CITY OF CAPE TOWN
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CAPE TOWN WATER OUTLOOK

March 2022 Edition

Water and Sanitation Directorate

City of Cape Town

Making progress possible. Together.

Previous editions of the Water Outlook

Edition 1: January 2018

Edition 2: March 2018

Edition 3: April 2018

Edition 4: May 2018

Edition 5: July 2018

Edition 6: September 2018

Edition 7: December 2018

Edition 8: October 2020

Next edition of the Water Outlook

The next edition of the Water Outlook will feature the ***Cape Flats Managed Aquifer Recharge Scheme as well as more information on the adaptable New Water Programme.***

Referencing

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Queries

Technical queries on the content of this document may be addressed to Water.Stakeholders@capetown.gov.za

Contents

1 Introduction

Cape Town's Water Strategy was approved by Council in 2019 after the 2014 - 2018 drought, and describes how the City of Cape Town (the City) will work with residents and other stakeholders to form a new relationship with water and ensure a resilient and sustainable water supply. The Strategy commits the City to a collaborative approach by building trust through transparency and mutual accountability.

The Cape Town Water Outlook is published in this spirit. The purpose is to make information available in an accessible way to stakeholders on the current status of Cape Town's water supply, progress being made to build resilience, and to provide an outlook on future water security.

This edition of the Cape Town Water Outlook specifically addresses the following topics:

- The current status of Cape Town's water supply system
- Cape Town's future water demand
- Status update on the timing and phasing of the New Water Programme (NWP)
- Selected project updates:
    - Water reuse: the Faure New Water Scheme
    - Establishment of an independent advisory panel for reuse and desalination
    - The clearing of alien invasive plants in catchment areas
- The Decision Support System (DSS) for water resource management
- Overall water security outlook

The next edition will feature the Cape Flats Managed Aquifer Recharge Scheme and more information on the adaptable New Water Programme – the planning for schemes beyond 2030.

Figure 1 Development of the TMG Groundwater Scheme

2 The current status of Cape Town's water supply system

2.1 Supply

Cape Town's water supply remains largely dependent on rainfall and the resulting runoff. After five years of below-average runoff (2014 to 2018), Cape Town has experienced two years of slightly above-average runoff (2019/2020 and 2020/2021), as shown in Figure 2. The result of the above-average runoff, along with depressed water demand, has been that the dams of the Western Cape Water Supply System (WCWSS) have spilled, and Cape Town has been able to lift water use restrictions.

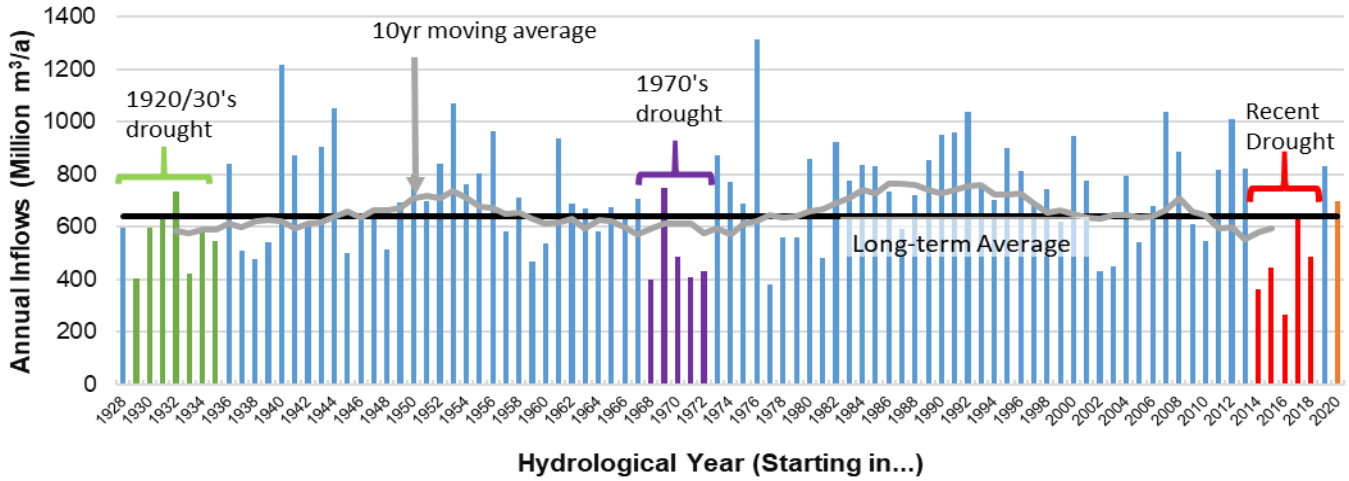


Figure 2 Annual Inflows into the large water supply dams

2.2 Demand

Water demand (total water use, including losses) has continued to rebound after the drought, as shown in Figure 3. Most recently, during heatwaves in December 2021 and January 2022, daily production increased to near pre-drought levels of around 1 100 MLD. The City is currently undertaking a detailed assessment to better understand the current water demand, the future growth of water demand, and the ability of Cape Town to reduce water demand in future droughts. This work is detailed in Sections 3.2 and 3.3 and is a crucial informant for planning augmentation schemes.

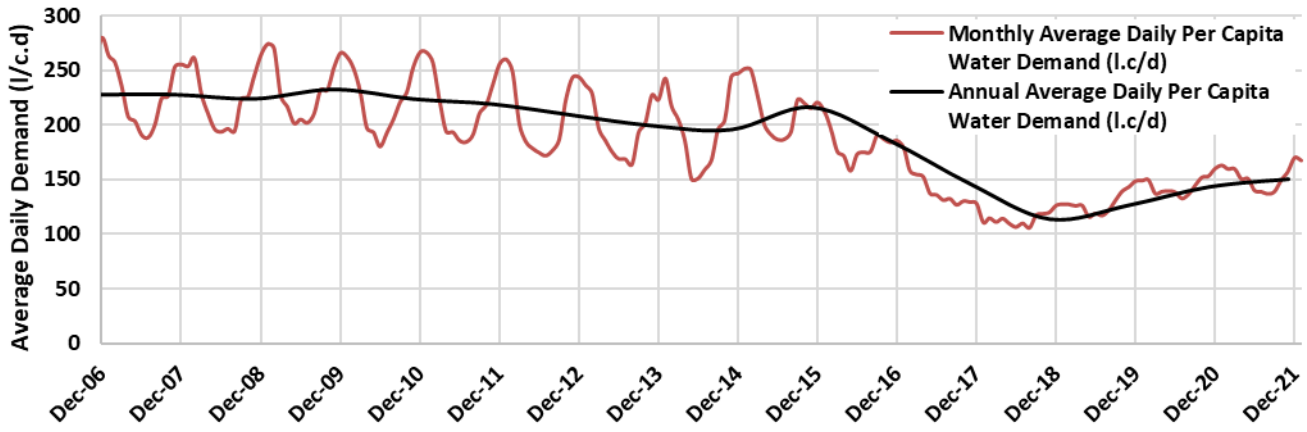


Figure 3 Cape Town total water use (litres per person per day)

2.3 Dam storage levels

Inflows into the dams have exceeded water demand annually, resulting in full dams at the end of winter during the last two years (Figure 4). Full dams offer water security to Cape Town for approximately two years. Cape Town's Weekly Water Dashboard provides, among other information, regular updates on the status of the dams.[1]

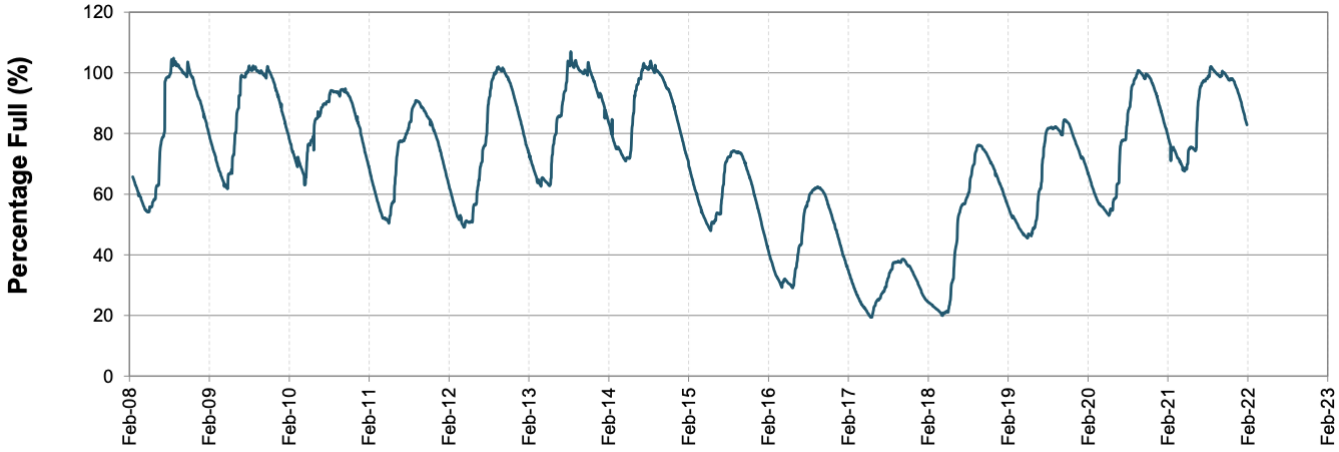


Figure 4 *Combined storage level of large dams supplying Cape Town*

2.4 Current level of assurance of supply

As a result of the fact that water demand has been and remains well below pre-drought levels (Figure 3), the dams that supply Cape Town recovered quickly and have 'spilled' for the last two (2) years. In the short term, this means Cape Town is water secure. As the demand rebounds and it is critical, as discussed in Section 7, that the NWP is implemented on schedule to maintain Cape Town's water security.

[1] Weekly Water Dashboard

3 Cape Town's current and future water demand

3.1 A rebound in water demand after the drought

Cape Town's total water use (water demand) has increased steadily from a low point of 500 million litres per day in June 2018 (Figure 5). However, peak summer demand over December 2021 – January 2022, of approximately 950 million litres per day, was still below the peak demand of 1 200 million in December 2015, six years earlier. Figure 5 shows that winter demand is close to pre-drought levels, at approximately 750 million litres per day. This implies a change in the water demand pattern, with less water being used outdoors for garden irrigation and the filling of pools, both of which are predominantly summer activities.

Future water use will be influenced by the extent to which outdoor water uses continues to be much lower than before the drought and to what extent indoor use efficiencies are sustained. In other words, how much of the change in demand is due to permanent behaviour changes and the use of alternative sources (e.g. private boreholes and rainwater tanks) versus temporary change 'to make it through the drought'. In addition, water demand may also have been influenced by changes to the tariffs and the economic effects of the global Covid-19 pandemic.

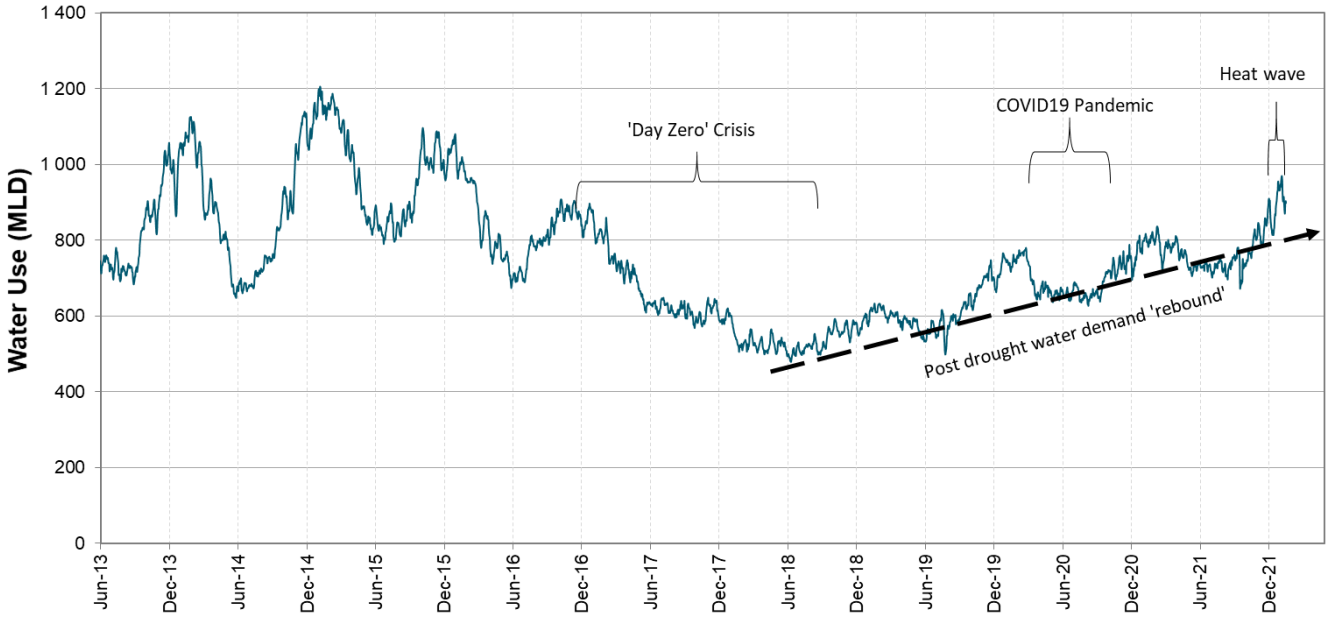


Figure 5 Overall Water Use by the City of Cape Town (Million litres per day)

3.2 Future water demand study

Water demand is the primary driver of the timing of the New Water Programme (NWP), and it is therefore critical that the City develops a detailed understanding of the drivers of water demand in Cape Town. To this end, the City is undertaking a detailed water demand study that will be used to inform decisions on the timing of the NWP.

The study will take a scenario approach based on 'possible, plausible, probable and preferable' demand scenarios. The study will inform both operational planning as well as long-term water resource planning and will seek to address, among others, the following questions:

- To what extent can demand changes be attributed to permanent changes due to landscape changes, installation of boreholes, rainwater tanks, water-efficient fittings, etc?

- To what extent have tariffs have played a role in demand reduction?
- To what extent can demand changes be attributed to changes in behaviour (length of showers, use of baths, etc.) and to what extent have these behaviour changes reverted to previous patterns over time?
- How has pressure management affected total water use?
- How do the above factors differ between socio-economic groups?
- If the City had to implement restrictions in the future, how would demand respond to these restrictions?

The City will use and analyse the following data as part of the effort to answer the above questions:

- Household metering data
- Tariff data
- Water supply pressure data
- Spatial data
  - Cadastral, land use, zoning, property characteristics
  - Zone maps and metered discrete zones
- Remote sensing data (Figure 6)
  - Aerial photography before, during and after the drought
  - Analysis of near-Infrared aerial survey data.
- Census data
- Climatic data

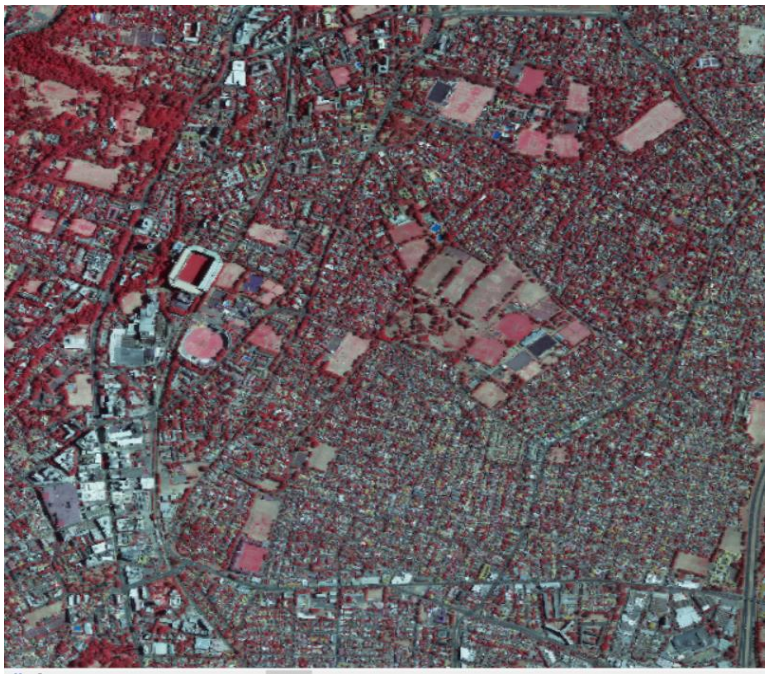


Figure 6 Near-infrared remote-sensing for understanding water demand

The City anticipates initial results from the study by December 2022, in time to inform the next update of the NWP phasing.

3.3 Water demand prediction tool

While the water demand study will provide insight into Cape Town's historical water demand patterns, the City will use the outputs and outcomes of that analysis to develop a tool that can be continuously updated as new information becomes available. This approach will allow the City to leverage and incorporate the latest research, including that generated by local universities, into its analysis and planning. This will help ensure that the City can constantly monitor changes to how water is being used and use these insights to inform planning.

This tool will make an important contribution to Cape Town's goals of becoming a water resilient and water sensitive city.

4 The New Water Programme status update

4.1 Overview

Cape Town's 2019 Water Strategy committed the City to developing 300 million litres per day of additional water supply capacity by 2030 to support its goal of becoming water resilient. This target also includes a surface water scheme being developed by the national Department of Water and Sanitation. A programme to achieve this strategic objective has been prepared by the City's Water and Sanitation Department and is called the New Water Programme (NWP). The City remains committed to achieving the Strategy's goal while noting that the programme's exact timing will depend on Cape Town's future water demand as discussed in the previous section, among other factors.

Planned augmentation schemes will account for approximately 25% of the City's water demand when these projects are run at full capacity. Greater diversity in its water supply sources will increase the City's water security.

Cape Town's future water resource mix will comprise the following sources:

Surface water (rain-fed dams)
Six (6) major storage dams serve the City. These rely on rainfall for replenishment and are connected in an integrated network to increase yield and resilience. Additional surface water supplies will be added to the system over time.

Groundwater
The City obtains water from shallow sandy aquifers as well as deep rock aquifers and is in the process of further developing these sources. These aquifers are being, and will be, managed in an environmentally sensitive and sustainable manner.

Desalination
The City will implement large-scale desalination projects building on its earlier experience of operating small-scale desalination plants. Desalination is likely to become an increasingly significant share of the mix in the medium and longer term because it is scalable and not dependent on rainfall.

Reuse
Water reuse is a cost-effective, reliable, and environmentally responsible option. Adopting water reuse will position Cape Town as one of the leading cities in the world in terms of sustainable water management.

4.2 Project selection and timing

The City updates the timing and phasing of all planned augmentation schemes that make up the New Water Programme (NWP) at the end of every calendar year. The selection and timing of projects which form part of the NWP take the following into account[2]:

[2] Detailed in the Water Strategy

1. **Cost**: Low-cost interventions, including water demand management, the control and eradication of alien invasive plants, and improvements to the management and effectiveness of the integrated surface water system, are prioritised.
2. **Existing funding commitments**: Schemes where funding has already been committed will be completed unless compelling reasons not to do so emerge.
3. **Timing**: Schemes that can provide water sooner will be prioritised until the desired reliability standard has been reached.
4. **Diversification and early learning**: Increased resilience is achieved by introducing different sources of water. In addition, where new sources of water are likely to become an important part of the future water supply mix (for example, desalination), the City will bring forward projects and implement these at a more modest scale to obtain earlier learning. This will enable future larger-scale projects to be implemented more quickly and more cost-effectively, which is an important benefit.
5. **Adaptability and scalability**: In light of the significant uncertainties related to future rainfall and demand, sources of water that can be scaled up and which have adaptable implementation (i.e. projects which can be accelerated if necessary) will be prioritised.
6. **Phasing**. The programme is also structured in two phases: committed projects and an adaptable programme that can be brought forward and/or scaled as necessary and as new circumstances emerge.

4.3 Updated programme

The results of the latest programme update are shown in Table 1. The major changes to the planned programme are as follows:

- Phases 2 and 3 of the Table Mountain Aquifer Project have been deferred to 2035. This will allow the City to learn lessons from the operation of the Phase 1 wellfield (Steenbras wellfield) and to apply these lessons to phase 2 & 3. Phases 2 & 3 can be brought forward should the water resource situation necessitate it.
- There is a slight delay of eight months in the Cape Flats Shallow Aquifer Project.
- The Berg Voelvlei River Augmentation Scheme has been delayed by a year due to the ongoing consultations around water allocations. This scheme is managed by the National Department of Water and Sanitation and is outside of the City's control.
- The Faure New Water Scheme and the First-phase Desalination Project have been delayed by 17 months and 20 months, respectively. This is as part of the post-drought optimisation of the NWP, which has taken into account the impact on tariffs (affordability), rebound in water demand, etc.

Table 1: Timing of New Water Programme project (as at November 2021)

Description	Completion / First Water Date		
	Water Strategy	Revision: Nov 2020	Revision: Nov 2021
Table Mountain Steenbras Phase 1	2020	Jul-20	Jul-21
Table Mountain Nuweberg Phase 2	2022	Dec-26	Jun-35
Table Mountain Groenlandberg Phase 3	2022	Jan-28	Jul-35
CFAStrandfontein West	2020	Jul-21	Mar-22
Cape Flats Aquifer: Hanover Park	2021	Jun-24	Jun-24
Cape Flats Aquifer: Strandfontein North & East	2021	Dec-25	Dec-25
Cape Flats Aquifer: Philippi	2021	Jun-26	Jun-26
CFA Mitchells Plain WTP	2021	Jun-27	Jun-27
Atlantis Aquifer	2021	Jun-24	Jun-24
Berg Voelvlei River Augmentation Scheme	2023	Jun-24	Jun-25
Faure New Water Scheme Phase 1	2024	Jun-26	Nov-27
Desalination Phase 1	2026	Jun-28	Feb 30

The effects of these changes on the planned increase in water supply capacity are shown in Figure 7. The New Water Programme is still on track to deliver close to 300 million litres per day of additional water by 2030, as per the commitment in the Water Strategy. The delay in bringing new water on stream increases water security risks in the period from 2024 to 2028, as detailed in Section 6.

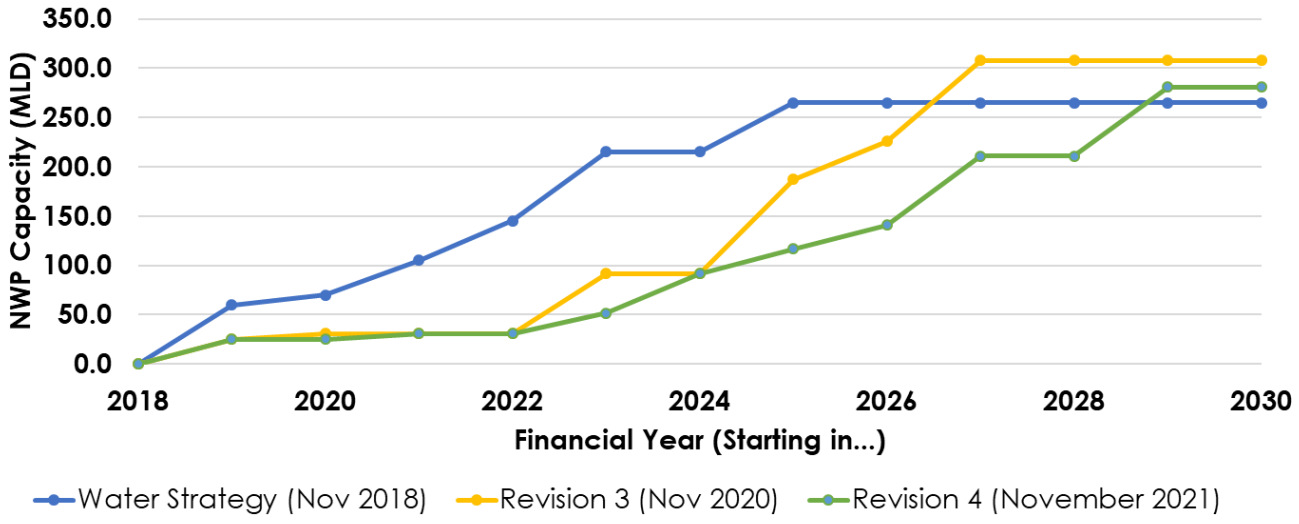


Figure 7 Updated timing and total supply capacity of the New Water Programme brought online

5 Selected project updates

5.1 The clearing and long-term control of alien invasive plants

Investing in catchment management is a cost-effective and sustainable way of improving Cape Town's water resilience and is a priority.

Some 'thirsty' invasive alien plant species grow rapidly and can significantly reduce the flow of water into the dams supplying Cape Town, reducing the overall yield of the system. It is estimated that the growth of alien invasive plants has reduced the amount of water that reaches the rivers and dams by approximately 55 million m^3 per year, and which equates to a reduction in the Western Cape Water Supply System's (WCWSS) yield of approximately 26,5 million m^3 per year (or 73 million litres per day). If future growth of these plants is left unmanaged, it is estimated that the WCWSS's yield will be reduced by approximately 85 million m^3 per year (or 232 million litres per day) by 2045.

The affected catchments fall both inside the boundaries of the City of Cape Town's jurisdiction as well as outside. The City undertakes invasive alien plant clearing in the catchments within its boundaries. In addition, the City contributes to catchment management through the water resource management charge levied by the National Department of Water and Sanitation (DWS). Other users (for example, agriculture) contribute through the same mechanism to catchment management activities, either directly via the National DWS or through the Breede-Gouritz Catchment Agency.

Figure 8 Clearing of alien invasive plants (AIPs) in the Western Cape

Agreement to fund the clearing and long-term control of alien invasive plants

Past efforts at clearing invasive alien plants have not been sufficient and a more substantive and coordinated effort is needed. To this end, the City Council approved a memorandum of agreement between the City of Cape Town and The Nature Conservancy in March 2021 which committed the City to investing R50 million over a period of two years (up to June 2023) to bolster efforts to clear thirsty alien invasive plants in higher-lying areas of dam catchments to help increase and safeguard future water supplies.

This agreement followed on from previous activities that included:

- A **memorandum of understanding** between the City of Cape Town and The Nature Conservancy (TNC) signed in 2016 whereby the City invited TNC to explore the creation of a Greater Cape Town Water Fund (GCTWF). The purpose of the Water Fund is to create suitable financial and governance mechanisms that unite public, private and civil society stakeholders around a common goal to contribute to water security through nature-based solutions and sustainable watershed management.
- A **steering committee** formed by TNC to guide the process of the establishment of the GCTWF, working with the National Department of Water and Sanitation, the Department of Environmental Affairs and Development Planning (DEADP), the South African National Biodiversity Institute (SANBI), the World Wide Fund for Nature (WWF), Cape Nature and key private sector partners.
- A **business case** for the GCTWF (November 2018), based on scientific analysis of alien plant growth and yield reductions, stakeholder engagement, long-term funding requirements, and a pilot programme to remove alien invasive plants affecting the Atlantis aquifer, a key water source for the region. The business case quantified the return-on-investment that nature-based solutions could bring to Cape Town.

Figure 9 Pine trees invade large areas of the mountain catchments

The Greater Cape Town Water Fund

The Greater Cape Town Water Fund will fall under the direction of the steering committee until it is established as a legal entity. Agreements will be set up between institutions to allow for secure long term funding for the clearing of AIPs by various implementing agents, e.g. Cape Nature. By following the approach outlined above, the City of Cape Town will be giving effect to the actions required under the Council-approved Resilience Strategy as well as the Water Strategy.

TNC plans to establish the GCTWF as a separate legal entity with a sustainable, long-term funding strategy. TNC will exit the Fund when it is financially sustainable and the GCTWF can then function independently.

The TNC currently gets the majority of its funding from the private sector (e.g. global corporates, local industries, philanthropy foundations). To date the TNC has raised R130 million from private sector sources. This funding has enabled the clearing of AIPs in high-altitude areas. For the 2020/21 financial year, the TNC matched the contribution from the City of Cape Town with an equivalent amount from the private sector and will also strive to replicate this in subsequent financial years. In the 21/22 and 22/23 financial years, amounts of R20 million and R25 million respectively have already been committed by the private sector.

Tracking the impact of alien plants on system yield

Failure to manage the growth and spread of alien plants in the past resulted in less water being available to the City than had been predicted in the forecasting model. This is because the yields had been calculated based on assumptions that an AIP clearing programme would be implemented. This was not a robust assumption. Therefore, the yield forecasting has been changed to explicitly show the impact of alien plant growth and to track the implementation and effectiveness of alien invasive plant control. An integrated approach involving ongoing follow up and maintenance, and stopping the spread of invasive trees, specifically pine species is essential to maintain the water gains.

The use of the water resources management charge

Overall, not enough is being spent on controlling alien invasive plants yet. The City will engage with the National Department of Water and Sanitation to determine how the Water Resource Management Charge could be best used to contribute to this very cost-effective way of protecting and increasing system yield.

5.2 An independent advisory panel for reuse and desalination

Cape Town's Water Strategy commits the City to diversify its water sources in order to build water resilience, including desalination and reuse. The New Water Programme includes two large and complex projects:

- The **Faure New Water Scheme**: A water reuse scheme with an ultimate capacity of 100 million litres per day and an estimated capital cost of R1,9 billion.
- A **permanent desalination plant** with a capacity of 50 million litres per day and an estimated capital cost of R2 billion.

It will be the first time that the City will be implementing projects of this kind at this scale. The Faure New Water Scheme will also be the first to be implemented at this scale internationally.

Given the magnitude of the capital commitment and the associated design, construction, operational and public acceptance risks, the City has decided to obtain expert advice and guidance for these two projects' planning, design, implementation, and operation.

Purpose and functions

The purpose of the independent advisory panel (IAP) will be to offer independent and expert advice to the City for the full duration of project planning, design, construction and initial operation of the abovementioned projects. The IAP will also provide expert and impartial validation of the project's soundness and safety.

The functions of the IAP will include the following:

- To promote the transparent development of potable (drinking quality) water reuse and desalination by the City to enhance public health through the appropriate application of science, engineering, and related best practices.
- To provide technical, engineering and project implementation advice at a level expected of leading experts in the reuse and desalination industries throughout the life-cycle of project implementation.
- To provide advice and support in response to questions raised by the City, their engineering team, and ultimately the scheme's operators.
- To provide support in interactions with the public, decision-makers, and regulators.

Membership

Members of the IAP will comprise experts in the following areas (among others): infrastructure design, water quality, microbiology, water treatment technologies, regulation, toxicology, water quality risk assessment and management, water chemistry and recycling, and water resource and environmental protection. Members will have a demonstrated commitment to advancing public health goals. In serving on the independent advisory panel, members must be free of real, potential or apparent conflicts of interest.

Establishment

The City has signed a memorandum of agreement with Water Research Commission (WRC) to establish an independent advisory panel for water reuse and desalination.[3] The City and the WRC are in the process of drafting the terms of reference to establish the IAP and outline the scope, roles and responsibilities, remuneration, meeting schedule, expected outputs and outcomes, and other necessary details. Once the terms of reference have been approved, the WRC will recommend a team of experts for consideration in consultation with the City. Members of the panel will serve in their professional capacity for a fixed term of three years, with the possibility of renewal for a second three-year term if invited to do so. The reports prepared by the panel will be made available on the City's website.

[3] The WRC was established in terms of the Water Research Act (Act No 34 of 1971) and is South Africa's premier water knowledge hub. The WRC currently coordinates several independent advisory teams of experts and communities of practice on a range of water-related themes; including the Team of Experts for Inter-Ministerial Committee on Acid Mine Drainage, Advisory Panel on Climate Change, and Advisory Panel on Water Technologies.

5.3 The Faure New Water Scheme

Water reuse is a major feature of Cape Town's Water Strategy.

The City's Water Strategy states that the City is committed to maximising the reuse of wastewater in line with the second edition of the National Water Resource Strategy (2013) to meet current and future water demand. At present, some 8% of treated wastewater is recycled for industrial, commercial and landscaping purposes. The 10-year committed programme includes future plans for the use of treated wastewater to recharge the Cape Flats aquifer and as a direct source of drinking water that will be blended with water supplied from the Faure water treatment plant, which serves a large part of the municipal area. This is in keeping with the City's objective of creating a water-sensitive city that seeks to maximise the integration of the urban water cycle that builds resilience and protects Cape Town's sensitive natural ecosystems. It also draws on international best practice.

Re-use increases water resilience, is cost-effective and less energy-intensive

Water reuse increases water resilience by introducing an additional engineered loop into the water cycle (Figure 10), and thereby ensuring that the urban water cycle is managed in a holistic and integrated manner.

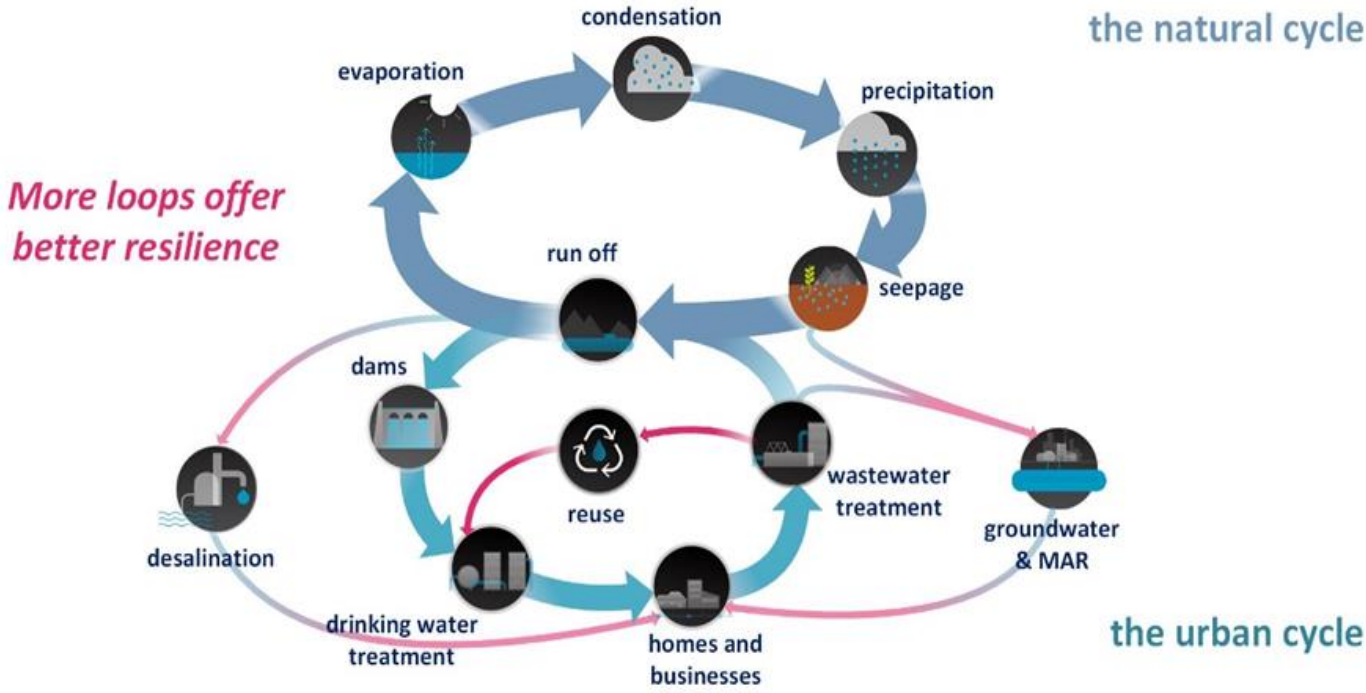
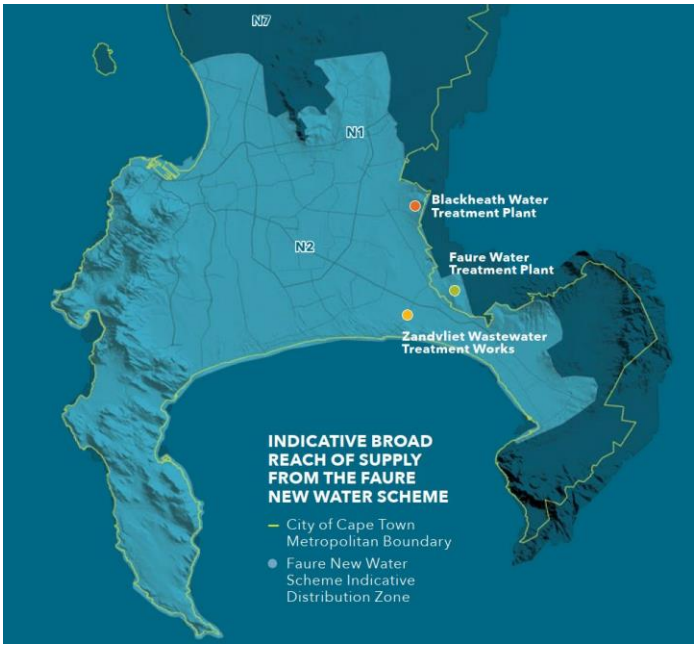


Figure 10 Improving the resilience of Cape Town's urban water cycle

Water reuse as an important part of the diversified mix of new water sources that will contribute to a more secure shared water future. Water reuse is also cost-effective and is much less energy-intensive compared to desalination.

The concept

The Faure New Water Scheme will receive source water from the upgraded Zandvliet wastewater treatment works. This facility will channel the effluent to a new advanced purification plant located at the Faure water treatment plant near Somerset West. Up to 100 million litres of clean drinking water will be produced per day. Initially, this supply will be blended with raw water from dams and treated once more using conventional treatment methods. From there, the distribution network will have the flexibility to supply the water widely across most of Cape Town.



Treatment process

The scheme combines the newest purification technologies with sophisticated online monitoring and control systems and best-practice operating protocols. The treatment process design follows the Validation and Hazard Analysis and Critical Control Points (HACCP) approach used by the food and beverage industry and has been peer-reviewed by international water reuse experts. The scheme involves a carbon-based treatment process, shown in Figure 11, which includes biological nutrient removal filtration, ozonation, biological activated carbon filtration, granular activated carbon filtration, ultrafiltration and ultraviolet light advanced oxidation.

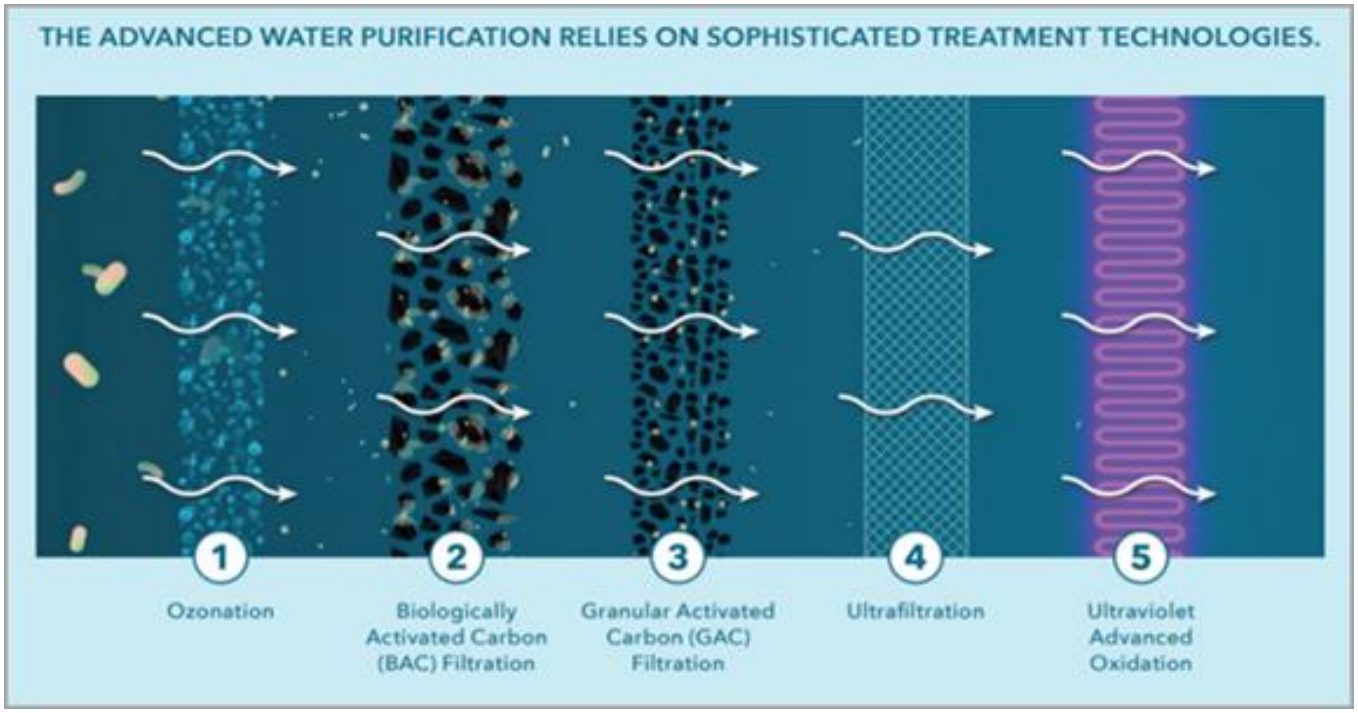


Figure 11 Faure New Water Scheme treatment processes

Stakeholder engagement

Communication materials relating to water reuse have been developed and are available on the City's website (www.capetown.gov.za/water-reuse). These include a brochure, leaflet and video - available in English, Afrikaans and isiXhosa – as well as a frequently asked questions sheet and a presentation.

The City has engaged internally with its staff and elected representatives as well as with neighbouring municipalities, provincial and national government officials, scientists and academics, environmental organisations, traditional leaders and religious leaders regarding the Water Strategy. Feedback to date has been positive and supportive across all engagements.[4]

Demonstration plant

The safe design of the Faure New Water Scheme has been informed by the knowledge and experience that the City gained through the implementation of a 10 million litres per day demonstration plant situated at the Zandvliet wastewater treatment works. This plant was initially intended as an emergency scheme to supplement the City's potable water supply but was later repurposed as a demonstration plant for the Faure New Water Scheme. As a result, stringent validation processes were undertaken and invaluable experience was gained.

Figure 12 Reuse demonstration plan

[4] These engagement started in October 2019 but the level and intensity of engagements over the last two years has been affected by the Covid-19 pandemic.

6 Other initiatives to improve water resilience

6.1 A Decision Support System for water resources management

A detailed review of water resources management during the drought showed that inadequate monitoring, operational inefficiencies, and long-term planning shortcomings contributed to the severity of the drought. The impact of climate change on the WCWSS has also become more evident.

Improved monitoring, analysis and decision-making will improve the resilience of the WCWSS. This requires the collection, management, analysis and interpretation of a large amount of data. The City's management of this data has evolved from a paper-based system (up to 1997) to an Excel spreadsheet based system (until recently). Data is manually captured from various sources used in several different water resources and bulk water supply models, with each model operating independently, and relies on consultants to process the data. The manual nature of data collection and reliance on external specialists is not sustainable in the long term. The recent drought further highlighted the fact that the potential loss of institutional knowledge is a significant threat to Cape Town's water security.

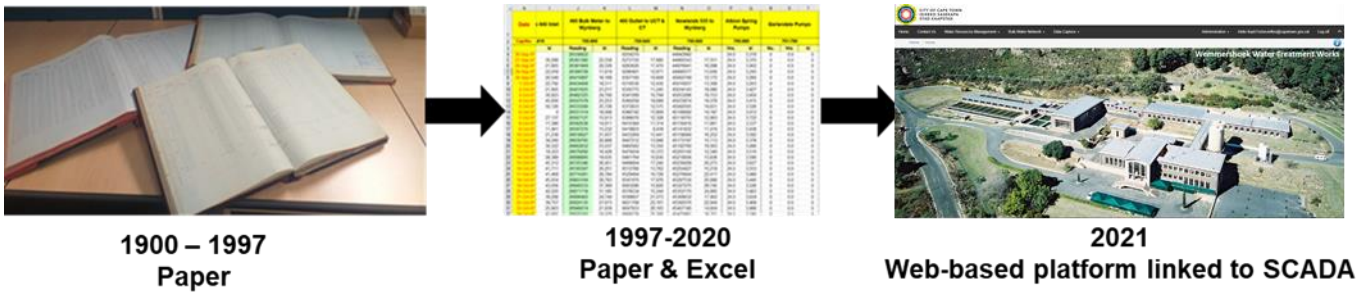


Figure 13 Progression in data management

To address these concerns, the City is developing a Decision Support System that will allow the City to monitor water management within the WCWSS and actively engage in all aspects of this management. This includes the following: efficiently providing decision-makers with the information required to plan for, prioritise and phase investment options using an adaptive pathways approach; monitoring and assessing the impacts of climate change; capturing and storing institutional knowledge, and assisting the City with operational decisions.

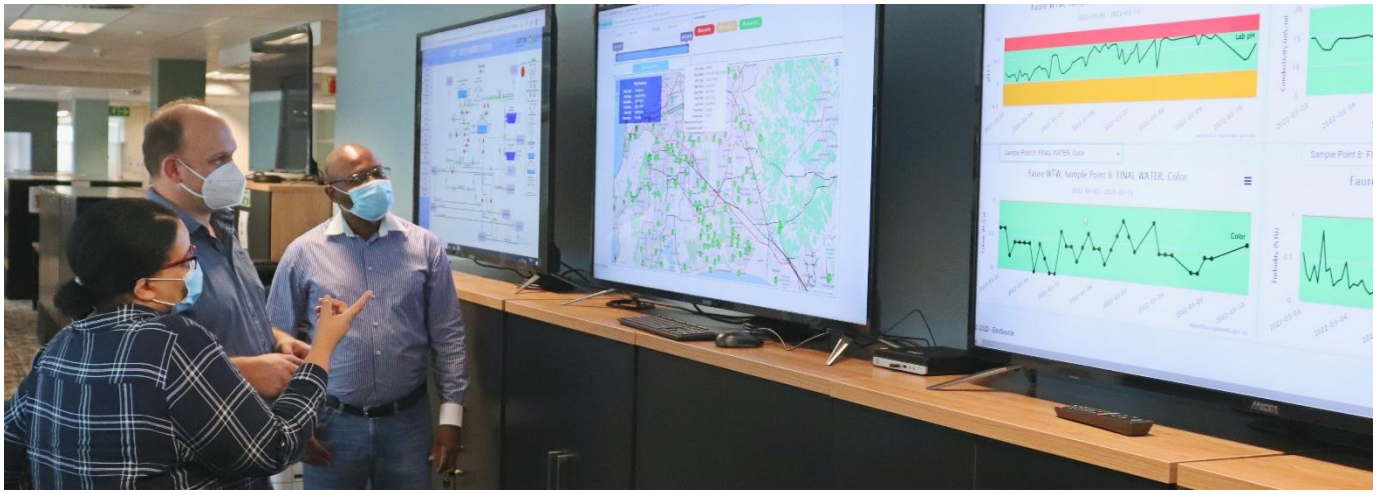


Figure 14 The Decision Support System being utilised

Implementation has been progressing steadily, including the following work streams:

- Centralised data management that allows for machine learning and artificial Intelligence processes.
- Creating a digital twin of the City's bulk water system and allowing the City to model ways to improve the system by applying improvements in the digital version, tracking the responses and then carrying the lessons learnt over to the real world infrastructure for more resilient and more responsive outcomes.
- Turning data into information through the development of tools that translate data into graphic, spatially-defined information that directly impacts our business and is relevant for decision-makers.
- Developing predictive tools to guide long-term planning.

7 Cape Town Water Outlook

7.1 Cape Town's future water security

In the short term, Cape Town remains water secure. If Cape Town's demand continues to tracks the low water demand curve, it will be necessary to implement the NWP as currently scheduled (Figure 15). If instead, water demand follows the planning demand curve adopted in the Water Strategy, it will be necessary for the City to ensure the New Water Programme is accelerated otherwise Cape Town's water security will be compromised.

Project delays will expose the City to water security risk

The implementation of the NWP now matches the low water demand curve – which the City is currently tracking – and the new water schemes will now no longer be implemented five (5) years in advance of when they are required. This poses a potential risk to Cape Town, as any further delays in implementation will mean that the City will no longer be able to supply water at a 1:200 year (99.5%) level of supply assurance. Reasons for the adjustments to the timing of the NWP are discussed in Section 4.3, and are largely as a result of the post-drought optimisation of the NWP, which has taken into account the impact on tariffs (affordability), rebound in water demand, etc. The timing is regularly reviewed based on the latest available information.

No five-year buffer

The Water Strategy aimed to implement future supply schemes five years before each scheme was required to meet projected demand. This approach to planning aimed to mitigate the uncertainties around possible implementation delays, climate change, future droughts and the rebound in water demand. This aimed to provide a 1:200 year level of supply assurance, which circumvents the need to impose water restrictions of greater than 30% even if another severe drought similar to that experienced during 2015 - 2018. For the reasons set out in Section 3, this five-year buffer has now been lost.

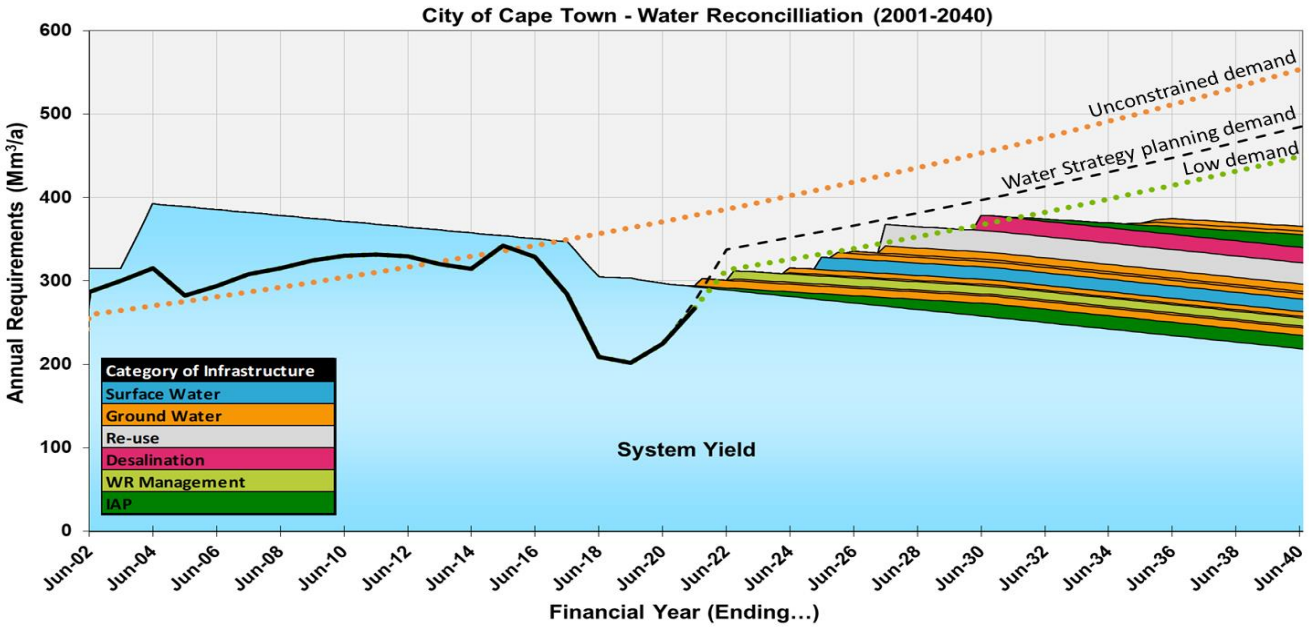


Figure 15 *Cape Town water supply vs demand – incorporating the NWP and climate change*

Risk analysis

The timing of the New Water Programme is reviewed annually to ensure that forecasts are as accurate as is practical, as new knowledge is gained and as a result of factors outside of the City's control. Given the updated programme forecast, set out in Section 3, and the fact that the programme now tracks the low demand projection without any project timing buffer, an extensive risk analysis was undertaken to look at the likelihood and severity of restrictions. This considered seven scenarios for adjusting the timing of the NWP based on climate and water demand (Figure 11). The analysis further demonstrated that to ensure that Cape Town remains water secure and resilient to future droughts, there can be no significant further delays to the New Water Programme projects (Table 1).

7.2 Conclusions on Cape Town's water outlook

Five significant conclusions may be drawn from the above discussion about Cape Town's water outlook and water supply security:

- It is imperative that the revised (November 2021 - Table 1) New Water Programme's planned timeframes are met and that projects are not delayed any further.
- There is an urgent need to understand Cape Town's demand trajectory better, as discussed in Sections 2 and 3.
- If Cape Town is exposed to a scenario where there is a step-change in rainfall, the NWP would need to be adjusted and many schemes brought forward as the current planning assumes a gradual decline in rainfall.
- Water Reuse and desalination are critical resources for the future.
- Planning for the adaptable New Water Programme needs to proceed.

The risk analyses undertaken by the City underscore these conclusions.