

10

**CONCLUSIONS**

## 10.1 Introduction

Our Eastern and Midlands Regional Plan (RWRP-EM) is the first of four (4) regional plans that, along with our Framework Plan, form Ireland's first National Water Resources Plan (NWRP). The NWRP allows us to review all of our water supplies in a consistent way and to develop a clear approach to resolve any issues and to prioritise investment in water services over the short, medium and long-term.

In the development of the RWRP-EM Irish Water considered relevant government policy and legislation, and a range of external factors which have the potential to impact our water supplies. These include the effects of climate change, increased population growth, economic development and tighter drinking water and environmental standards. The resources planning process will enable Irish Water to support the sustainable development of our water resources at a regional and national scale.

The RWRP-EM has developed Plan Level solutions, known as Preferred Approaches, to address the Needs of the 134 Water Resource Zones (WRZs) within the Eastern and Midlands Region.

The purpose of the Plan is to allow us to understand the scale and type of transformation required across the entire public water supply in terms of achieving our Quality, Quantity, Reliability and Sustainability objectives for existing and future water users.

To understand the current state of our assets and its surrounding environment, the RWRP-EM reviewed the:

- External baseline across the Eastern and Midlands Region in terms of natural resources, population, growth and economic development, and impacts of climate change; and
- Internal baseline of our existing water supply asset base in terms of capacity and performance of supplies (abstractions and treatment plants) and efficiency of our distribution networks.

## 10.2 Baseline of the Public Water Supplies in the Eastern and Midlands Region

The existing water supply asset base within the Eastern and Midlands Region consists of 209 abstractions from groundwater and surface water sources, that feed 201 Water Treatment Plants (WTPs). On average 910 Ml/d of water is produced by these WTPs and fed into 134 stand-alone WRZs. The distribution network within the 134 WRZs consists of 19,000 kilometres of water mains. The existing WTPs and major interconnecting water mains are shown in Figure 10.1.

At present the Needs across the water supplies include:

- 75% of the supplies do not meet a 1 in 50-year Level of Service (LoS) in normal weather conditions.
- 82% of the supplies do not meet the LoS standards in drought conditions.
- 90% of supplies are associated with a 'high-risk' for one of our Barriers and therefore do not conform to the conservative Quality risk reduction standards we have set for ourselves as a water utility.
- Based on desktop assessments, 20 of our supplies may not be sustainable or resilient to climate change in the short to medium term.
- Efficiency of our current distribution networks in the region is poor, and it is estimated that 38% of the water that is passed through our watermains is lost through leakage.

We also face the challenges of:

- Facilitating government policy on growth and economic development; and
- Transforming our supplies to ensure that the entire public water supply is environmentally sustainable and adaptable to climate change.

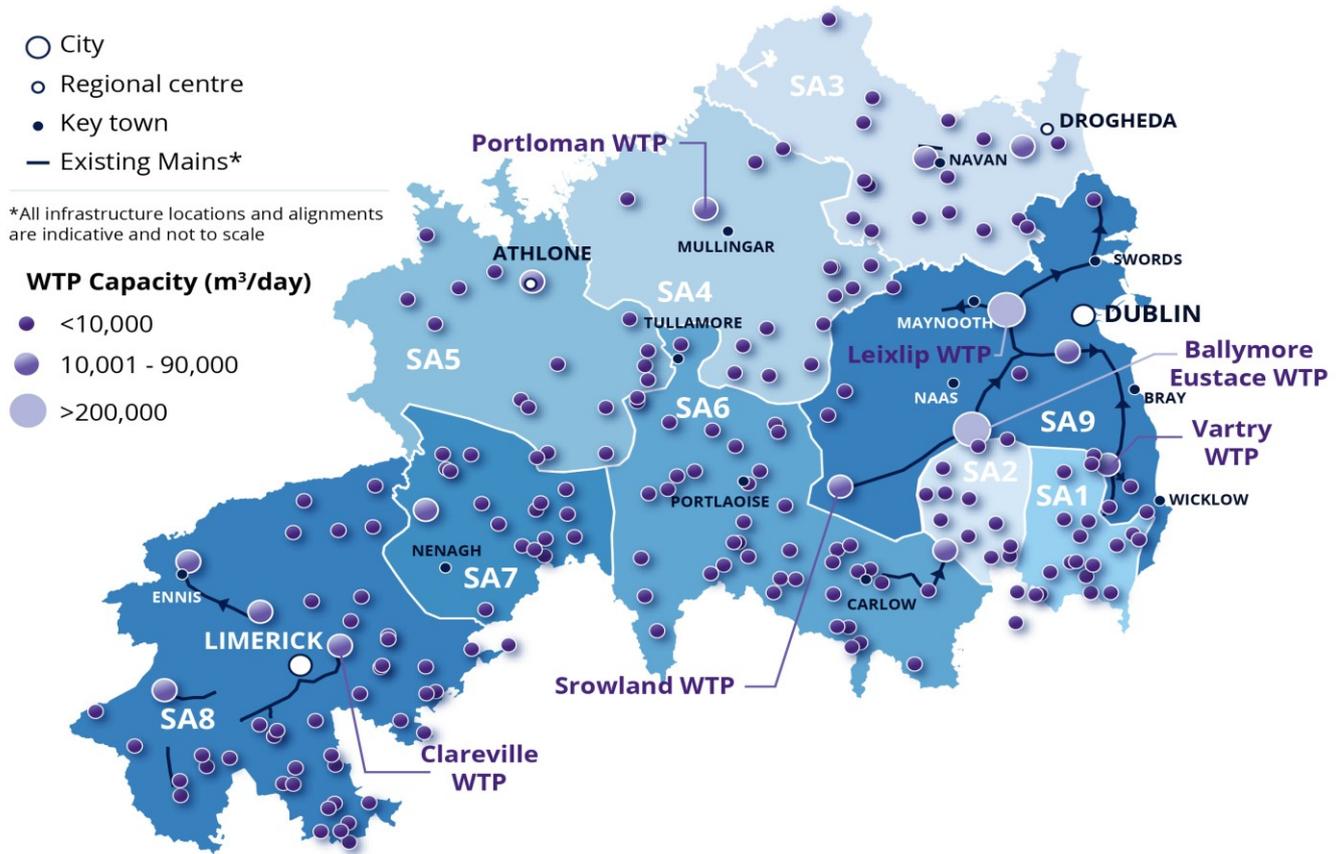


Figure 10.1 Existing Water Treatment Plants (WTPs) and Major Interconnecting Mains (Trunk Mains)

### 10.3 Plan Development

The purpose of the RWRP-EM is to identify the Preferred Approach and interim solutions we need to develop in order to transform our water supplies in the Eastern and Midlands Region over the short, medium and long-term. The Plan when delivered, will achieve the standards we set for ourselves in the Framework Plan, including:

- At least a 1 in 50 LoS, across all water supplies in all-weather scenarios including normal, dry, drought and winter conditions.
- Ensuring that the correct barriers are in place at all our sources, treatment plants and within our distribution networks, to ensure that risks to water Quality are reduced to an acceptable level.
- Ensuring that all of our supplies are environmentally sustainable and resilient to climate change.

To achieve this, as part of the RWRP-EM we reviewed over 1,132 Unconstrained Options to address the identified Needs, and progress to the options screening process adopted as part of the Framework Plan. We have developed Plan Level outline designs and costings for 594 Feasible Options.

The basis of the Feasible Options considered within the RWRP-EM is that they must be environmentally sustainable, feasible, promotable and deliverable. The Feasible Options developed are summarised in

Figure 10.2 below and cover a broad range of supply types including, groundwater, surface water, water transfers and desalination.

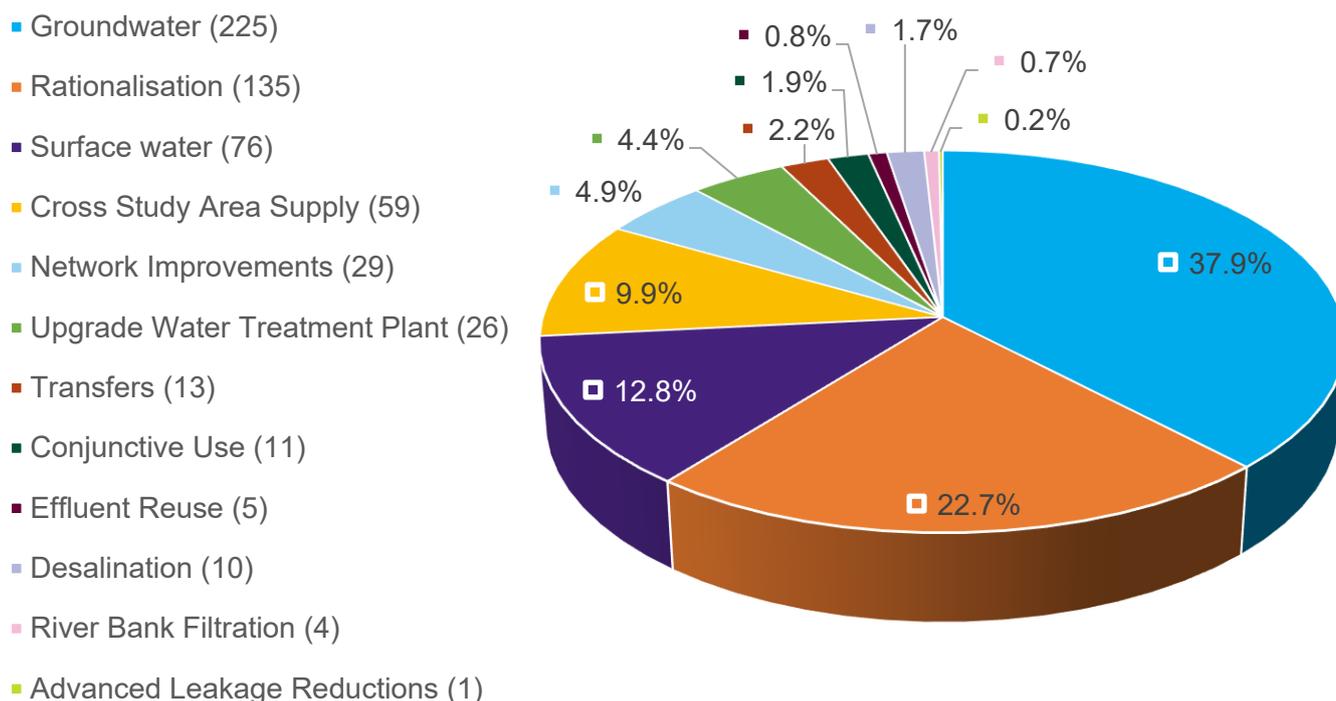


Figure 10.2 Feasible Option Types

We then assessed all the Feasible Options to develop the Preferred Approach for each WRZ.

The Feasible Options consisted of not only small options that were only suitable to address the Need in the immediate vicinity of each supply, but also larger regional options that could address Need across multiple supplies. The Preferred Approach is the Feasible Option or combination of Feasible Options that provide the best overall outcome for the supply in terms of the assessment criteria we set within the RWRP-EM. The criteria, as described in Section 7.2, aligns with relevant government policy.

Within the Approach Development Process for the Eastern and Midlands Region we applied the resources planning methodology (EBS – Economics of Balancing Supply and Demand) uniformly to rank and appraise the options. This provided a robust and transparent process to support the selection of a Preferred Approach that represents the best overall outcome against our assessment criteria. In other words, the Plan does not promote particular types of options. If a small local solution scores best against the Plan and policy objectives, encapsulated by the assessment criteria, our Approach Development Process would present this as the Preferred Approach. Similarly, if a larger Regional Option provided a better outcome across a number of supplies, it would be selected as the Preferred Approach.

## 10.4 Plan Outcome

As described in the RWRP-EM, when we applied the adopted resources planning methodology to the 134 WRZs in the Eastern and Midlands Region, the outcome was the Preferred Approach for addressing the identified Needs across the Eastern and Midlands Region. The Regional Preferred Approach consists of a combination of local water supply sources and regional solutions. These include:

- Reducing the number of WRZs in the Eastern and Midlands Region from 134 to 89.
- The development of larger interconnected WRZs for the urban areas in the region.
- Upgrades to 130 existing water treatment plants, in terms of size and barrier performance.
- 4 new water treatment plants (WTPs).
- Decommissioning 70 WTPs.
- Interconnecting 55 supplies via 970 kilometres of trunk mains.
- Reducing leakage to 22% of regional demand. This is achieved through, pressure management, active leakage control, find and fix and asset replacement.

The outcome of the Regional Preferred Approach, if all projects identified within it are delivered, is that:

- All 89 WRZ in the Eastern and Midlands Region can meet a minimum 1 in 50 LoS during normal, dry, drought and winter conditions.
- All WRZs will include appropriate barriers to mitigate against water Quality risk.
- All WRZ's will be resilient with improved environmental Sustainability.

These outcomes are further described in section 10.5.

## 10.5 Benefits of the Preferred Approach for the Eastern and Midlands Region

### 10.5.1 Reducing Quantity Risk

If all the options identified in the Regional Preferred Approach are delivered there will be no supply Deficit across the 89 WRZs that will make up the Eastern and Midlands Region. This means that, following implementation of the RWRP-EM, each WRZ will have enough water in supply (Water Available for Use) to meet peak water demand during all-weather planning scenarios (Normal Year Annual Average (NYAA), Dry Year Annual Average (DYAA), Dry Year Critical Period (DYCP) and Winter Critical Period (WCP)) at a 1 in 50 LoS. This achieves the objectives identified under Lose Less and Supply Smarter.

In the Eastern and Midlands Region this will be achieved via, two (2) large Regional Options including a transfer from the River Shannon, four (4) new water treatment plants, upgrades to existing WTPs to address capacity issues and 970 kilometres of new trunk mains (>300 mm diameter).

One of the large Regional Options, the New Shannon Source (NSS), in combination with nine (9) existing WTPs, will resolve identified Need across 37 WRZs.

Irish Water has also committed to leakage targets beyond the Sustainable Economic Levels of Leakage (SELL) (as outlined in Section 5). The additional targets will reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500 m<sup>3</sup>/day. Figure 10.3 shows the cities, regional cities, and Key Towns of the Eastern and Midlands Region (identified as part of the Regional Spatial and Economic Strategies (RSES) and the Local Authority Development Plans (LADP)), which will benefit the Lose Less Pillar (leakage reduction) of the RWRP-EM. There are a further 61 settlements in the region where

leakage will be reduced to 21% of demand. These settlements are listed in the Study Area Technical Appendices 1- 9.

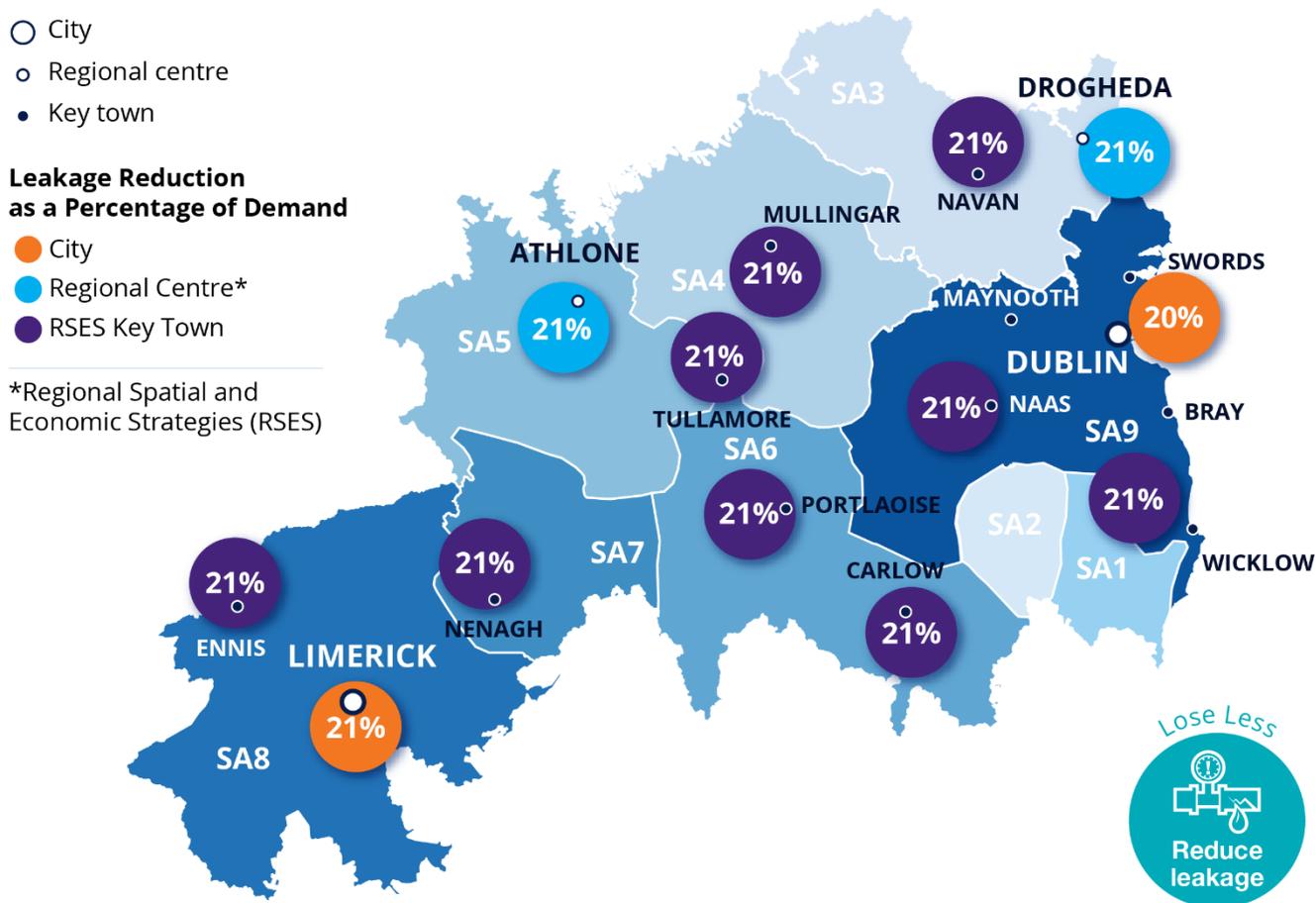


Figure 10.3 Leakage Reduction Targets for the Eastern and Midlands Region

Additional benefits of the Preferred Approach for the Eastern and Midlands Region include:

- Each supply will have the appropriate headroom and outage standards to ensure that we can provide a minimum 1 in 50-year LoS to water users.
- The two (2) new larger WRZs will allow us to balance peaking and headroom requirements across a larger baseline thus allowing us to manage extreme weather events and uncertainty in a more efficient way.
- As rainfall patterns typically vary across the country, connecting our supplies across the entire Eastern and Midlands Region reduces the vulnerability to drought events.
- Overall Quantity risk will also be reduced based on utilising appropriate sources for all supplies, enabling growth and economic development within the Eastern and Midlands Region and ensuring that the targets set by the Regional Assemblies and Local Authorities can be achieved.
- Provision of the 1 in 50 LoS to our customers will reduce the number of outages our customers would typically expect to experience and reduce the frequency of water conservation orders and hose pipe bans required.
- The reduction in leakage and improvement in efficiency across our networks, will result in lower water treatment costs.

## 10.5.2 Reducing Risk to Water Quality

Although, our compliance with the Drinking Water Regulations is over 99.1%, at present 90% of the 201 WTPs in the Eastern and Midlands Region have barrier or alarm deficits when assessed against the risk reduction standards we have set for ourselves as a utility. This means that, in some cases, the treatment assets do not have the capability to fully address Quality risks at all times; particularly after very heavy rainfall, where the raw water quality in our sources may deteriorate significantly for short periods of time.

Quantity and Quality risks are interrelated, as often water quality risks are caused or exacerbated by insufficient capacity in our water treatment plants. For example, having sufficient treatment capacity to allow us to take filters offline for essential repairs results in lower potential risks to water Quality. This is why peaking and outage allowances are included within the Supply Demand Balance and the design standards for future projects within the capital investment plans.

In addition to this, raw water quality can fluctuate significantly based on weather conditions in the natural environment. Controlling water Quality risk across a very large number of isolated supplies 24 hours per day, 365 days per year can be difficult. Therefore, larger water supplies, which allow for more focussed operational controls and monitoring can help address this risk. The effectiveness and efficiency of larger supplies with improved interconnectivity is evidenced in the majority of other EU jurisdictions, many of which have far fewer WRZs despite having larger populations. However, larger supplies are not the most appropriate approach in all circumstances and, where we have smaller supplies, selecting sources that are less susceptible to large variations in water quality with good source protection such as groundwater, can also assist in managing operational risk.

When the options identified in the Regional Preferred Approach are delivered there will be no barrier deficit at any of the WTPs in the Eastern and Midlands Region. Therefore, the risk of drinking water non-compliance or boil water notices will be significantly reduced.

In the Eastern and Midlands Region this will be achieved via delivery of four (4) new WTPs, and upgrades to 120 existing WTPs and decommissioning 70 WTPs. In addition to the capital works, source protection measures and development of full Drinking Water Safety Plans for each supply will allow for appropriate and continuous risk management in accordance with the requirements of the recast Drinking Water Directive.

Additional benefits of the Preferred Approach, in terms of water Quality for the Eastern and Midlands Region include:

- The new supply from the River Shannon referred to as “the New Shannon Source” or NSS. The NSS is the only Feasible Option identified as having sufficient supply to resolve multiple WRZs across different Study Areas. Its delivery will result in 82% of the population in the Eastern and Midlands Region being served via secure interconnected WRZs with nine (9) WTPs. This will allow for tighter management and operational controls over water quality, and investment can be concentrated and maintained on a smaller amount of infrastructure.
- The new interconnected Eastern and Midlands Region WRZs will provide 78% of the water supply to the Eastern and Midland Region in volumetric terms.
- The NSS, which can be delivered directly to the strategic reservoir network in the Greater Dublin Area, will ensure there is enough supply in the system to provide a 1 in 50 LoS to our customers. This will significantly reduce the risk of a boil water notice or a water outage.
- Expansion of the existing Limerick Regional WRZ to smaller vulnerable supplies in Limerick and Tipperary and Clare. As a result, 9% of the water supply in volumetric terms will be served via the Clareville WTP or augmented from that supply. The new WRZ will involve treated water storage, plant

shutdowns, provisions for outage, strategic network storage and drawdown and repairs for trunk mains, and operational balance for the existing supply for Shannon Foynes from the River Deel during drought periods.

- 8% of the remaining volume will be supplied by 71 WRZs utilising groundwater sources (including new, maintained and increased supplies) that have been selected based on water availability, sustainability, natural storage and stable raw water quality. The Preferred Approach for these WRZ will also involve appropriate source protection, treatment barriers and treated water storage specific to each WRZ. Therefore, the operational vulnerability of having a larger number of small supplies will be offset by utilising secure and stable sources.
- 5% of the remaining volume will be supplied via surface water sources (including new, maintained and increased supplies) to ten (10) WRZs. Given the smaller number of these WRZs it is anticipated that water quality risk can be managed using correct treatment barriers within the new and upgraded WTPs including appropriate plant shut down and strategic storage. In most cases, these non-interconnected surface water supplies have been selected as there is no groundwater availability in the area. However, as the Preferred Approach progresses towards Project Level, we will investigate whether there are further nature-based solutions that can improve the risk profile of these sources. An example of this would be to investigate the feasibility of an infiltration gallery or abstraction from riverbed gravels as an option on a standard intake. Such solutions can improve the stability of raw water, particularly after storm events.

### 10.5.3 Reliability and Sustainability

In the Eastern and Midlands Region, Irish Water currently abstracts from 209 different water sources and has 201 WTPs which collectively serve 2.48 million people or 60% of the national population; all of which need to be maintained and operated in a sustainable manner. Surface water abstractions make up 87% of the water delivered to customers, either from rivers or lakes, with the remaining 13% from groundwater sources. These surface water and groundwater interactions are an important consideration when identifying options to support increased water demands and in managing the water Quality we supply.

The lowest areas of rainfall across Ireland occur across the Eastern and Midlands Region. The counties of Louth, Meath, Dublin and Kildare experience the driest weather. The areas with lowest rainfall in the region have also the greatest population density, resulting in resources in the most populated areas being at risk of becoming stressed. Water supply reliability is further impacted by adverse weather conditions including storms, cold weather conditions and dry periods. Due to climate change it is likely that over time in Ireland we will encounter wetter and stormier conditions at certain times of the year, and prolonged dry periods at other times of the year. Therefore, the reliability and sustainability of our sources will become more reliant on appropriate storage in the natural environment over time.

Sustainability issues are also not just a result of climatic conditions. In Ireland, many of our water supplies were developed in a piecemeal manner over time, with water sources based on proximity to the populations they served. As towns and villages have grown in size over time, it has meant that some of these supply sources now have sustainability issues particularly in dry weather.

Under the Water Framework Directive (WFD), Ireland must ensure that all waterbodies achieve 'Good' status by 2027. In 2018 the Government published the General Scheme of the Water Environment (Abstractions) Bill 2018 (The Bill), to introduce abstraction licensing aligned to the WFD. This legislation will set the amount Irish Water can take from the water supplies that it abstracts water from. Irish Water lacks comprehensive data to fully understand the impact of the new legislation on many of its abstractions. Irish Water is building a telemetry system which will aid bringing all this data together (as it

was historically collected by individual local authorities), but this will take time. Therefore, improved monitoring and gathering better data is a priority.

On an interim basis, Irish Water has developed an initial desktop assessment based on available information. This conservative assessment is used to identify existing surface water sites where abstractions may exceed sustainable abstraction thresholds and also to identify sustainable future sources. This assessment was used in developing our Preferred Approach for the Eastern and Midlands Region.

In addition to this, the assessment criteria used in our approach appraisal process has been built using the objectives of the Strategic Environmental Assessment. This means environmental Sustainability is built into the core of our plans and that all Feasible Options and Preferred Approaches have been assessed as being sustainable at Plan Level. This will be further assessed at Project Level, as the projects identified within the Preferred Approach progress.

As mentioned above, the Preferred Approach at a Regional Level consists of the following:

- The new interconnected Eastern and Midlands Region WRZ, which will provide 78% of the water supply to the Eastern and Midland Region in volumetric terms, serving a population of 2.48 million. As part of the Regional Preferred Approach, 95% of the abstraction volume for the region is from a source with an impounding reservoir that can store sufficient water during wet periods or from sustainable groundwater sources to ensure water availability during dry periods. Climate change reduction has been considered in determining the available supply from our sources.
- The new Limerick Regional WRZ will provide 9% of the water to the region in volumetric terms serving a population of 225,000. The cornerstone of this supply will be the existing impounded storage from the River Shannon. Therefore, this WRZ is reliable, sustainable and adaptable to climate change.
- Of the remaining 13% of the supply in volumetric terms, 8% comes from groundwater sources with natural storage and 5% comes from sustainable lakes or river sources.
- The number of abstractions reduces from 209 to 164. This facilitates the removal of nine (9) potentially unsustainable surface water abstractions and reduction to sustainable levels of a further three (3) surface water abstractions.

The Preferred Approach for the RWRP- EM is reliable, sustainable and resilient to climate change, based on the following:

- The process of assessing performance of existing and future abstractions is based on conservative standards on water availability.
- The Feasible Options must be assessed to be sustainable at a Plan Level.
- The approach appraisal process utilises a multi criteria assessment where the assessment criteria are based on the objectives of the Strategic Environmental Assessment.
- The Preferred Approach will result in 95% of the supply being served by abstractions from sources with storage, including impounding aquifers, impounding reservoirs and lake sources. The remaining 5% of supplies will come from sustainable river sources.

The Reliability of our water supplies is also dependent on the standard of our network infrastructure. The Study Area Technical Reports appended to the RWRP-EM outline a number of vulnerable critical assets within each Study Area. These critical assets will be replaced or rehabilitated as part of the development of the Preferred Approach, reducing the risk of outage across our supplies.

#### 10.5.4 Abstraction Pressures and Water Framework Directive

Within the Preferred Approach, all new abstractions have been identified at sites where the yield is sufficient to provide our target 1 in 50-year LoS, and where the amount we propose to abstract is within sustainable abstraction thresholds.

If the various projects identified within the Preferred Approach are delivered it will allow us to decommission some WTPs which have unreliable yields and have levels of abstraction that are potentially unsustainable. In some areas, including the Limerick Regional WRZ, the Preferred Approach is to augment existing supplies with either new abstractions or transfers of treated water. This gives us the opportunity to address additional sustainable abstraction issues, and lower abstraction volumes at existing sites during critical periods. The operation of these interconnected WRZs will allow us to optimise the operation of these supplies to provide resilience and environmental benefit whilst balancing energy and carbon impacts. For example, in normal conditions we will use a local source within sustainable abstraction guidelines but as flows reduce, we lower abstraction from that source and increase use of transferred water which may be pumped from further away.

The benefits of the Preferred Approach in terms of abstractions are summarised in Table 10.1 which compares the Regional Preferred Approach with the two (2) alternative Regional Approaches that were appraised as part of the Preferred Approach development in Section 8.

These Approaches are;

- Combination 2 - Regional Approach One without Transfers
  - This approach retains the NSS as the Preferred Approach for SA9; however, it utilises Local Options instead of Study Area transfers. These Local Options are identified in each of the Technical Appendices for Study Area 1-8.
- Combination 3 - Regional Approach Two without Transfers
  - This approach considers a scenario where the Preferred Approach for SA9 does not progress and an alternative option, which comprises a Desalination Option, is considered for SA9. This approach does not support regional transfers. Study Areas 1-8 are supplied by Local Options.

A further comparison of the Preferred Approach against the two (2) alternative Regional Approaches is presented in Section 10.6.

Table 10.1 refers to the overall Regional Approach, which includes abstractions associated with the NSS, within Cross Study Area transfers and local surface water and groundwater sources.

**Table 10.1 Summary of Abstractions for the Overall Regional Approaches**

<b>Abstraction Type</b>	<b>Overall Regional Approach with Transfers (including Combination 1)</b>	<b>Overall Regional Approach One without Transfers (including Combination 2)</b>	<b>Overall Regional Approach Two without Transfers (including Combination 3)</b>
Abstractions Decommissioned	56 GW abstractions 17 SW abstractions including 9 SW abstractions where the abstraction is potentially greater than the estimated sustainable abstraction.	26 GW abstractions 5 SW abstractions where the abstraction is potentially greater than the estimated sustainable abstraction.	26 GW abstractions 5 SW abstractions where the abstraction is potentially greater than the estimated sustainable abstraction.
Abstractions Maintained	70 GW abstractions 23 SW abstractions	105 GW abstractions 35 SW abstractions	105 GW abstractions 35 SW abstractions
Increase Existing Abstractions	37 GW abstractions 6 SW abstractions	42 GW abstractions 13 SW abstractions	42 GW abstractions 13 SW abstractions
New Abstractions	26 GW abstractions 1 SW abstraction from the River Shannon.	41 GW abstractions 5 SW abstractions including new abstraction from the River Shannon.	46 GW abstractions 10 SW abstractions including new abstraction from the River Shannon 1 abstraction from the Irish Sea.

### 10.5.5 Transformation

The development of the RWRP-EM allows Irish Water for the first time to review water supply needs collectively across the Eastern and Midlands Region and across the entire spectrum of risk including Quality, Quantity, Reliability and Sustainability. It allows us to consider Local Options to resolve these Needs and larger Regional Options that can address multiple supplies.

The Plan allows us to move away from reactive management of risk at a single source or for a single Need (e.g., Quality risk alone), to a more holistic view of the transformation required across all of our

supplies to meet the objectives set out in the Water Services Strategic Plan (WSSP) and the Water Services Policy Statement (WSPS). The Water Services Strategic Plan is Irish Waters Strategic Plan which is a plan required under statute and sets out Irish Waters business objectives in terms of water and wastewater services. The Water Services Policy Statement 2018-2025, is the Governments policy document on water services.

The Regional Preferred Approach across the Eastern and Midlands Region will result in 89% of the population being served via the Eastern and Midlands interconnected WRZs and the Limerick Regional WRZ, which as outlined in Section 8.5 are systems which benefit from the Shannon catchment. In addition to this, the supplies for Nenagh and Athlone will be interconnected via the River Shannon source.

If all of the projects identified in the RWRP-EM are delivered then, all of the Cities, Regional Cities, and Key Towns identified as part of the Regional Spatial and Economic Strategies (RSESSs) and the Local Authority Development Plans (LADPs), will be part of an interconnected water supply, as shown in Figure 10.4. This can be compared to the existing disconnected water supply systems shown in Figure 10.1.

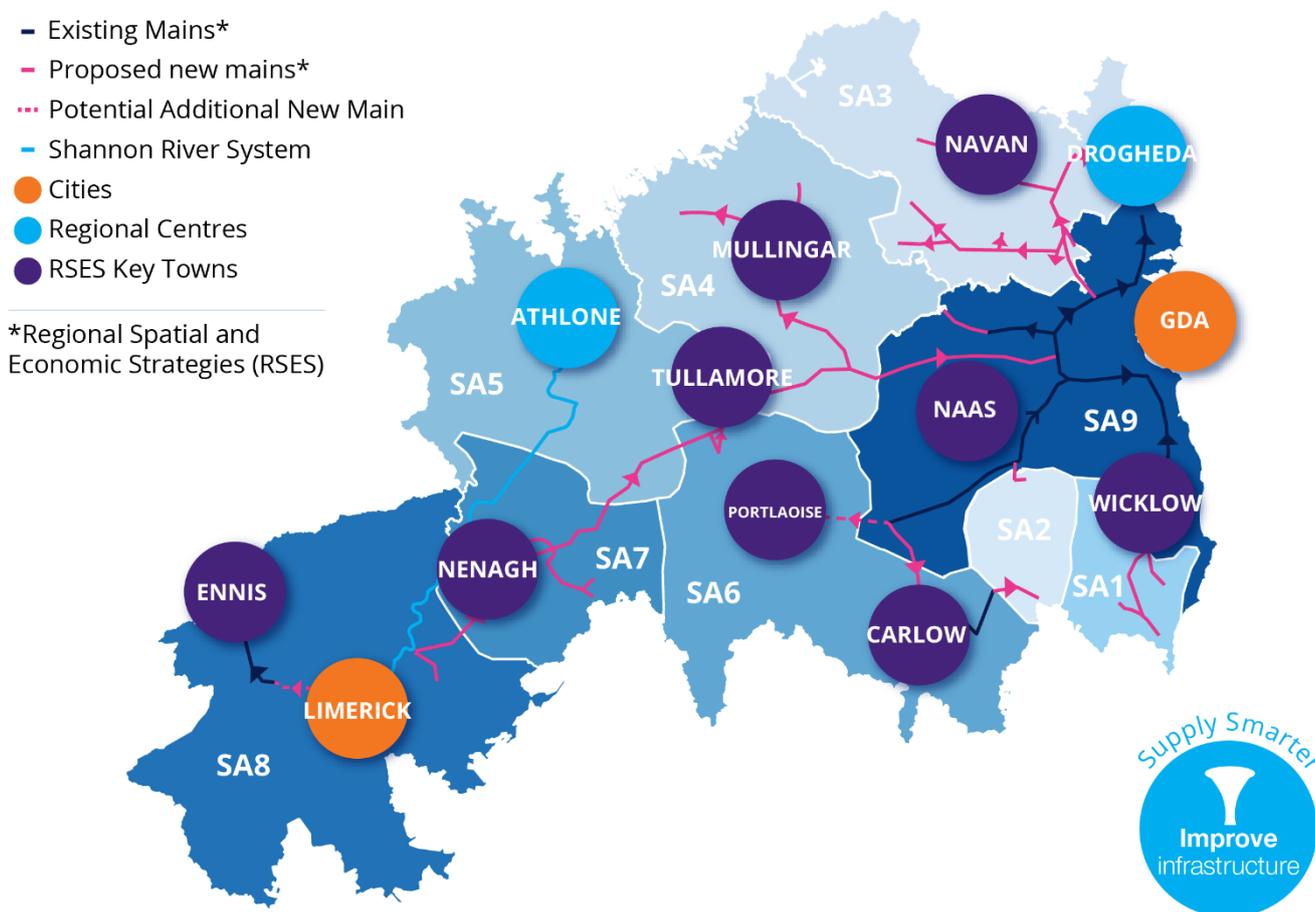


Figure 10.4 Regional Transfer Interconnectivity Servicing Regional Towns

The RWRP-EM provides the following:

- An understanding of, *inter alia*, the current state of our infrastructure, the potential sustainability of our supplies, potential water Quality issues, the location of potential new sources, what locations these new sources can supply (and in what quantity), what additional locations existing abstractions can supply and where investment is needed and its priority.
- A high degree of flexibility in our plans, particularly in terms of domestic and non-domestic growth. For example, our baseline figures for non-domestic growth, include high growth in water demand in the GDA, and medium growth in the Key Towns and cities. Having an interconnected network allows us to facilitate and support higher growth in the smaller connected settlements within the Eastern and Midlands Region, if needs manifests itself in that way over time.
- More balance across the Eastern and Midlands Region, with the abstractions for regional supplies balanced across all of the major catchments across the region. Water abstraction to support public water supply will become more sustainable and resilient to future shocks such as drought and climate change.
- Improved risk management across a smaller number of interconnected WRZ, where possible. Where this is not possible, we will manage risk by selecting secure protected water sources and appropriate treatment barriers.
- An understanding of the transformation required across our water supplies, to ensure that we can have reliable and sustainable supplies into the future.
- An understanding of the scale and asset type we require to ensure Quality and that our customers receive the required Quality and Quantity.
- The combination of solutions - Use Less, Use Less and Supply Smarter.
- The investment required over the short, medium and long term to transform our supplies.
- A sensitivity assessment that allows us to test the Preferred Approach against a range of future scenarios.

#### 10.5.6 Alignment with Policy

The Framework Plan was designed to align with all relevant government policy, including policy on water services, growth and economic development, the environment, climate change adaptation and public spending.

The Preferred Approach identified within the RWRP-EM therefore aligns with the government policy framework and Irish Water's own internal policies and standards for our water supplies.

#### 10.5.7 Alignment with Investment Planning

The completion of and adoption of the RWRP-EM along with the three (3) remaining Regional Water Resources Plans for the South West, North West and South East will identify the Preferred Approach to address Quality, Quantity, Reliability and Sustainability issues for every WRZ in Ireland. Therefore, the NWRP will provide the foundation for understanding the strategic investment requirement to transform our water supplies and will drive our future investment plans for water services.

This Plan is essentially a summary of the investment required in our water infrastructure and will drive future investment plans. Irish Water will prioritise this capital need utilising a Value Framework, to ensure the projects that offer the most value to our customers are progressed first, and the Future Forecast for

capital investment will be built on that basis. This will result in a 40-year Investment Plan that includes accurately scoped and appropriately prioritised capital projects.

## 10.6 Alternatives to Plan

The Preferred Approach at Regional Level involves significant transformation of the overall supply including greater connectivity and transfers across Water Resource Zones, as summarised in Section 10.5.

In Section 8 of the RWRP-EM, we considered two alternatives in order to test the outcome of the regional Preferred Approach against two (2) alternative scenarios:

- Combination 2: No transfers between water supplies were allowed.
- Combination 3: No transfers between water supplies or new options involving the River Shannon were allowed.

The outcome of this test is summarised in the radar plot shown Figure 10.5. In a radar plot the option that takes up the most amount of space on the chart, represents the best overall outcome.

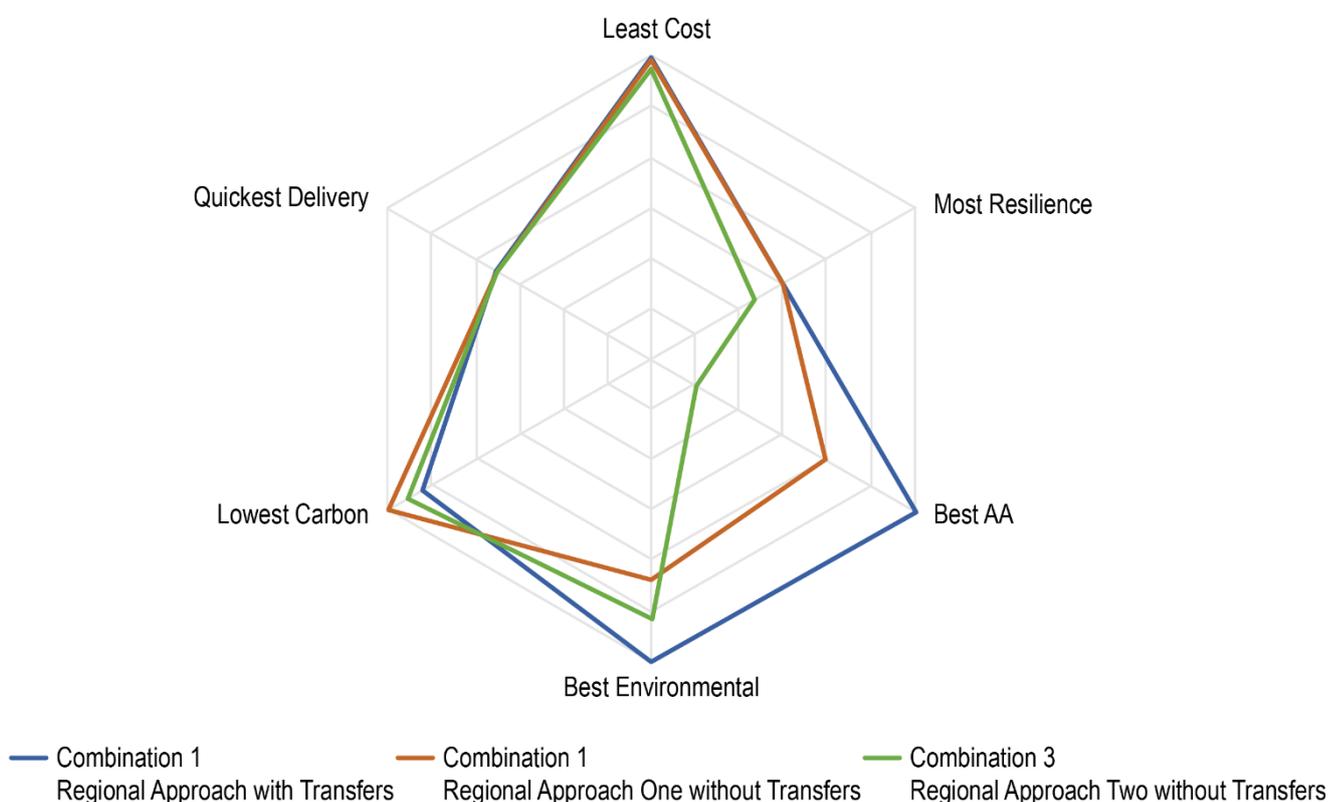


Figure 10.5 Comparison of Alternative Regional Approaches

As can be seen from the comparison, the Preferred Approach results in a significantly better outcome in terms of resilience, environment and ecology. It also provides the best outcome in terms of cost. Although it is not the Least Carbon Approach, there is only a very marginal difference between it and the best performing carbon option. At detailed Project Level, the carbon performance can be improved significantly through energy efficient design and investigation of low carbon initiatives. Also, further work

on future operational modes will allow us to optimise the interconnected supplies, in order to provide resilience and environmental benefit whilst balancing energy and carbon impacts.

In addition to relatively worse environmental outcomes, the alternatives to the RWRP-EM Preferred Approach, do not facilitate any strategic transformation of our supplies. Although they might be viable, we would be left with the same fragmented water supply system, with little flexibility to changes in demographics or economic development.

## 10.7 Interim Options

Given the significant issues with the baseline supplies in terms of Quality, Quantity, Reliability and Sustainability, the “do nothing” approach is not feasible. Need will also get worse over time due to growth in demand and reduction in supply availability and resilience due to climate change.

It may take a considerable period of time to deliver the Preferred Approach across all supplies within the Eastern and Midlands Region due factors such as:

- Scale of Need across all WRZs;
- Likely minimum project lead-in times; and
- Irish Water’s current capital funding arrangements.

Therefore, Irish Water also recognises the need for localised, shorter-term interventions within existing supplies to address critical water Quality risk and supply Reliability issues, before the Preferred Approach can be implemented in full.

Accordingly, within the RWRP-EM we have also developed an “interim solution” approach, which allows such interventions to be identified and prioritised.

As a general principle, this interim approach envisages shorter term, improvements to existing infrastructure and equipment. These interventions are not intended to deliver a long-term solution to identified supply and water Quality issues. They are generally smaller in scale and rely on making best use of existing infrastructure to meet urgent or priority need to address water Quality risk or supply Reliability. The Interim solutions are determined in line with the Preferred Approach and as such, they are considered “no regrets” infrastructure investment.

## 10.8 Conclusions

The public water supply in the Eastern and Midlands Region serves a population of 2.48 million people, and 76,000 businesses via 134 individual WRZs. The water supplies in the Eastern and Midlands Region require significant transformation and investment in order to meet the requirements of safe, secure, reliable and sustainable water supply. The Framework Plan set the standards we must achieve to meet Irish Water’s objectives as set out in the WSSP. It also developed the methodology we would use to identify the Preferred Approach to resolve Needs across our water supplies.

Within the RWRP-EM we summarised the Need across the 134 supplies and identified the Preferred Approach at Regional Level to address these Needs.

Delivery of the Preferred Approach will provide the best overall outcome for the region, particularly in relation to environmental, ecology and resilience outcomes, and will result in:

- Transformation of water services in the region, from a fragmented supply system with large variation in levels of service, to an interconnected supply with uniform and improved level of service.

- Customer benefits in terms of increased Reliability and reduced occurrence of outages across our supplies.
- Customer benefits in terms reduced water Quality risk and the instances of boil water notices
- Improved resilience, with 95% of the population supplied via sources with impounding storage or aquifer storage that will allow us to manage seasonal variation in water availability and drought events.
- Sources that are more environmentally sustainable and allow us to adapt to climate change and align with the requirements of the Water Framework Directive and Habitats Directive.
- Improved operational control across our water supplies, and ability to react to adverse events.
- Improved efficiency of our distribution networks in terms of leakage, pressure and strategic storage.
- Ability to facilitate growth and economic development.