# South East Queensland Water Security Program 2023

seqwater
WATER FOR LIFE

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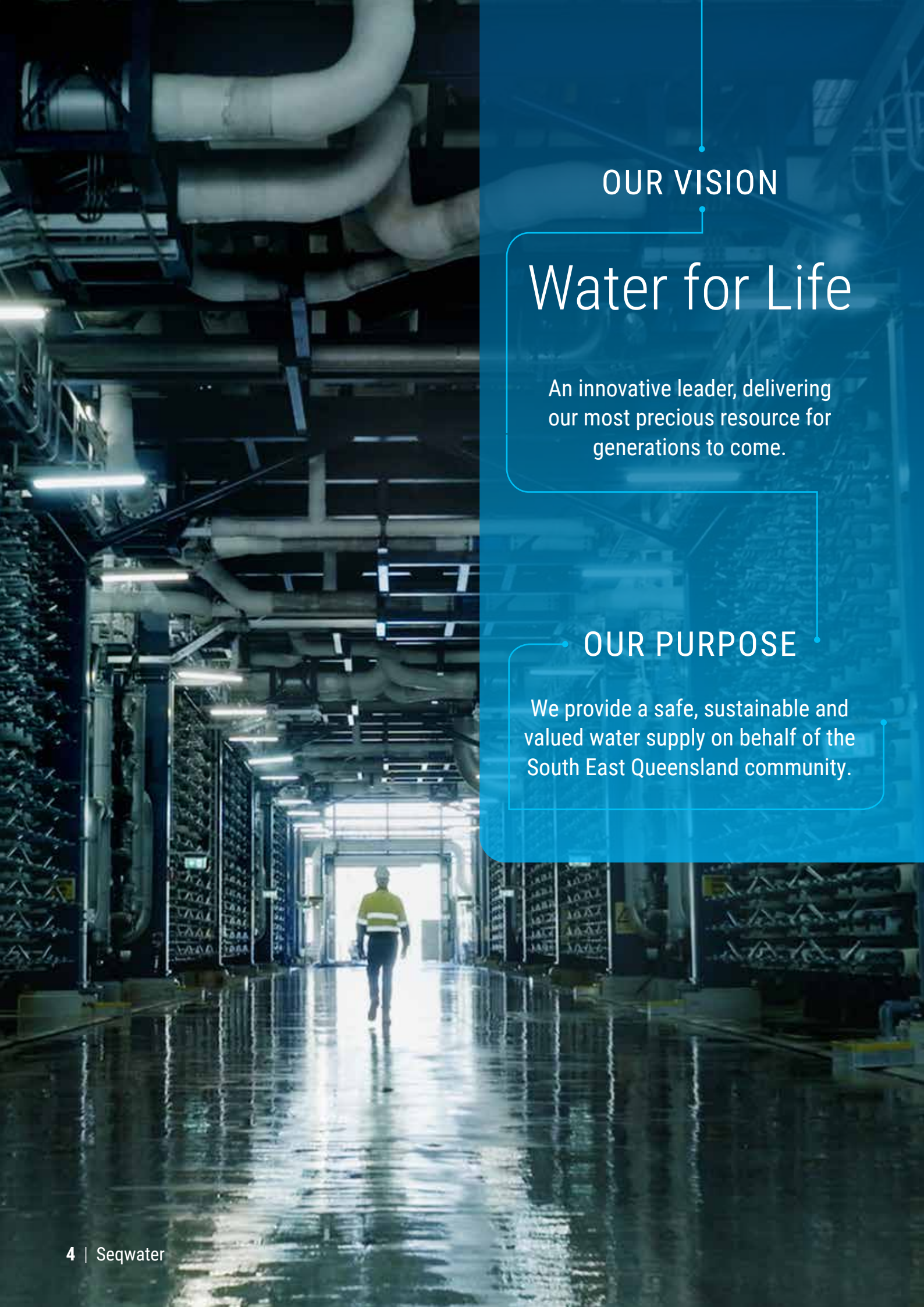
*Seqwater acknowledges the Traditional Custodians of the land, catchments and waterways on which we live, work and play.*

*We pay our respects to Elders past, present and emerging; and acknowledge their continued connection to the land, water and culture of South East Queensland.*

# Contents





## OUR VISION

# Water for Life

An innovative leader, delivering our most precious resource for generations to come.

## OUR PURPOSE

We provide a safe, sustainable and valued water supply on behalf of the South East Queensland community.

# About the program

## The Water Security Program 2023 sets out Seqwater's plan to ensure South East Queensland (SEQ) communities have access to a safe, secure and valued water supply now, and for future generations.

The Water Security Program 2023 demonstrates how Seqwater will:

- continue to achieve the Queensland Government's desired level of service objectives for SEQ.
- continue to plan to ensure water supplies are adequate to meet regional residential and non-residential needs over the long-term.
- ensure the community's basic water needs are met under all circumstances, including drought emergencies.
- ensure SEQ communities are kept informed of what water restrictions may be imposed in the event SEQ faces a severe drought.

Seqwater regularly reviews its Water Security Program to account for updated water demand forecasts, as well as revised assessments of the impacts of climate change on the availability of water.

This document is the latest iteration of Seqwater's Water Security Program and replaces the 2017 version.

Seqwater will continue to review the latest developments in climate change science and data as well as monitor how actual demands are comparing against forecasts.

Together with infrastructure planning and investigations, a further review of the Water Security Program will be undertaken in the 2-3 years following the completion of key project business cases, as outlined in this document.

# Overview

SEQ has a safe, reliable and resilient water supply system, stemming from careful and ongoing water security planning and investment in a diverse asset base which allows Seqwater to supplement supply in a timely way when needed.

Under current levels of demand, the region has enough spare supply to help manage through dry periods. However, vigilance is needed to ensure SEQ is well prepared for future change including population growth, as well as threats to water supply arising from prolonged drought events or climate change.

Climate change research suggests SEQ will see an increase in the annual average temperatures and levels of evaporation, as well as potential impacts to the volumes of inflows into dams. This means that climate change may materially reduce the volume of water that is available from the system of existing bulk water sources.

Just like major enhancements of the past, such as the introduction of the SEQ Water Grid and the Gold Coast Desalination Plant, current modelling suggests the next major enhancement of the SEQ Water Grid could be needed by 2035, depending on how actual water demands track against demand forecasts.

It is therefore prudent to start planning now for a new major enhancement, particularly given climate change might mean SEQ is not able to rely on dams as much in the future.

# Water Security Program 2023

The Water Security Program builds on the strengths and opportunities offered by SEQ's existing bulk water infrastructure, outlining a number of major strategies for future water security including:

Reviewing SEQ Water Grid operations to ensure they are continuously optimised to match available water supplies with current and projected water demands.

Proceeding with the planning and connection of supplies from the Logan River, including Wyaralong Dam, to the SEQ Water Grid, and a new water treatment plant.

Working with power station customers to update projected water demands and ensure optimised supply and best use of the Grid.

Progressing the development of a business case to investigate the proposed upgrade of the existing Gold Coast Desalination Plant at Tugun to increase capacity.

Undertaking a detailed business case to explore opportunities for a new desalination plant for the region (likely to be required by 2035) including potential locations, capacity and timing of delivery.

Examining further opportunities to utilise the Western Corridor Recycled Water Scheme to supply to industry and agricultural customers to offset some potable demand. The Scheme will also continue to remain a drought response measure.

Working with SEQ Retailer Customers - Urban Utilities, Unitywater, Logan Water, Redland City Council and the City of Gold Coast - to update and refine water demand forecasts to inform ongoing planning and ensure timely and efficient investment in water infrastructure.

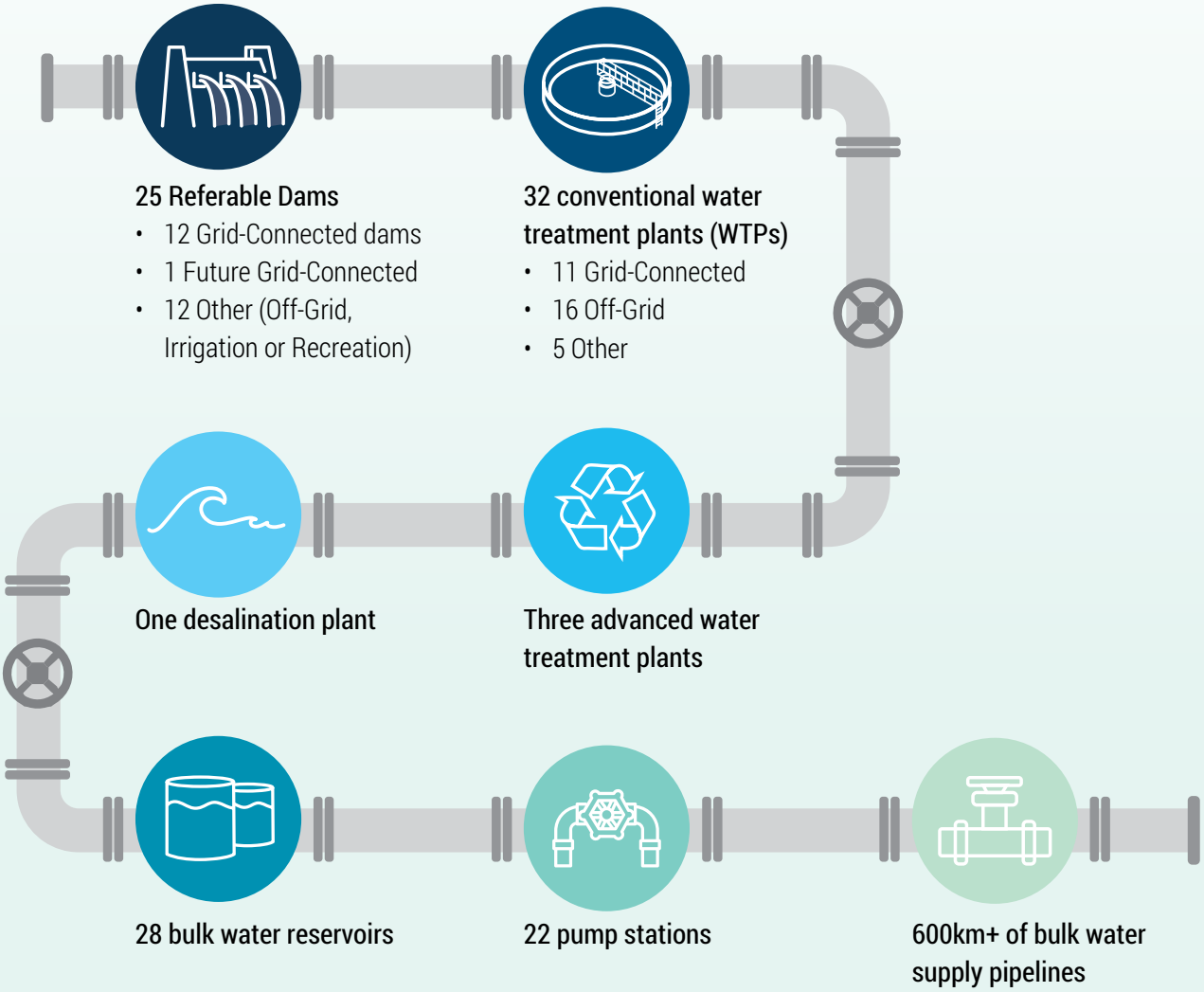
Ensuring SEQ is well placed to maintain sufficient supply during the 2032 Brisbane Olympic and Paralympic Games to meet demands from the transient population.

# South East Queensland's existing bulk water supply system

## The SEQ Water Grid

The SEQ Water Grid is the backbone of SEQ's bulk water supply network. Connecting a range of dams, treatment plants, reservoirs and pump stations, the Grid allows treated drinking water to be moved around the region as required. This is especially important when variable rainfall leaves some areas with full dams and other parts of the region with lower dam levels. The Grid can supplement but not completely replace local water supplies due to some network constraints. Water is also heavy and therefore costly to transport, so it's important to only pump and move water around the Grid if really necessary.

The Seqwater network comprises:



## Existing bulk water supply sources

There are a range of bulk water sources that currently supply water to the SEQ Water Grid. These include:

- rainfall-dependent sources such as rivers, dams or off-stream storage;
- groundwater;
- desalination; and
- purified recycled water (available for industrial customers and as a back-up supply in severe drought).

When these sources are full and operational, Seqwater has access to ~494 GL per year of water entitlements and ~43 GL per year of desalinated water, while it only takes ~300 GL per year to meet demands of SEQ. However, rain often doesn't fall where it's needed and there needs to be some water set aside to manage supply through times of drought. During drought, the purified recycled water scheme can provide an additional ~59 GL per year of water to Wivenhoe Dam.

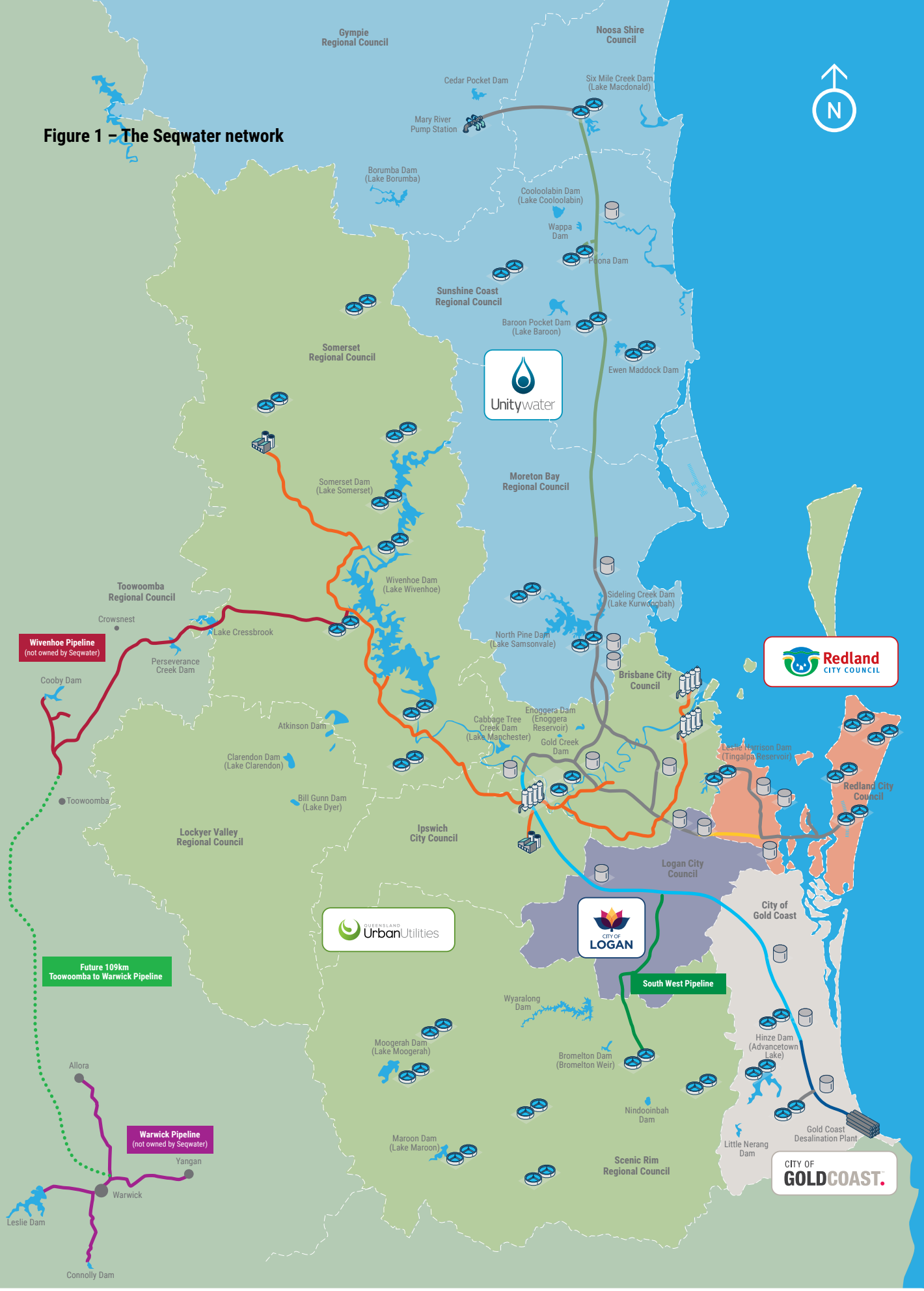
| **Existing Grid Connected bulk water sources** | | **Volumes of water currently able to be supplied** |
|---|---|---|
| Dams | Wivenhoe, Somerset, North Pine, Hinze, Baroon Pocket, Leslie Harrison, Ewen Maddock, Cooloolabin, Sideling Creek (Lake Kurwongbah), Lake Macdonald (Six Mile Creek), Little Nerang and Wappa. | Up to 478 GL per year* |
| Groundwater and surface water | Minjerribah (North Stradbroke Island) | Up to 16 GL per year |
| Desalination | Gold Coast Desalination Plant | Up to 43 GL per year |
| Purified recycled water | Western Corridor Recycled Water Scheme | Up to 59 GL per year |
| TOTAL | | Up to 597 GL per year |

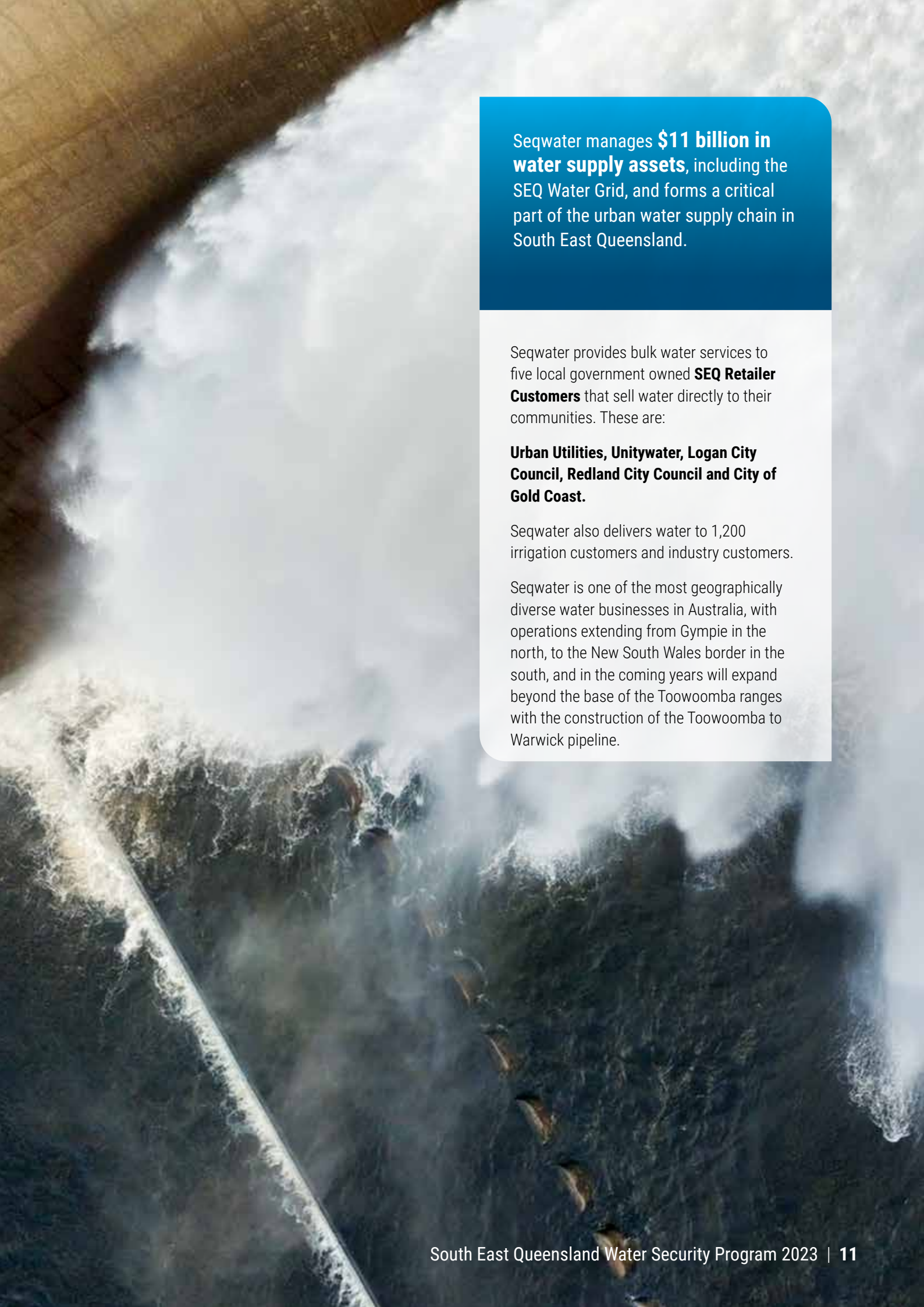
* Available supply under water plan entitlements with consideration for water treatment plant and network transport capability constraints.

**Case Study: Connecting the network for improved climate resilience**

The SEQ Water Grid is a network of bulk water supply pipelines that stretch more than 600 kilometres to enable treated drinking water to be moved around the region. The Grid allows rainfall-dependent dams and weirs to be complemented with climate resilient water sources, including the Gold Coast Desalination Plant and Western Corridor Recycled Water Scheme. The Grid was built in response to the Millennium Drought (2001-2009) and has enabled SEQ to have a safe, reliable and resilient water supply since this time.

**Figure 1 – The Seqwater network**





Seqwater manages **$11 billion in water supply assets**, including the SEQ Water Grid, and forms a critical part of the urban water supply chain in South East Queensland.

Seqwater provides bulk water services to five local government owned **SEQ Retailer Customers** that sell water directly to their communities. These are:

**Urban Utilities, Unitywater, Logan City Council, Redland City Council and City of Gold Coast.**

Seqwater also delivers water to 1,200 irrigation customers and industry customers.

Seqwater is one of the most geographically diverse water businesses in Australia, with operations extending from Gympie in the north, to the New South Wales border in the south, and in the coming years will expand beyond the base of the Toowoomba ranges with the construction of the Toowoomba to Warwick pipeline.

## Off-Grid communities

Seqwater supplies drinking water to approximately 53,000 people living in 16 Off-Grid communities that are not directly connected to the SEQ Water Grid (shown in Figure 2). Seqwater is responsible for planning and managing the source, storage and treatment of water to meet the needs of each of these communities.

Water supply sources in Off-Grid communities are varied. They include:

- non-Grid dams shared with non-urban water users (water source for the Off-Grid communities of Beaudesert, Boonah-Kalbar, Kooralbyn, Rathdowney)
- groundwater (water source for Minjerribah (North Stradbroke Island) which includes the Off-Grid communities of Amity Point, Dunwich and Point Lookout)
- run-of-river (water source for the Off-Grid communities of Canungra, Dayboro, Kenilworth, Jimna, Linville).

Water for these communities is sourced and treated locally, then distributed to households and businesses by the relevant SEQ Retailer Customer.

**Figure 2 – Off-Grid communities**

# Climate resilient water sources

## Desalinated water

Desalination is the process of treating seawater so it is safe to drink. At the Gold Coast Desalination Plant (GCDP), seawater is drawn from the ocean about one kilometre off the coast via a pipeline.

A process called reverse osmosis forces the seawater through thin, porous membranes at high pressure which separate water molecules from salt and other dissolved minerals.

The desalinated water is then blended with other treated water or directly distributed to homes, businesses and industries connected to the SEQ Water Grid.

Although it is required to produce less water when dam storages are full, the GCDP has been in operation since it was first brought online in 2009 and plays an important role supplementing the Grid when needed, including during extreme weather events.

With short notice, the plant can provide up to 133 megalitres per day, increasing the capacity of the Grid to be able to respond to emergent issues, such as flooding, system maintenance and drought.

Following wet weather in February and March 2022, when the Mt Crosby Water Treatment Plants went offline, the GCDP ramped up production, ensuring continued water supply for the community.

In 2022-23, the GCDP produced 7310 ML to support operation of the Grid and increase the system's resilience. Almost half of this was in continued response to the 2022 flood events, when raw water quality issues reduced production at conventional water treatment plants.

Significant volumes were also produced to supplement the Grid throughout maintenance and upgrades of water treatment plants.

In the preceding two financial years, the GCDP was also used extensively in drought response.

# Purified recycled water

Through the Western Corridor Recycled Water Scheme, Seqwater provides purified recycled water (PRW) to industrial customers for electricity production. Seqwater will investigate opportunities to increase industrial use (such as hydrogen production and other renewable energy projects), in addition to agricultural uses, in order to offset Grid demand.

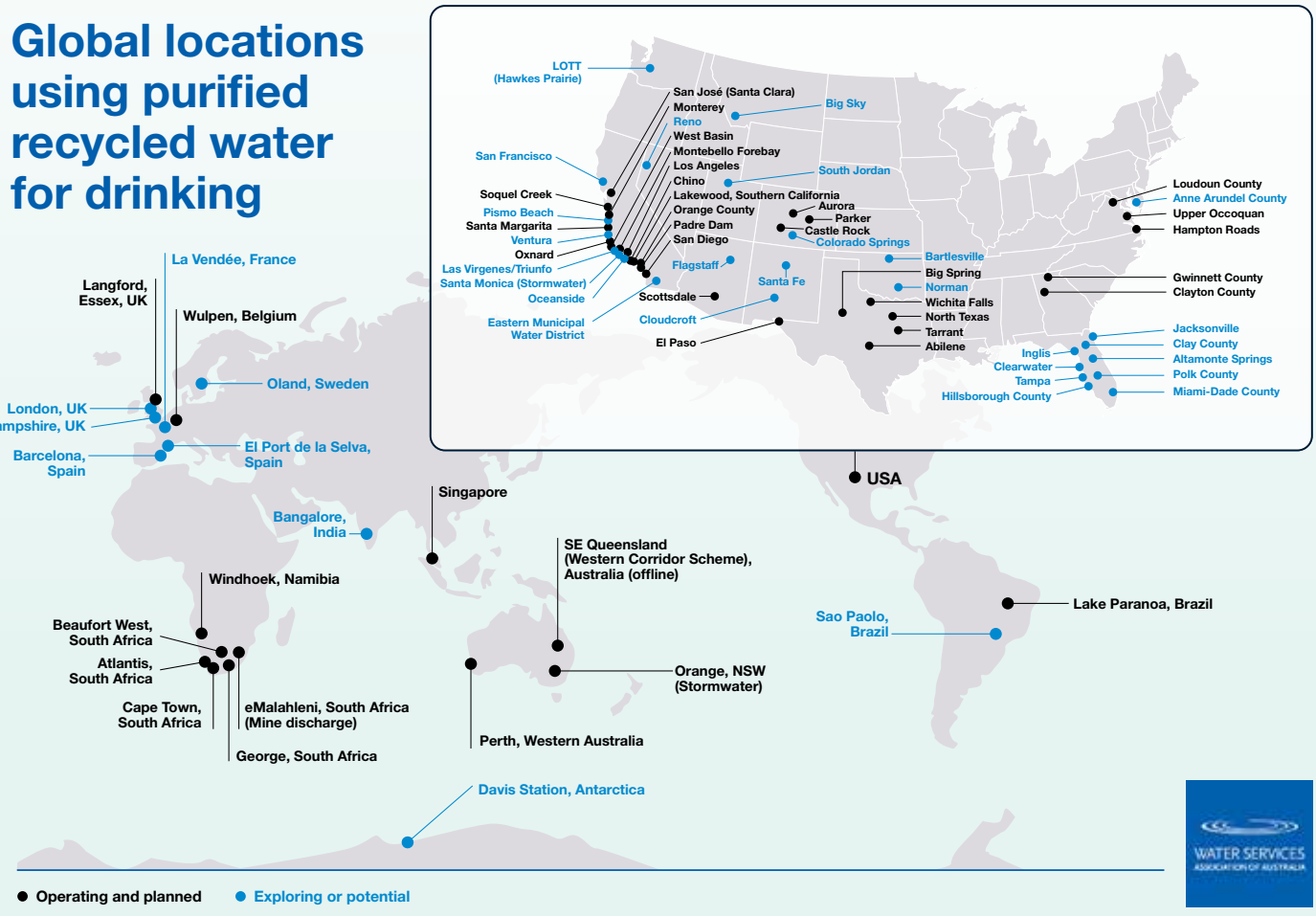
The Western Corridor Recycled Water Scheme also remains an important drought supply asset, which can be considered as a drinking water supply during a severe drought when the SEQ Water Grid storage levels reach 40%.

### PRW advanced water treatment process

PRW exceeds the strict standards set by the Australian Drinking Water Guidelines and is safe for drinking. It is originally sourced from wastewater which has been subjected to several advanced treatment processes.

Water is then exposed to intense ultraviolet light and hydrogen peroxide to destroy any traces of impurities before being added to captured rainwater already stored in Lake Wivenhoe. Under the Scheme, Wivenhoe water would then be treated once more at Seqwater's conventional water treatment plants at Mt Crosby.

**Figure 3 – examples of locations around the world that use, or are exploring the use of, purified recycled water**



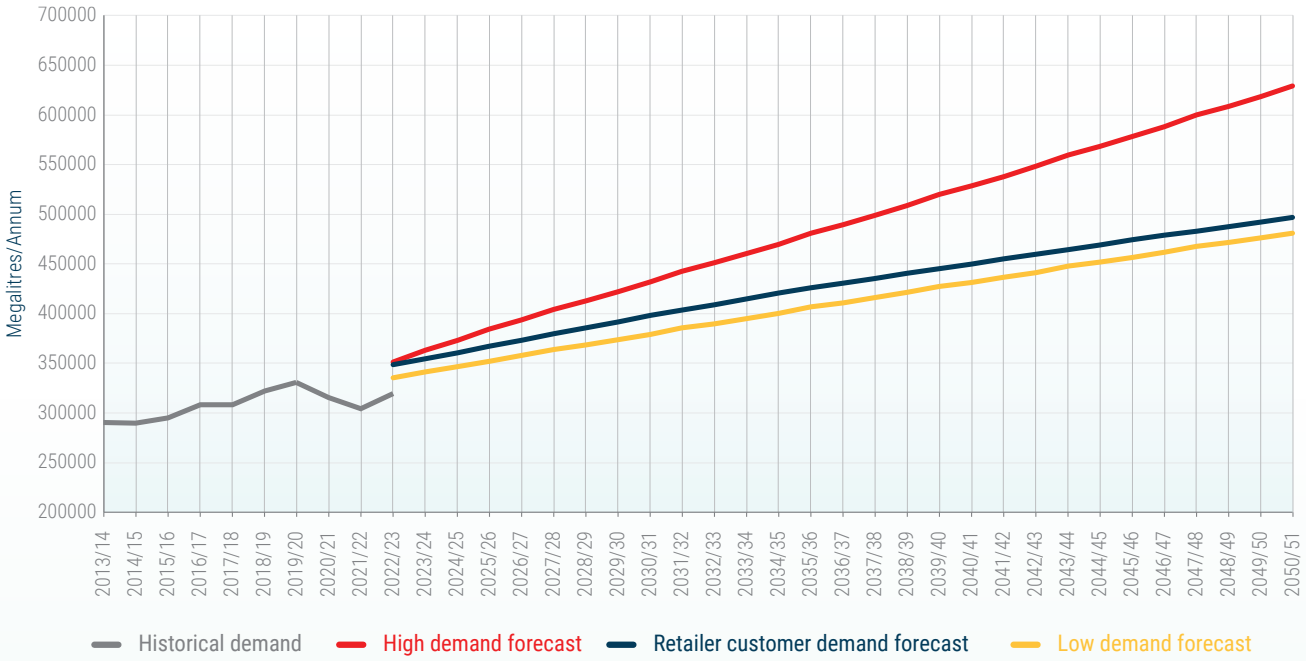
# Forecasting South East Queensland's water demand

Growth in SEQ's water demands is expected to increase over the next 30 years from ~300,000 ML/a to ~500,000 ML/a – principally driven by an increase in the region's serviced population.

SEQ Retailer Customers have provided Seqwater with water demand forecasts for the next 30 years for each sub-region. Together with other contracted volumes, these forecasts comprise the overall total of projected water demands. SEQ Retailer Customers each use their own methodologies for determining their demand forecasts and provide updates to the forecast annually.

As demand increases, Seqwater will need to invest in solutions to maintain water supply during drought by optimising use of existing assets and the SEQ Water Grid. Current modelling shows there is sufficient supply to manage through an extreme drought until the middle of the next decade. However, there is enough climate change and demand uncertainty to justify starting to plan for the next major upgrade now.

**Figure 4 – Historical and projected South East Queensland water demands**




Demand projections from SEQ Retailer Customers sit within the Seqwater 'high' and 'low' demand scenarios developed in 2019. These scenarios are primarily based on the projected population growth rates provided by the Queensland Government Statistician's Office (QGSO), 2018 Edition.[1]

## Demand projections

Seqwater uses demand forecasts from SEQ Retailer Customers and population forecasts to estimate a per person water demand.

Seqwater uses the SEQ Retailer Customer demand forecasts as its main guide for water supply planning. The range between high and low population growth is used as a sensitivity analysis for the earliest and latest possible times to deliver bulk water supply system enhancements.

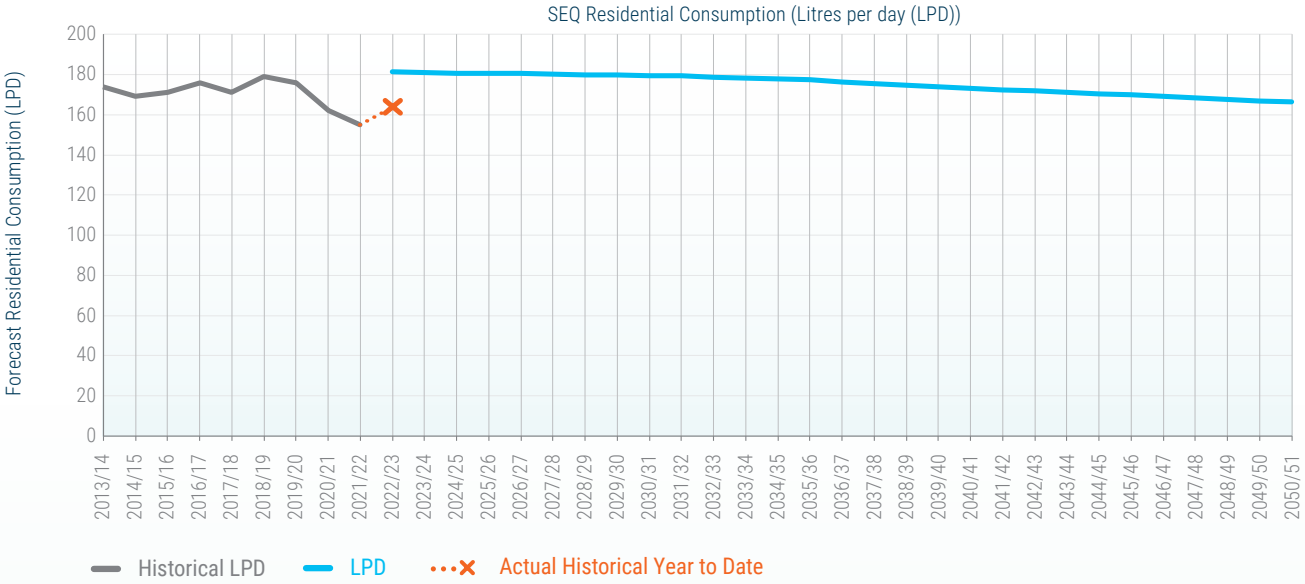
In addition to population growth rates, there are a range of other factors which affect the accuracy and trends in demand projections.

The historical demand until 2020 approximately aligns with the SEQ Retailer Customer demand forecast growth rate. However, between 2020 and 2022, there is a change in the regional demand profile likely due to COVID-19 and rain events, which resulted in reduced demand.

Other factors influencing demand projections include uncertainties around the future water demands of power stations in the region as well as the emerging demand for hydrogen production and other renewable energy projects in SEQ. Water demand projections must also account for supply to Toowoomba and Warwick increasing the volume of water required from Wivenhoe Dam.

[1] Seqwater notes that updated population projections became available from QGSO in 2023. These were not available when modelling was completed for the Water Security Program.

**Figure 5 – Estimated projected regional average residential per capita urban water demands**




Seqwater will continue to annually collate updated information about historical use and projected water demands obtained from SEQ Retailer Customers. These updated demand assessments will be compared with the initial forecasts and published by Seqwater in its Water Security Program Annual Reports by end of March each year.

Continually updating and tracking the region's water demand against the forecasts in this way will enable Seqwater to adapt its ongoing and future operations and management of existing water assets throughout SEQ. It will also help inform future planning decisions about whether – and if so, when – existing bulk water infrastructure needs to be expanded, or new infrastructure built.

If actual water use is found to be tracking closer to the lower band of the forecast water demand range, it may mean plans for building new bulk water infrastructure might be able to be deferred. In addition, if there is spare capacity in the bulk water supply network, Seqwater may be able to make water available on a temporary basis to irrigators or industrial water users connected to the system.

If, on the other hand, actual water use is tracking closer to the higher end of the forecast water demand range, it may mean construction of planned new bulk water infrastructure needs to be brought forward.

**SEQ residents are water wise**

Water efficiency measures and programs have proven very successful and resulted in a material decrease in the regional average urban water demands per person since 2005.

Future water demand projections are based on the conservative assumption that average per capita water use will only experience a slight decline from current levels over the next thirty years.

# Desired level of service objectives for South East Queensland's water security

The strategies within the Water Security Program are designed to achieve the desired level of service (LOS) objectives for SEQ's water security, defined in the Water Regulation 2016 and summarised below.

## Projected regional average urban demand for SEQ region

The bulk water supply system is to be able to supply enough water to meet the 'projected regional average urban demand', which is the estimated demand, expressed in litres for each person for each day for residential and non-residential water use in the SEQ region for each year over the next 30 years.

## Bulk water drought supply objectives

The bulk water supply system must be able to supply enough water so that:

- medium level water restrictions for residential use will not happen more than once every 10 years on average and will not restrict the average water use for the SEQ region to less than 140L for each person for each day;
- medium level water restrictions on non-residential water use that is incidental to the purpose of a business (watering a garden in the grounds of a factory for example) will not happen more than once every 10 years on average; and
- medium level or more severe water restrictions must not last longer than five per cent of the modelled time.

## Essential minimum supply volume (EMSV)

Where the essential minimum supply volume means the volume needed to supply an average of 100L for each person for each day for residential and non-residential water use (not accounting for system losses) the bulk water supply system must:

- be able to supply an "essential minimum supply volume", and
- not be reduced to being able to supply only the essential minimum supply volume more than once every 10,000 years on average.

## Minimum operating levels (MOL)

Individually, Baroon Pocket Dam, Hinze Dam and Wivenhoe Dam must not reach their minimum operating levels more than once every 10,000 years on average.

# Operating and managing the bulk water supply

The way water is drawn from SEQ's bulk water sources has a significant impact on available water supplies both in the short and long-term. Managing system operations efficiently and effectively means water supplies will last longer and costs to consumers will be minimised.

Optimising the operations of the bulk water supply system – including how water is moved within the SEQ Water Grid in response to changing conditions – can significantly enhance water security. This is achieved by making the most of existing assets, balancing water supplies and demands in each sub-region, and ensuring the type and timing of investments in new bulk water infrastructure is optimal.

Seqwater manages the Grid to balance cost, operational needs and water security risks, while always ensuring the safety of drinking water. When storage levels are high, Seqwater gives preference to operating lower-cost water sources, such as water treatment plants connected to major dams. Conversely, when drought conditions unfold, Seqwater seeks to preserve storage levels in key dams by using other water sources such as desalination.

# SEQ's existing bulk water system capacity

## Level of service yield of the existing system assuming no climate change

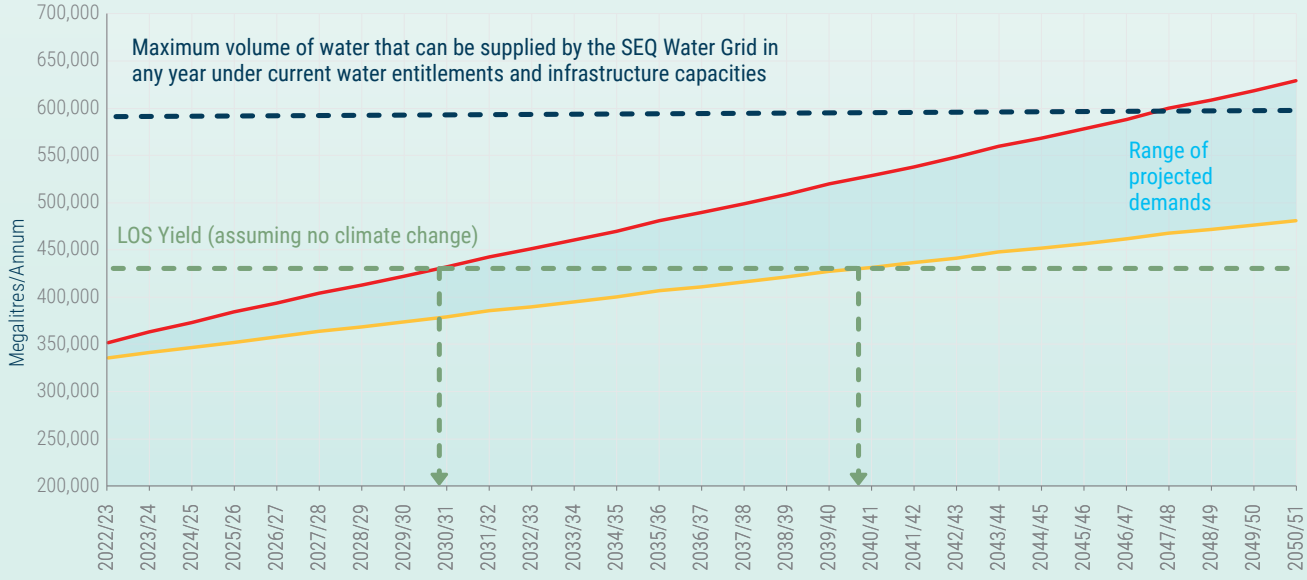
Seqwater has undertaken modelling to calculate the maximum annual average volume of water the SEQ Water Grid may safely supply in the future whilst continuing to meet the level of service (LOS) objectives. The volume of water that can reliably be supplied while meeting the LOS objectives is known as the LOS yield.

If it is assumed the region's future long-term climate is similar to that observed historically over the last 100 years, then modelling suggests that the existing system's LOS yield would be 430,000 megalitres per annum.

This is 25% less than the annual volume (600 GL) of water that is available from the SEQ Water Grid from dams and other sources. This is because level of service yield is based on providing a higher reliability than provided under the statutory water planning instruments. Seqwater's planning helps ensure sufficient water is stored and conserved in wet years to continue to supply water during subsequent periods of low rainfall, which can extend for a number of years.

Seqwater's Dam Improvement Program is currently delivering infrastructure upgrades that will ensure ongoing safety and security of the bulk water supply well into the future. Whilst the program is underway, Wivenhoe, Somerset and North Pine Dams will be temporarily operated at reduced full supply levels. The water security program assessments are based on the dams being fully restored to their fixed full supply levels.

**Figure 6 – Level of service yield of the existing system assuming no climate change**



# Impact of climate change

Without considering climate change effects, the current modelling predicts the existing water supply system will be able to meet the desired level of service objectives until approximately 2031 (based on high demand projections) and 2041 (based on low demand projections). However, accounting for potential consequences of climate change, these timeframes are brought forward significantly.

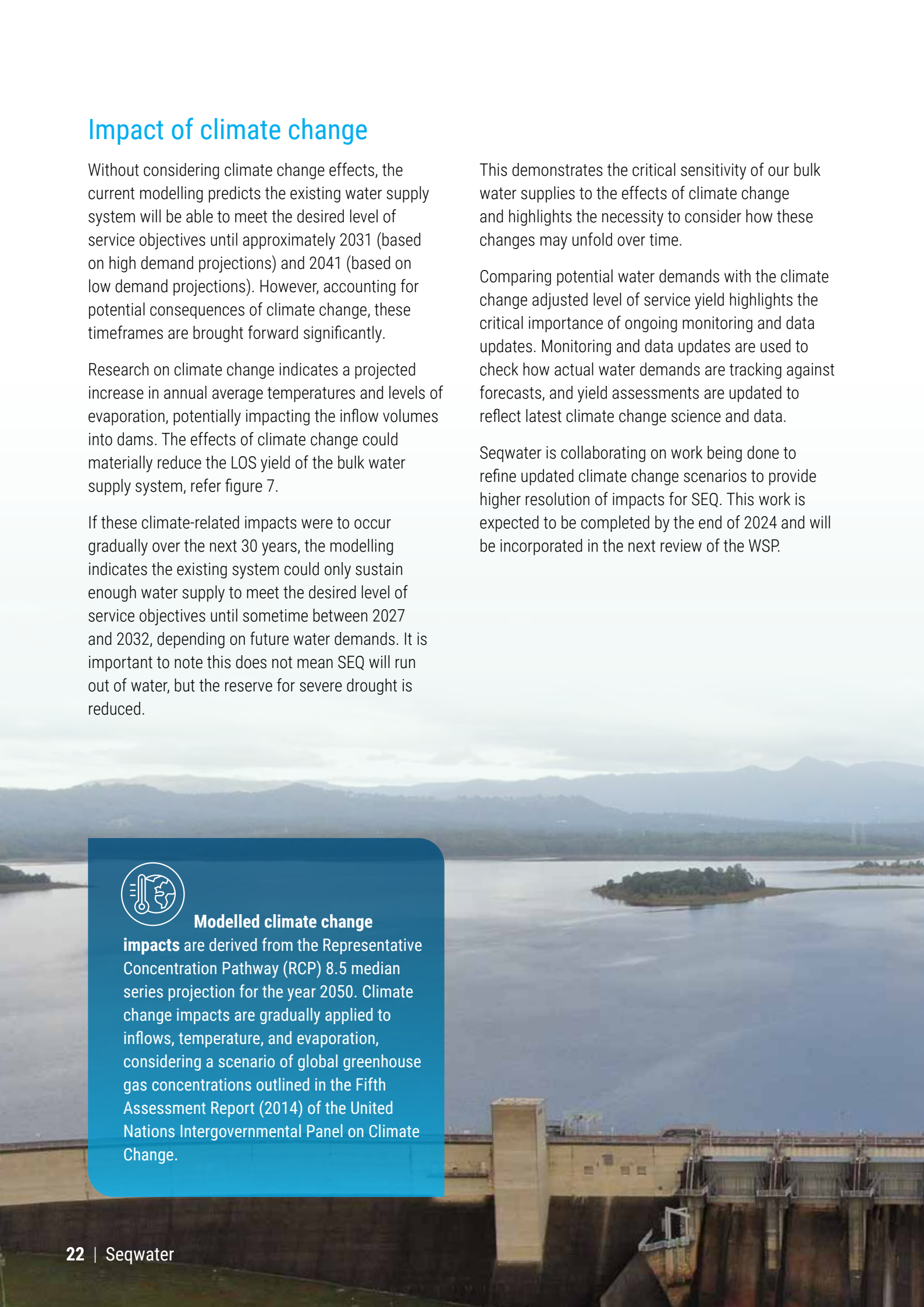
Research on climate change indicates a projected increase in annual average temperatures and levels of evaporation, potentially impacting the inflow volumes into dams. The effects of climate change could materially reduce the LOS yield of the bulk water supply system, refer figure 7.

If these climate-related impacts were to occur gradually over the next 30 years, the modelling indicates the existing system could only sustain enough water supply to meet the desired level of service objectives until sometime between 2027 and 2032, depending on future water demands. It is important to note this does not mean SEQ will run out of water, but the reserve for severe drought is reduced.

This demonstrates the critical sensitivity of our bulk water supplies to the effects of climate change and highlights the necessity to consider how these changes may unfold over time.

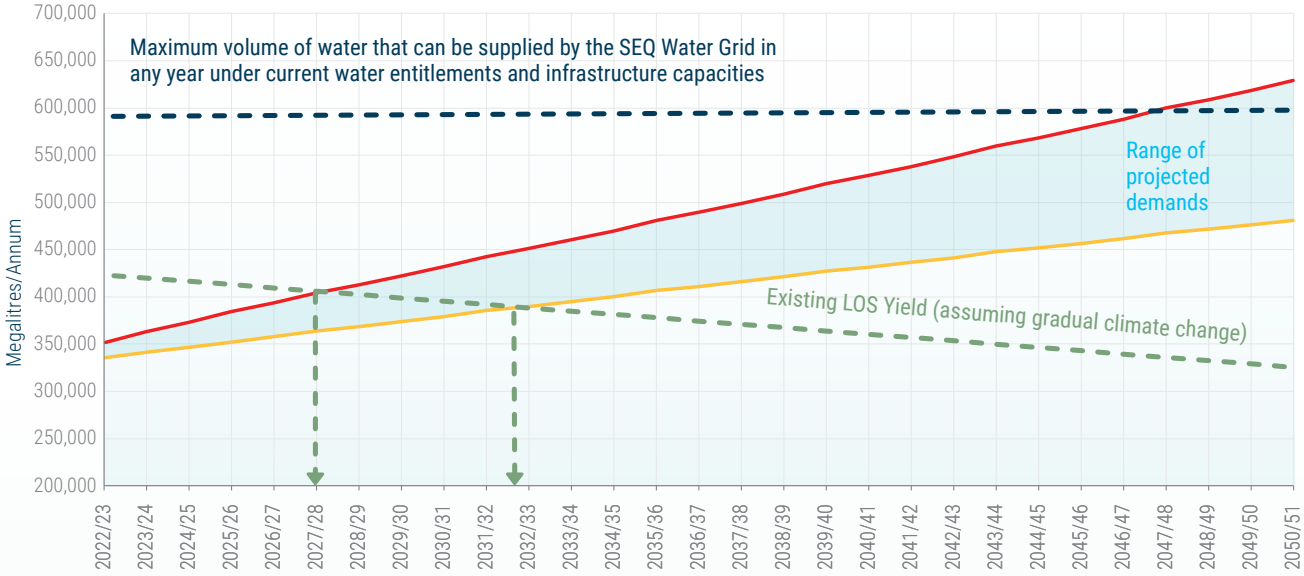
Comparing potential water demands with the climate change adjusted level of service yield highlights the critical importance of ongoing monitoring and data updates. Monitoring and data updates are used to check how actual water demands are tracking against forecasts, and yield assessments are updated to reflect latest climate change science and data.

Seqwater is collaborating on work being done to refine updated climate change scenarios to provide higher resolution of impacts for SEQ. This work is expected to be completed by the end of 2024 and will be incorporated in the next review of the WSP.



**Modelled climate change impacts** are derived from the Representative Concentration Pathway (RCP) 8.5 median series projection for the year 2050. Climate change impacts are gradually applied to inflows, temperature, and evaporation, considering a scenario of global greenhouse gas concentrations outlined in the Fifth Assessment Report (2014) of the United Nations Intergovernmental Panel on Climate Change.

**Figure 7 – Level of service yield of the existing system with gradual climate change prior to enhancement**




## Seqwater's Environment, Social and Governance approach

Seqwater's approach to Environment, Social and Governance (ESG) is targeted towards potential opportunities to transition asset management and operations to a more sustainable future and aligns with the Queensland Government's position reflected in the Queensland Sustainability Report.

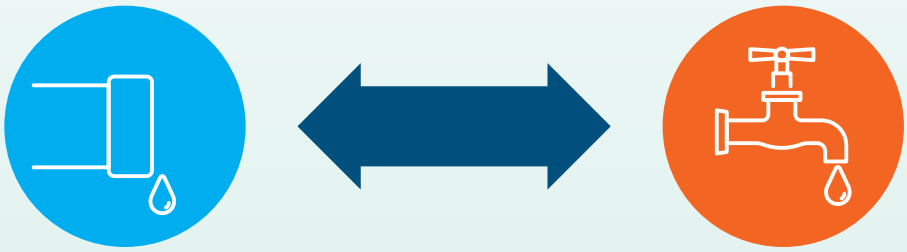
Over the next five years, Seqwater's investments in projects and initiatives will incorporate considerations of how Seqwater sources and consumes energy within its operations, as well as across its energy-related value chain.

# Meeting the desired level of service objectives

Seqwater will pursue two key strategies for ensuring the desired level of service objectives will continue to be met in the future. These are:

- Strategies for increasing the system's level of service yield by building new, or upgrading existing, bulk water supply infrastructure and using the SEQ Water Grid to direct water where it's needed most.
- Strategies for working with SEQ Retailer Customers to manage water demands, improve water use efficiency and reduce water use.

**Figure 8 – Strategies for continuing to achieve level of service objectives in the future**



### SUPPLY

- Planning and building new bulk water infrastructure
- Using the SEQ Water Grid to direct water to where it's needed most
- Adding desalinated water to the SEQ Water Grid

### DEMAND

- Working with SEQ Retailer Customers to manage water demands, reduce water use and minimise system leakage and water losses
- Potable water substitution opportunities

# Increasing future water supplies

As demand increases, Seqwater will need to invest in solutions which increase water supply to be drawn upon during times of drought. Current modelling shows Seqwater has sufficient supply to manage through an extreme drought for the next decade by making the most of current infrastructure. However, there is enough uncertainty in climate change impacts and demand growth to justify starting to plan for the next major upgrade now in case these timeframes need to be brought forward. As Seqwater undertakes this planning, it will identify triggers for when construction activities will need to commence and the Water Security Program will be updated.

## Water supply infrastructure projects planned for the next 5-10 years

Seqwater has started planning for the next bulk water supply infrastructure projects to maintain water security in SEQ amidst climate change and growth. This first phase of planning is focused on making the best use of the available assets, with business cases underway that consider:

- an expansion of the Gold Coast Desalination Plant at Tugun; and
- the completion of a water treatment plant downstream from Wyaralong Dam and connection to the SEQ Water Grid.

The construction of the water treatment plant downstream of Wyaralong Dam may need to be supported by the recommissioning of the Bromelton off-stream storage to maximise the amount of water which can be taken from the Logan River system.

These two projects will each increase the capacity of Seqwater's existing bulk water infrastructure and utilise infrastructure already in place to cater for expansion of these assets. Upgrades to the network will also be made to ensure new water supplies can be delivered to where they are needed.

Seqwater is open to discussion with SEQ Retailer Customers about other opportunities for supplying water demands from new alternative sources.

The Western Corridor Recycled Water Scheme will be considered as a drought response measure if SEQ Water Grid storage levels reach below 40%. Purified Recycled Water (PRW) also continues to be provided to industry. Seqwater will investigate further opportunities to increase PRW supply to industry, and potentially agricultural customers.

Seqwater has also analysed the benefits of changing the way the Grid is operated and whether different modes of operation can materially increase the LOS yield from existing infrastructure. This modelling showed the benefits of different operating strategies were modest, would involve higher cost, and put small storages and the communities that rely upon them at greater risk. There may be potential benefits of changing operations in the future as a result of regional growth and climate change. The operational strategies are periodically reviewed to ensure Seqwater is making the most of existing assets. This review incorporates best available information, including consideration for water security.

Seqwater has started planning for the Brisbane 2032 Olympic and Paralympic Games, with Lake Wyaralong earmarked for the Rowing and Canoeing Events. Seqwater will consider if operational changes are required to accommodate the Games and impacts of increased demand. Demand increase is expected to rise modestly by approximately five per cent during the time that the events are held.

## Water supply infrastructure projects planned for the next 10-20 years

Government determines the extent of water available from rivers and dams through an extensive water resource planning process. These plans in SEQ have found there is no spare water resources for dams in South East Queensland of the scale that would be required to meet the region's potential growth in water demands in the longer term.

As such, Seqwater is planning for a second desalination plant as the next major water supply expansion for the SEQ Water Grid. Unlike most of the drinking water produced in SEQ, desalination is not dependent on rainfall and may be used in times of extreme weather including droughts and in times of flood when sediment loads in flood water are difficult to treat.

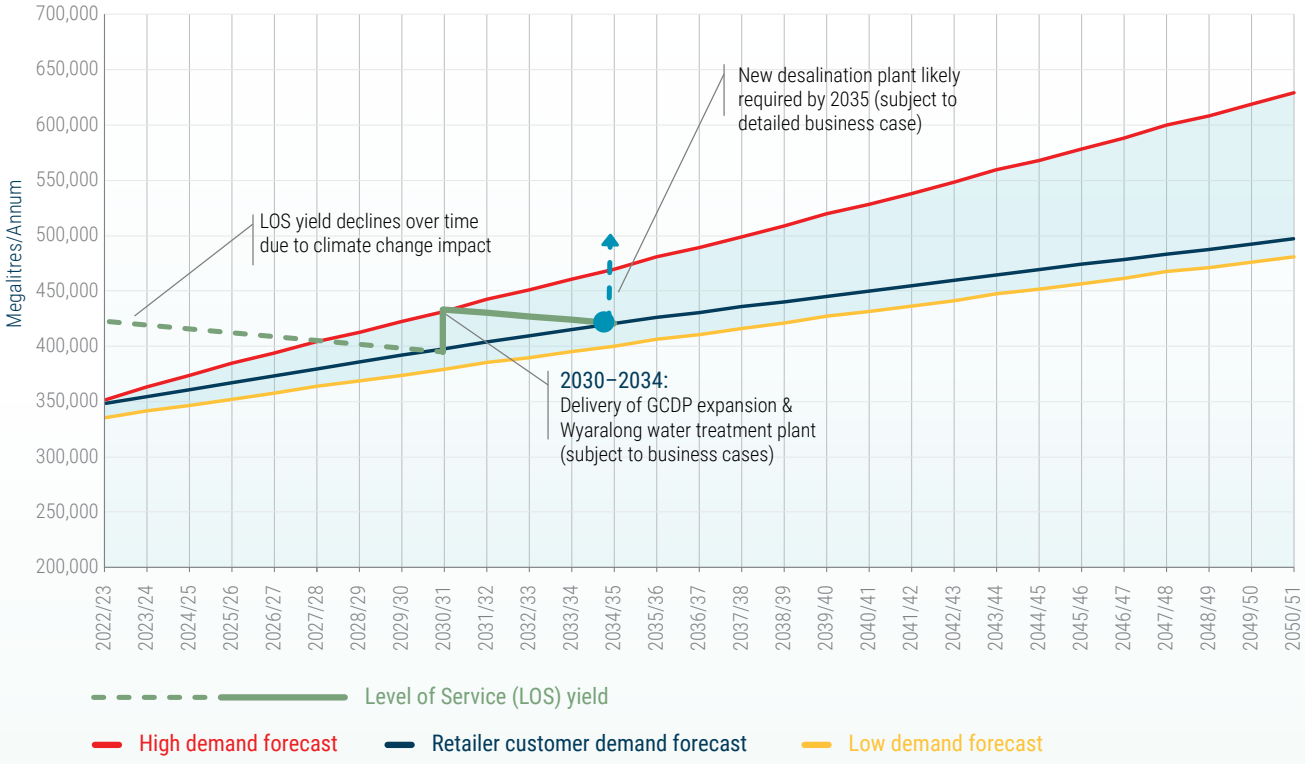
Seqwater will undertake a detailed business case which will be completed by the end of 2024.

The planning for a new second desalination plant and the timing of its delivery will take into consideration how this source will interact with other infrastructure planning and operation of the Grid. The detailed business case process will determine the preferred location and capacity of the desalination plant. Seqwater is committed to keeping South East Queensland communities informed as this planning progresses.

Lake Borumba Dam, near Imbil south west of Gympie, is being investigated by Queensland Hydro as a future pumped hydro storage. The Borumba Pumped Hydro Project will be capable of dispatching 2,000 MW and storing up to 24 hours of energy. When generating, the project will have the capacity to supply electricity to up to 2 million Queensland homes.

Seqwater is in consultation with Queensland Hydro and understands that the design will ensure that water supplies currently sourced from Borumba Dam are maintained into the future. However, the hydro project will not add to the yield of the SEQ Water Grid.

**Figure 9 – Level of service yields including proposed future bulk water infrastructure upgrades**




Seqwater has undertaken modelling to estimate when commissioning of the proposed Gold Coast Desalination Plant (GCDP) upgrade, Wyaralong Water Treatment Plant and the additional desalination plant would be required.

Figure 9 shows that delivery of the Wyaralong Water Treatment Plant and GCDP expansion, based on current SEQ Retailer Customers demand forecasts, are likely to be needed around 2031. Water security planning will be based on this target date of around 2031, but with a state of readiness to enhance sooner if needed.

Similarly, the next major enhancement could be needed in the early 2030s but could be as late as 2037 depending on the rate of demand growth. Seqwater has adopted a target date of around 2035, but with a state of readiness to build the next desalination plant sooner if needed.

The above graph demonstrates the timing of infrastructure is dependent on the rate of increase of demand. There may be other reasons to bring these projects forward. For example, to increase resilience in the SEQ Water Grid or to bolster supply during the construction period for major dam safety improvement projects.

When the second desalination plant is built, initially it is expected to be needed during drought and for operational flexibility when other major assets are offline due to extreme weather or planned maintenance.

It is likely that over time, SEQ may become less reliant on dams to supply its water demands as the use of desalinated water increases.

A key advantage of having a greater proportion of desalination in the future bulk water supply mix, means the demand-supply balance will be subject to less volatility. This means there will be less need to set aside large volumes of water in water storages as a buffer against future uncertainty in rainfall, inflows and evaporation rates.

This may, in turn, create short-term, temporary opportunities to make spare water available to support agriculture and other industries in the region.

## Off-Grid Future Water Supplies

Seqwater has considered the future demand forecast for all Off-Grid communities with SEQ Retailer Customers and determined the level of sustainable supply, which indicates additional investment will be required within the 30-year plan period at Beaudesert, Boonah–Kalbar, Canungra and Dayboro, to meet the desired level of service objectives.

All other Off-Grid communities meet the water security level of service objectives for the next 30 years with their existing infrastructure. These locations may receive infrastructure investment for other drivers besides longer-term water security.

**Table 2 - Off-Grid Level of Service Yield**

| Off-Grid Community | Average Demand | | LOS Yield | Proposed Enhancement and Year Required |
|---|---|---|---|---|
| | 2023 | 2051 | | |
| | ML/Annum | | | |
| Jimna | 6 | 7 | 20[1] | Meets the LOS requirements beyond 2051 |
| Linville | 11 | 13 | 35[1] | Meets the LOS requirements beyond 2051 |
| Somerset Dam Township | 15 | 15 | 70[1] | Meets the LOS requirements beyond 2051 |
| Rathdowney | 24 | 24 | 80[1] | Meets the LOS requirements beyond 2051 |
| Kenilworth | 45 | 64 | 110 | Meets the LOS requirements beyond 2051 |
| Amity Point | 80 | 86 | 200[1] | Meets the LOS requirements beyond 2051 |
| Dunwich | 104 | 111 | 390[1] | Meets the LOS requirements beyond 2051 |
| Kooralbyn | 212 | 249 | 450[1] | Meets the LOS requirements beyond 2051 |
| Esk | 289 | 418 | 475 | Meets the LOS requirements beyond 2051 |
| Point Lookout | 208 | 208 | 750[1] | Meets the LOS requirements beyond 2051 |
| Beaudesert | 846 | 1831 | - | Pipeline Connection to Grid underway to achieve LOS Objectives |
| Canungra | 117 | 246 | 165[2] | Strategic water supply options planning underway |
| Dayboro | 166 | 218 | 275 | Strategic water supply options planning underway |
| Boonah-Kalbar | 531 | 792 | 1320 | Modelling indicates yield may decline to ~700 ML/a by 2051 due to climate change impacts. Further investigation post-2040 |
| Kilcoy | 1332 | 1604 | 1495[3] | Yield constrained by WTP capacity. Planning for upgrade underway. |
| Lowood | 4057 | 6177 | 5985[3] | Yield constrained by WTP capacity. Planning for upgrade underway. |

1. LOS Yield is limited by the water entitlement
2. Current Entitlement for Canungra is 150 ML/a - LOS yield of 165 ML/a based on existing storage, drought response plan and additional entitlement from town water reserve
3. LOS yield for Lowood and Kilcoy is based on the current WTP capacity. Planning underway for WTP upgrade will resolve yield constraint.

While none of the Off-Grid communities have a shortfall in their level of service requirements based on current demand, growth in local demand in time is expected to trigger investment in the following locations:

- **Beaudesert:** Construction of a new pipeline connecting Beaudesert to the SEQ Water Grid is well underway to maintain continuity of supply (as identified in the 2017 Water Security Program).
- **Canungra:** Seqwater has commenced working on the strategic water supply options for Canungra, and timing for that investment, which is likely to be required within the next 8-12 years. Upon completion of these investigations and assessments, Seqwater expects to shortlist a preferred option and will ensure the community is kept informed.
- **Dayboro:** Investigations are underway on the strategic water supply options for Dayboro, and timing for investment, which is likely to be required within the next 8-12 years. Upon completion of these investigations and assessments, Seqwater expects to shortlist a preferred option and will ensure the community is kept informed.
- **Boonah–Kalbar:** It is anticipated that additional water security infrastructure may be required in approximately 20 years.

# Managing water demands and improving water use efficiency

Although Seqwater plays a lead role in providing water security and coordinating demand management measures, SEQ Retailer Customers are the direct link between demand management measures and water consumers.

Importantly, the regulatory powers for imposing and enforcing water restrictions reside with the SEQ Retailer Customers.

SEQ Retailer Customers not only manage programs for reducing water demands, but they also play a vital role in regularly updating demand forecasts upon which Seqwater's future bulk water infrastructure planning relies.

Demand management measures have been developed collaboratively by Seqwater and the SEQ Retailer Customers. These measures include:

- Water restriction schedules (detailing the permitted activities under each level of water restriction)
- Communications campaigns to encourage water efficiency
- Education programs for non-residential users
- Community water efficiency programs and presentations
- Working with peak industry bodies to promote water efficiency.

While demand management options can reduce demand and assist with drought response, they can also have an economic and social cost. It is therefore important to understand and assess the economic impacts of any demand management options being considered.

Effective demand management can also defer when new bulk infrastructure needs to be built and minimise additional capital investment and ongoing operational costs.

Seqwater, together with its SEQ Retailer Customers, is developing a Decision Making Framework (DMF) for the purpose of guiding decision-making in water supply planning and delivery in South East Queensland, to deliver optimal outcomes for end use customers. The DMF takes a 'whole-of-supply-chain' perspective and aims to ensure that the least costly infrastructure and management options are selected, including joint investment decisions by Seqwater and SEQ Retailer Customers. Seqwater and some of its SEQ Retailer Customers are conducting a desktop pilot on the draft DMF to identify refinements and improvements before the DMF is finalised.

# Responding to drought conditions

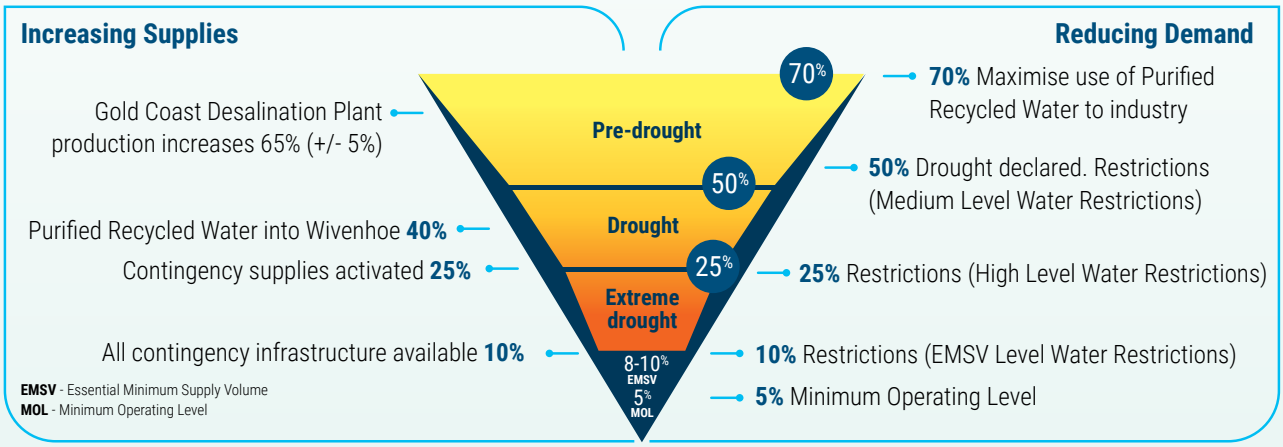
Seqwater has updated the drought response plan (see figure 10 below), which sets out the timing of actions to be taken should SEQ Water Grid storage levels fall below 70% capacity. This plan has been tested through modelling and achieves the desired level of service objectives.

The trigger levels are indicative targets for the various drought response measures to come into effect, and have been developed using updated drought modelling, latest available climate data as well as lessons learned from the last drought. The corresponding times to initiate each measure will be determined based on several factors including:

- SEQ Water Grid storage levels
- weather outlook and current water demand
- the lead time necessary to fully develop and implement initiatives.

The actions described below represent core planned drought response activities and are not limited to these. Seqwater will continue to explore ways to better manage supply and demand within the SEQ region. As examples, opportunities for better demand management could arise from technology and the adoption of smart meters, or potentially supplying existing non-potable water demands from sources other than the SEQ Water Grid storage.

**Figure 10 – Drought response triggers**




## Pre-drought phase (70% to 50%)

Seqwater will enter pre-drought phase when the Grid storage level reaches 70%. This is the trigger level for taking preliminary action that will incur additional costs above business as usual operations.

This includes actions to:

- direct water in the SEQ Water Grid to where it is needed most (regardless of the least immediate cost of operation)
- maximise production of desalination water
- raise awareness of declining dam levels through public communication activities
- initiate further measures for preparing for a potentially worsening drought, including undertaking studies, design and develop a plan (if needed) for the construction of contingency infrastructure.

## Drought phase (50% to 25%)

Drought will be declared, and medium level water restrictions will commence in this phase when the SEQ Water Grid storage level drops to 50%.

Water restrictions will be applied through a collaborative effort between Seqwater and the SEQ Retailer Customers and will target reducing regional residential water use to 140 LPD when Grid storage levels reach 50%.

Seqwater is responsible for overall coordination including forecasting when restrictions are likely to commence, whilst SEQ Retailer Customers are responsible for implementing water restrictions with residential water users. With regional collaboration, restriction targets are being reviewed to ensure they remain suitable for water security and achievable for the community.

Measures will also be implemented in preparation for potentially entering even more severe droughts, and to reduce the likelihood of increased restrictions. For example, in accordance with Seqwater's drought response plan, the Western Corridor Recycled Water Scheme is available to be introduced into operation when the SEQ Water Grid storages reach 40% combined capacity.

The amount of time for the Western Corridor Recycled Water Scheme to become fully operational will depend on the age and condition of the asset and the level of use by industry and other customers. This will therefore be reviewed when the pre-drought trigger has been reached and the recommissioning plan will be updated and implemented as appropriate. Seqwater will also consider the weather outlook at the time and, in consultation with the Queensland Government, implement recommissioning activities as appropriate to ensure Western Corridor Recycled Water Scheme is fully available before the 40% Grid storage level is passed.

## Extreme drought phase (below 25%)

This phase is triggered if severe drought conditions continue to occur and the SEQ Water Grid storage level drops below 25%.

Seqwater will complete and activate additional contingency water supplies including new climate-resilient infrastructure, prior to reaching this level. Given the scope of this, supply depends on the conditions of the prevailing drought as well as the availability of future Grid infrastructure projects identified within this Program. Seqwater will use an adaptive strategy to implement contingency supplies. This adaptive strategy will identify and accelerate delivery of suitable infrastructure within Seqwater's forward works programs to ensure the community's water needs can continue to be met during extreme drought but also that the infrastructure will have lasting value for the SEQ Water Grid.

If the SEQ Water Grid storage drops below 25% then more severe water restrictions will be implemented (targeting 120 LPD) to further minimise the risk of reaching the minimum operating levels.

## Essential Minimum Supply Volume Level phase

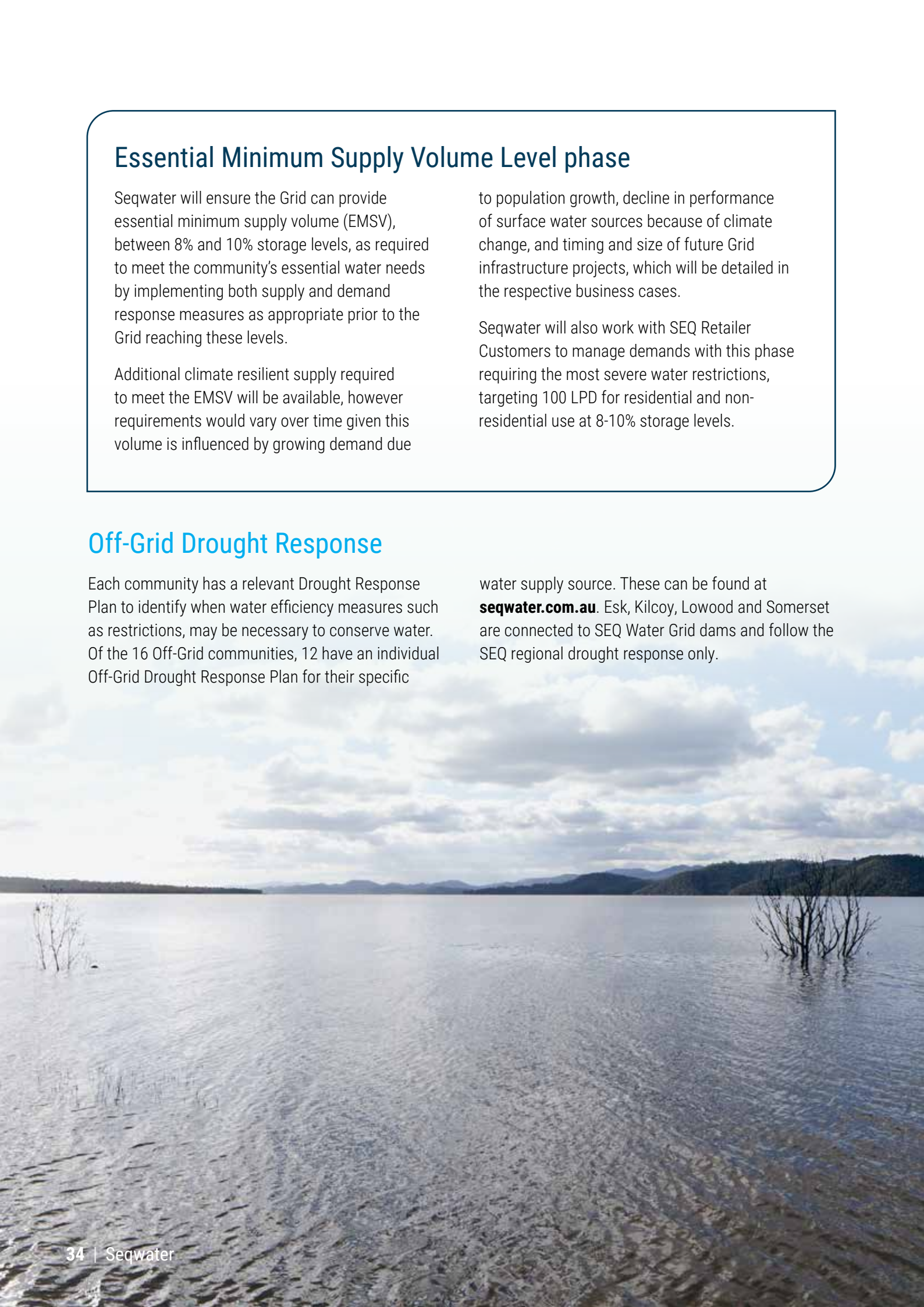
Seqwater will ensure the Grid can provide essential minimum supply volume (EMSV), between 8% and 10% storage levels, as required to meet the community's essential water needs by implementing both supply and demand response measures as appropriate prior to the Grid reaching these levels.

Additional climate resilient supply required to meet the EMSV will be available, however requirements would vary over time given this volume is influenced by growing demand due to population growth, decline in performance of surface water sources because of climate change, and timing and size of future Grid infrastructure projects, which will be detailed in the respective business cases.

Seqwater will also work with SEQ Retailer Customers to manage demands with this phase requiring the most severe water restrictions, targeting 100 LPD for residential and non-residential use at 8-10% storage levels.

## Off-Grid Drought Response

Each community has a relevant Drought Response Plan to identify when water efficiency measures such as restrictions, may be necessary to conserve water. Of the 16 Off-Grid communities, 12 have an individual Off-Grid Drought Response Plan for their specific water supply source. These can be found at **seqwater.com.au**. Esk, Kilcoy, Lowood and Somerset are connected to SEQ Water Grid dams and follow the SEQ regional drought response only.



# Water Security Program 2023: Action Plan

| | Timeframe | Planned actions |
|---|---|---|
| NOW | 2023 - 2024 | • Review the depth and storage volumes of Seqwater's largest dams using the latest techniques to ensure dam capacity assumptions remain accurate as these are critical to LOS yield assessments<br>• Review ongoing developments in climate change science and data and update water supply modelling with new information about climate change impacts<br>• Proceed with business cases for the proposed Gold Coast Desalination Plant expansion and Wyaralong Water Treatment Plant (WTP) to determine if these are the best short-term options to meet growth<br>• Complete a new detailed business case by the end of 2024 for the next major enhancement – a new desalination plant |
| NEXT | 2024 - 2028 | • Provide an update to the Water Security Program<br>• Continue with investigations and project development for the next major enhancement – a new desalination plant<br>• Confirm timing and staging of infrastructure upgrades |
| LATER | 2028 - 2035 | • Deliver a new Wyaralong WTP, if the business case is supported<br>• Deliver Gold Coast Desalination Plant expansion, if the business case is supported<br>• Deliver the next major enhancement, a new desalination plant, if the business case is supported |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