, according to AER data and the recently completed dwellings assessment, is approximately 10% lower than the desktop estimates.

²⁴ [Annual Environmental Report 2024 Claregalway](#)

Projections show there will be sufficient capacity at the WWTP through 2040, including allowances for headroom within this period.

Medium to Long Term (2040 onwards)

Taking both the upper and lower bound estimates into account, the existing WWTP is projected to have sufficient capacity through to the 2080 design horizon. The headroom allowance for this agglomeration has been conservatively set at 15%, indicating that without capital investment at the WWTP, capacity constraints may arise after 2040.

Based on upper bound projections, the estimated growth for this agglomeration from 2022 to 2080 indicates an increase of approximately 4,000 PE, equating to a nearly 250% rise in capacity. Considering available headroom, by 2080 the wastewater treatment plant (WWTP) may exceed its design capacity by 14% in the absence of strategy intervention.

While this projection does not indicate an immediate need for investment, it should nonetheless be accounted for during the development of options within the Strategy.

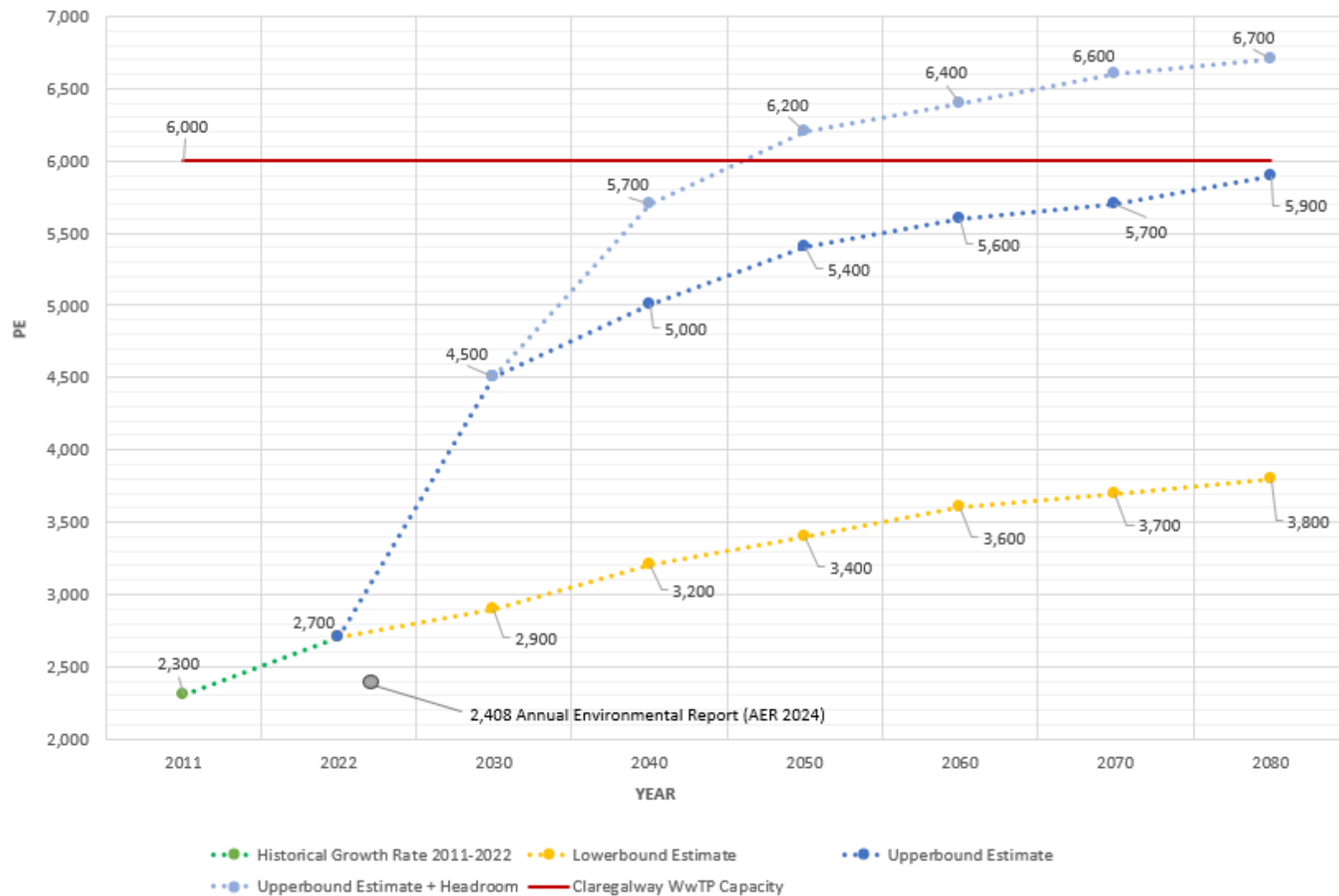


Figure 4-8 Claregalway PE projection

4.5 Unserviced Agglomerations

The remaining settlements, which include Clarinbridge, Kilcolgan, Craughwell, and Furbogh, are not presently connected to UÉ wastewater treatment plants (WWTPs). Nonetheless, the potential effects of these areas have been evaluated in anticipation of possible service by UÉ infrastructure in the future. Figure 4-9 provides a summary of the agreed drainage boundaries for each agglomeration and settlement incorporated in the GWS.

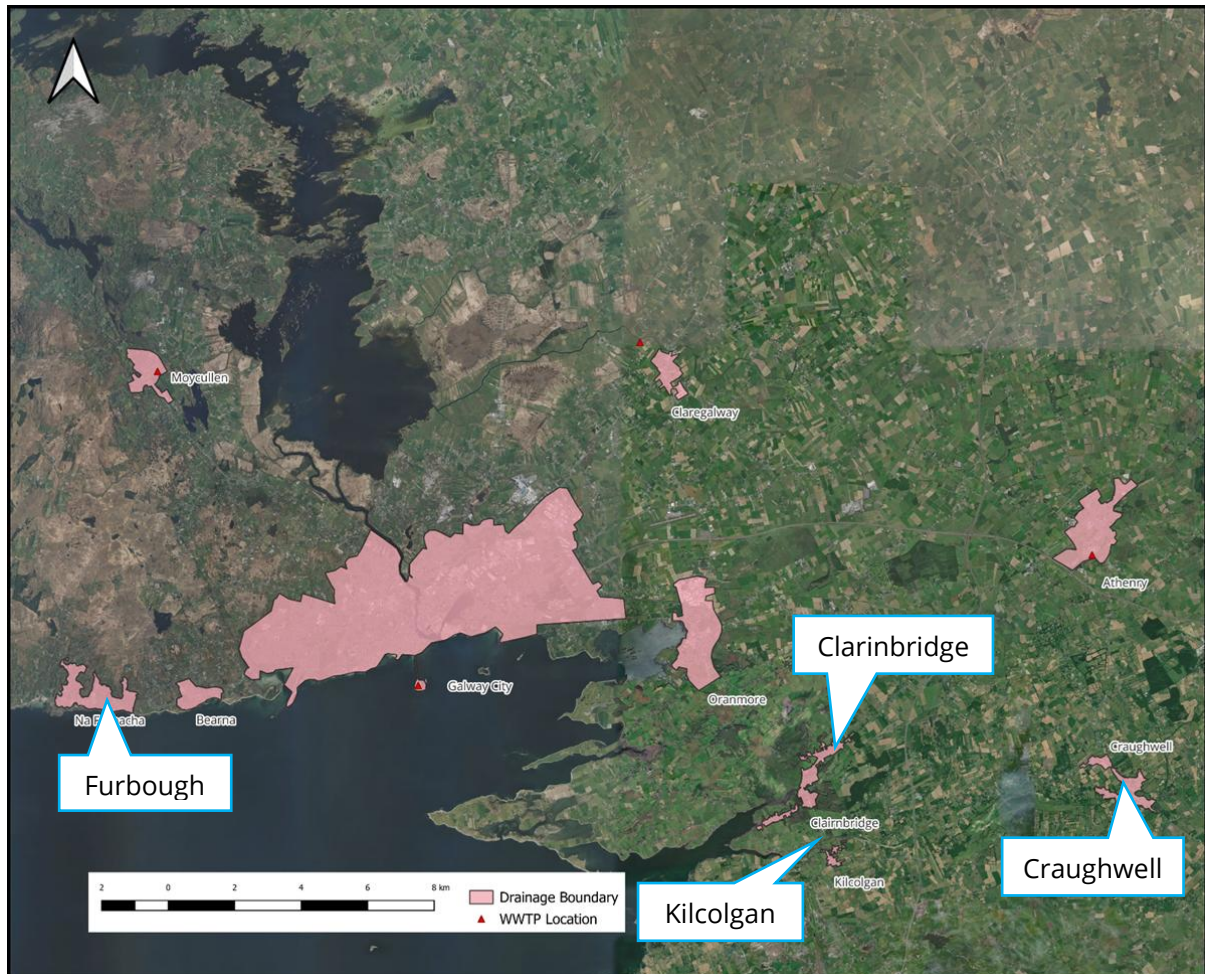


Figure 4-9 Unserviced Agglomerations

Figure 4-10 presents the projected population growth for each village over the duration of the Strategy. Collectively, these estimates indicate an additional 8,000 PE could be incorporated into the study area if such transfers occur during the strategy's implementation period. The potential impact of this preferred approach has been thoroughly assessed in the development of the Strategy options.

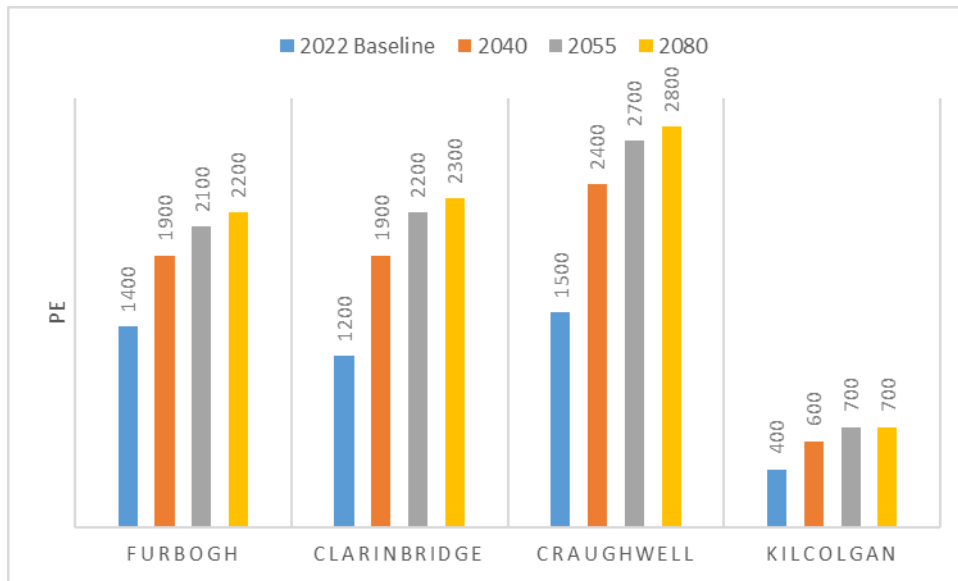


Figure 4-10 Unserviced Agglomerations Growth Projection Estimates

4.6 Spatial Distribution of Growth

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 LDA and local authorities.

Future growth enablers from the NPF have further informed the distribution, including:

- Regeneration projects to extend and intensify the City Centre, focusing on areas such as the Station, Docks, Headford Road, and Sandy Road;
- Infill and regeneration opportunities to enhance housing and employment in inner suburban areas;
- Sustainable development of new greenfield sites for housing and supporting infrastructure, such as at Ardaun;
- National water supply and wastewater projects to improve Galway's water supply and wastewater treatment capacity.

Projected loads were allocated to zoned land parcels based on their intended use (e.g., residential, commercial, community). Residential population densities were determined using Development Plan data, stakeholder input, and the 2024 *Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities* from the Government of Ireland. Trade and other loadings were distributed based on policy documents, stakeholder input, and UÉ's modelling standards. Figure 4-11 illustrates the spatial distribution of this load throughout the study area through 2080. The data indicate that growth density is predominantly concentrated in the eastern region of Galway City and the study area.

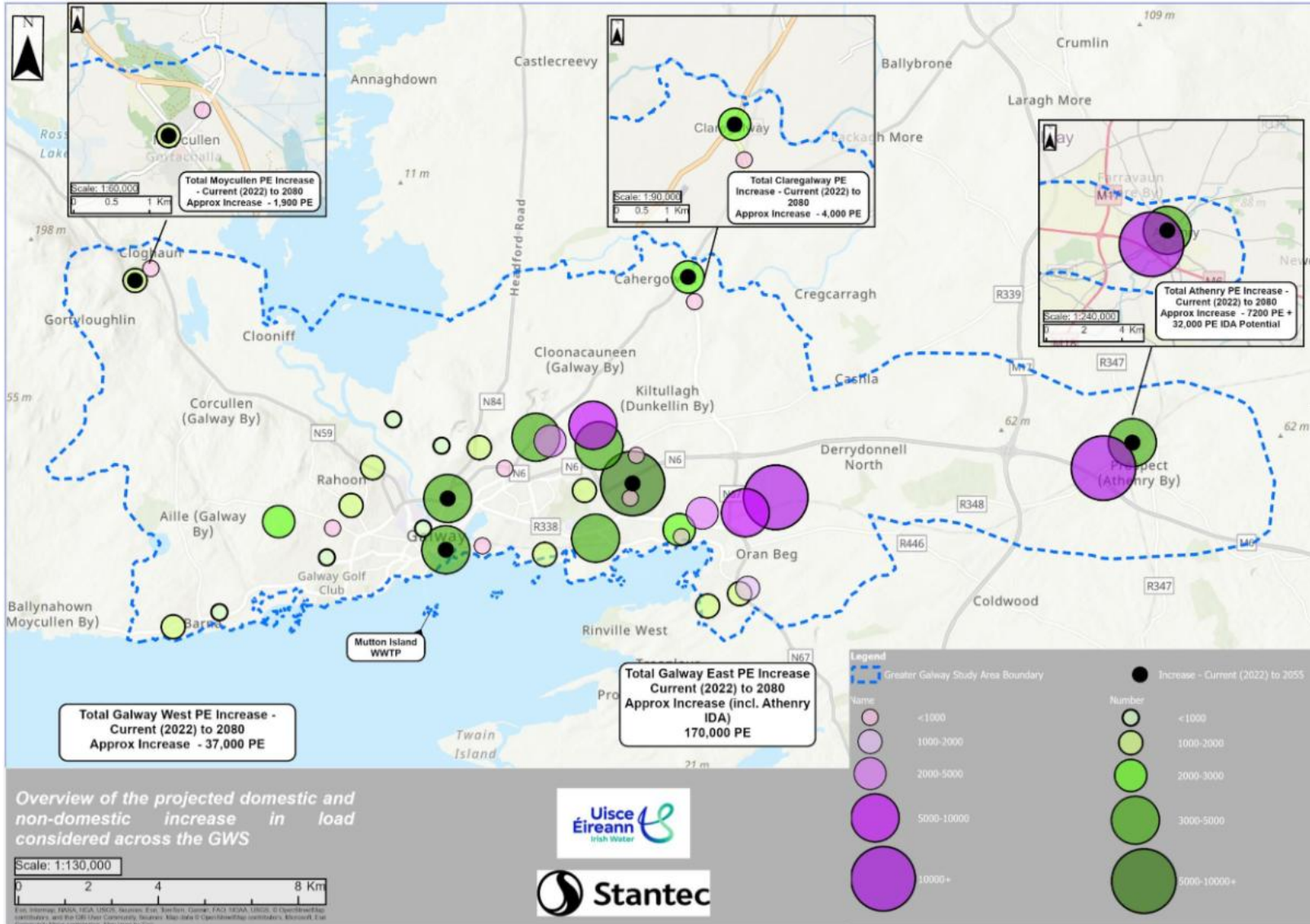


Figure 4-11 Spatial Distribution of growth across study area

5. Summary

This appendix evaluates future population growth and associated infrastructure needs within the Galway City study area up to 2080. It details how regeneration, infill development, and sustainable expansion of greenfield sites will drive growth, particularly in the eastern region. Overall, the total PE to be treated is forecast to increase to over double to around 383,000 by 2080 (Table 5-1).

According to upper bound estimates, the analysis suggests that, in the absence of intervention, 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.

Should it be decided to transfer the load into the study area, the four satellite villages - Furbogh, Clarinbridge, Craughwell, and Kilcolgan - are projected to contribute an additional 8,000 PE to the study area.

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

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 such as up to 2080. In practice, this means that infrastructure plans are designed to accommodate higher-end population estimates, ensuring resilience against unexpected demographic shifts. Many factors can influence population growth, such as national demographics, political stability, global economics and geo-political uncertainty. In line with Strategy recommendations, population projections should be re-visited in line with Strategy revision timeframes (i.e. every 5 years).

Table 5-1 Summary of PE per agglomeration and Strategy Horizon

Agglomeration	2022 Baseline	2040 Horizon	2055 Horizon	2080 Horizon
Mutton Island	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