
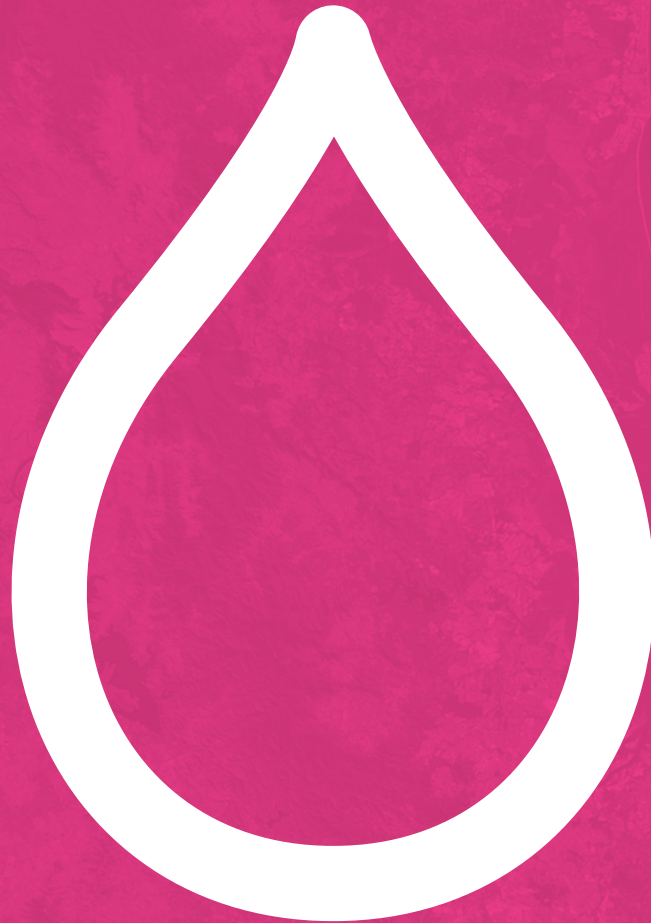


**WITHOUT  
LIMITS**

**SEQ2040**   
**GROWING BETTER**



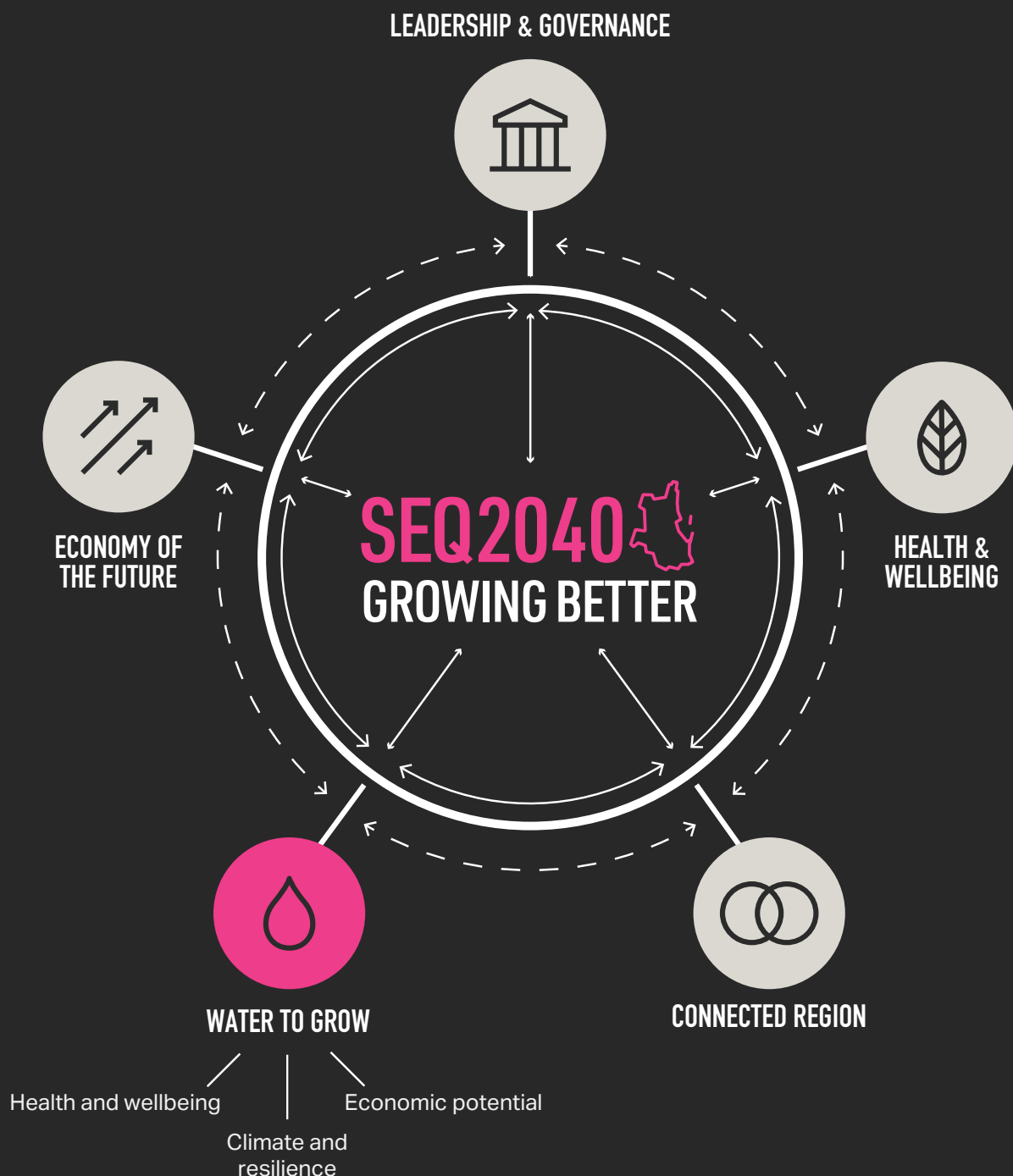
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## **PAPER 2 WATER TO GROW**

Author: Alastair Leighton, Director – Cities, AECOM

**AECOM**

**SOUTH EAST QUEENSLAND'S DEMAND FOR WATER IS AT ITS HIGHEST EVER, WITH ANNUAL RAINFALL DELIVERED IN FEWER DAYS PER YEAR THAN EVER BEFORE. HOW CAN WE TAKE A DIFFERENT APPROACH TO WATER MANAGEMENT TO ENSURE THAT WE HAVE WATER TO GROW?**



# 01

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## THE CONTEXT

It seems strange that we pay more for bottled drinking water than we pay for fuel, particularly when we waste large quantities from our taps. What happens when the demands of the growing population, economy and the environment exceed the available supply?

Our approach to managing water acknowledges that we typically have either too much or too little. In South East Queensland (SEQ) we experience that dichotomy in extremes. We have recent drought and flood experience. It's predicted that more extreme events will make this damaging cycle an even greater risk and in the face of this, our fragmented approach to supply, our waste and drainage systems

are showing the cracks. We need a robust, integrated and visionary plan to enable us to adapt our current practices – to manage risks, but also to imagine and unlock far more value from our relationship with water.

We must question our awareness of water challenges as SEQ grows. How much energy have we committed to thinking ahead to ensure that we safeguard this critical resource? How will we share our existing water with another two million people in SEQ? How will we harness water to the best economic, social and environmental effect at the heart of a dynamic and resilient polycentric region?



**WATER IS ONE  
OF OUR MOST  
VALUABLE  
ASSETS. HOW  
DO WE VALUE  
OUR WATER?**

# 02

## THE CHALLENGE

**O**ur structural approach to water is outdated. The roots of water management can be traced back to rapid urbanisation and public health threats during the nineteenth century when limited infrastructure and contaminated supplies generated deadly cholera outbreaks in London. The responsibility for water supply and wastewater systems was demarcated, and the infrastructure to support population growth followed. Water became a critical public health issue and, therefore, critical infrastructure for communities and it remains so today. Currently we have a clear split in our attitudes to water into three very separate systems: potable supply, waste disposal and efficient stormwater removal.



POTABLE SUPPLY



WASTE DISPOSAL

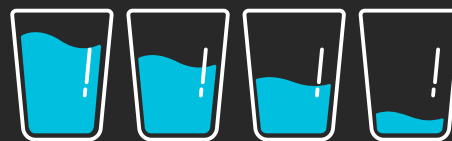
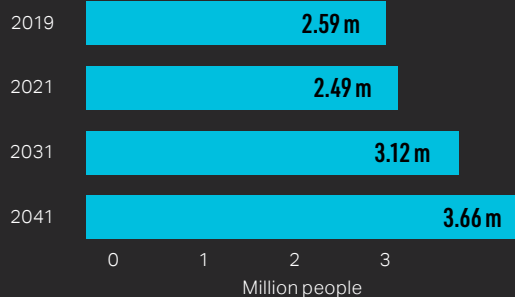
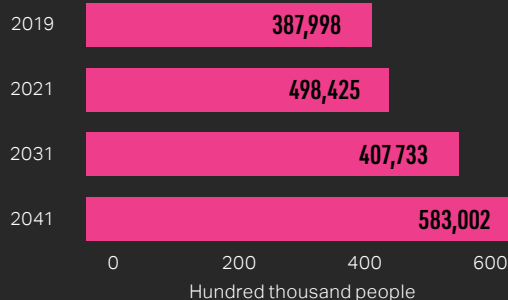
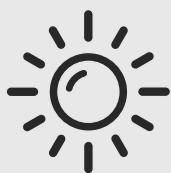
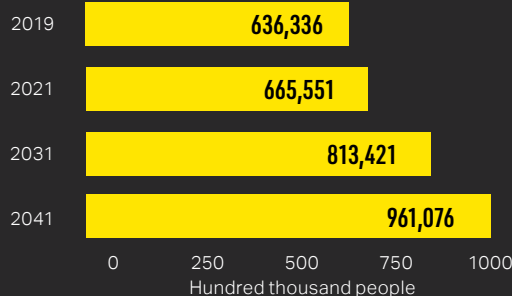


EFFICIENT  
'STORMWATER'  
REMOVAL

**The need for efficiency led to these water systems being addressed in isolation and created a complacency that is shaken when our supply is threatened.** When water is supplied, it is clean, safe and sustaining. Once used, it is dirty, unpleasant and to be disposed of as quickly and effectively as possible (while protecting the rivers and oceans). The 'third water' – stormwater – is drained away through fast and efficient drainage systems.

**SEQWATER ESTIMATES THAT BY 2046  
THE TOTAL WATER DEMAND WILL  
OUTSTRIP THE CURRENT TOTAL WATER  
FROM AVAILABLE SOURCES BY 20%.**

**SOUTH EAST  
QUEENSLAND'S  
POPULATION IS  
ESTIMATED TO  
GROW FROM  
3.2 MILLION TO  
5.5 MILLION BY 2041**

**2019**TOTAL WATER  
FROM AVAILABLE  
SOURCES**440,000**  
ML/ANNUM**2046**TOTAL  
WATER  
REQUIRED**525,000**  
ML/ANNUM**BRISBANE****SUNSHINE COAST****GOLD COAST**Source: [yourseqwater.com.au](http://yourseqwater.com.au), 2019

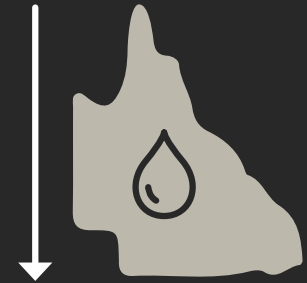


**W**e either need to reduce consumption dramatically or consider alternative mechanisms to ensure continuity of supply. We have grown accustomed to abundance at little cost, but population growth combined with climate risks will force us to rethink our approach.

**The current planning approach doesn't address the challenges of climate risk, population growth, health challenges, the economics of scarcity, and geopolitical and regional challenges associated with land and resources.** The [State Infrastructure Plan](#), [Shaping SEQ](#), and [Connecting SEQ 2031](#) all use a 'predict and provide' methodology – predicting growth and determining population demand using current trends to

ensure a supply of sufficient housing, hospitals, schools, jobs, energy, water and transport infrastructure. It looks backward to look forwards and reflects current fragmented approaches to infrastructure and responsibility.

**We need to plan, monitor, and manage the future.** We must embrace new ways of thinking and investing to address new challenges and build resilience as part of a brighter future for SEQ to 2040 and beyond. We need forward-thinking to assess current performance and make sure we have a robust platform. Consideration of our water behaviours today presents a range of tangible risks that we need to address.



**RAINFALL INTENSITY HAS INCREASED. QUEENSLAND'S TOTAL ANNUAL RAINFALL IS NOW DELIVERED IN 70 DAYS, WHEN IT USED TO BE SPREAD OVER 100 DAYS. THIS IS ONE OF A NUMBER OF CHALLENGES THAT NEED TO BE UNDERSTOOD TOGETHER AS SEQ GROWS.**



**50%**

increase in days over 35° by 2030 (Sunshine Coast)



**30%**

projected decrease in rainfall by 2070



**17%**

of Gold Coast households under rental stress

**We must understand all infrastructure in terms of the economic, social and environmental return on investment.** Our demand for water supply is split between residential communities, industry, other commercial uses, agriculture and the environment. It represents our investment in communities to *grow better*. We need to value water in the same way we value other things we consume. Water needs to be recognised as a critical and scarce asset to sustain the economic and social needs of communities and as a vital component of our environmental systems.

**Investment in infrastructure can deliver multiple benefits if an integrated and collaborative approach is taken,** combined with an appropriate timeframe for realising a return on the investment (or recognising the potential costs associated with different risks eventuating). We need to understand the full potential and the associated asset value of water as a framework for future investment that can deliver a more ambitious and comprehensive return on investment, based on the demands of the climate and population growth.

# CASE STUDIES



## SAN FRANCISCO BAY

**San Francisco Bay** is managed by a whole-of-catchment approach to water networks and flood risk. The San Francisco Public Utilities Commission developed a framework for investment with short, medium and longer-term strategies to manage flood risk, but it also delivers a range of benefits from an ambitious and integrated approach. It acknowledges the interconnected nature of infrastructure networks, environmental systems, and communities. Investment committed to addressing a primary challenge can deliver a broader value proposition and unlock additional potential if opportunities and ideas are explored at the right time.



## YORKSHIRE WATER

In the UK, **Yorkshire Water** has developed different approaches to demonstrating value – for stakeholders and community – through the development of different types of capital. This recognises the value proposition derived from an infrastructure dividend. The water system is about far more than dams, pipes, and taps. The infrastructure enables and supports the development of other human, environmental, and social forms of capital that can be defined as a tangible asset, with real value.

# 03

## OUR PROPOSITION

### OUR PROPOSITION IS FOCUSED ON THREE AREAS:



To develop an understanding of the economic potential of water as an asset, to deliver capital value and enhanced opportunities for new funding and delivery models.



A specific role and function for water systems related to enhanced health and wellbeing for growing communities (the health of people and places).



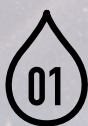
Long-term integrated thinking to deliver enhanced outcomes for climate responsiveness and community resilience.

**T**hese areas overlap, but we also need to understand them as discrete opportunities to deliver tangible legacy value. The leadership, governance, and funding arrangements addressed in paper 1 - [Leadership and Governance](#) provide a strategic framework for adopting this ambitious approach.

We consulted with organisations in the SEQ water sector, including Seqwater and Unitywater. Their leaders are optimistic and visionary in their approaches to these challenges. Like in other sectors, there are constraints to what can be achieved through the limitations of a fragmented and inflexible approach (our established ways of dealing with water) along with considerable public complacency increasing the level of risk.

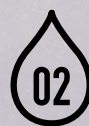
Our *SEQ2040 – Growing Better* vision values water as an asset and recognises its scarcity but realises the transformative potential of smart and integrated approaches to water services within resilient communities. Our fragmented approach to infrastructure planning, investment, delivery and management will struggle to optimise this precious resource – a different, integrated and place-based approach is required.





## RECOGNISING AND HARNESSING THE ECONOMIC POTENTIAL OF OUR WATER

- We need a circuit-breaker to change established practices for procurement, delivery, and investment required to adopt alternative approaches that can deliver smarter responses for the climate and the community. Delivery models for residential development are typically based on extensions to infrastructure on a house-by-house basis, providing the traditional network of pipes. In parallel with public and industry engagement, we must define mechanisms to support new investment in 'advanced infrastructure'.
- We should develop a clear understanding of the capital value of ecosystem services as part of regional and local planning frameworks. In the US, this approach is a requirement for regional planning. It provides an understanding of the economic value of the environmental services such as water treatment within a catchment. It places a replacement value on these services to ensure that the value of preservation – or the cost of loss – can be understood in real economic terms. These environments are a critical asset for future resilience.
- We need a public debate for the region. Growth expectations for SEQ in 2040 have implications for different classes of infrastructure that we have typically assigned to separate silos for regulation, ownership and investment. An integrated plan with a legacy focus would enable proactive change to be defined to deliver an appropriate return on investment linked to a clear vision for SEQ's future performance. This plan could then provide an incremental but ambitious mandate for change to deliver certainty to support longer-term investment.



## USING WATER TO ENHANCE COMMUNITY HEALTH & WELLBEING

- Our water approach should also influence future economic performance through smarter integration and the economic productivity that comes from a healthy community. Water plays a critical role in a place-based and climate-responsive approach to delivering healthy, resilient communities.
- We are not creating healthy environments, and we need a compelling alternative to break the mould of piecemeal pipe-based (closed) infrastructure. We should establish new funds as the vehicle for proactive investment in water infrastructure networks as the foundation for healthy and vibrant communities. These would have enhanced shade and an environment geared to supporting more active lifestyles from the outset.
- We propose micro storage networks to build enhanced resilience. This initiative would be based on community partnerships and joint ownership models. Local storage networks would also be used to support irrigation for urban cooling, enable productive landscapes associated with community health and wellbeing and unlock commercial potential for economic benefit.



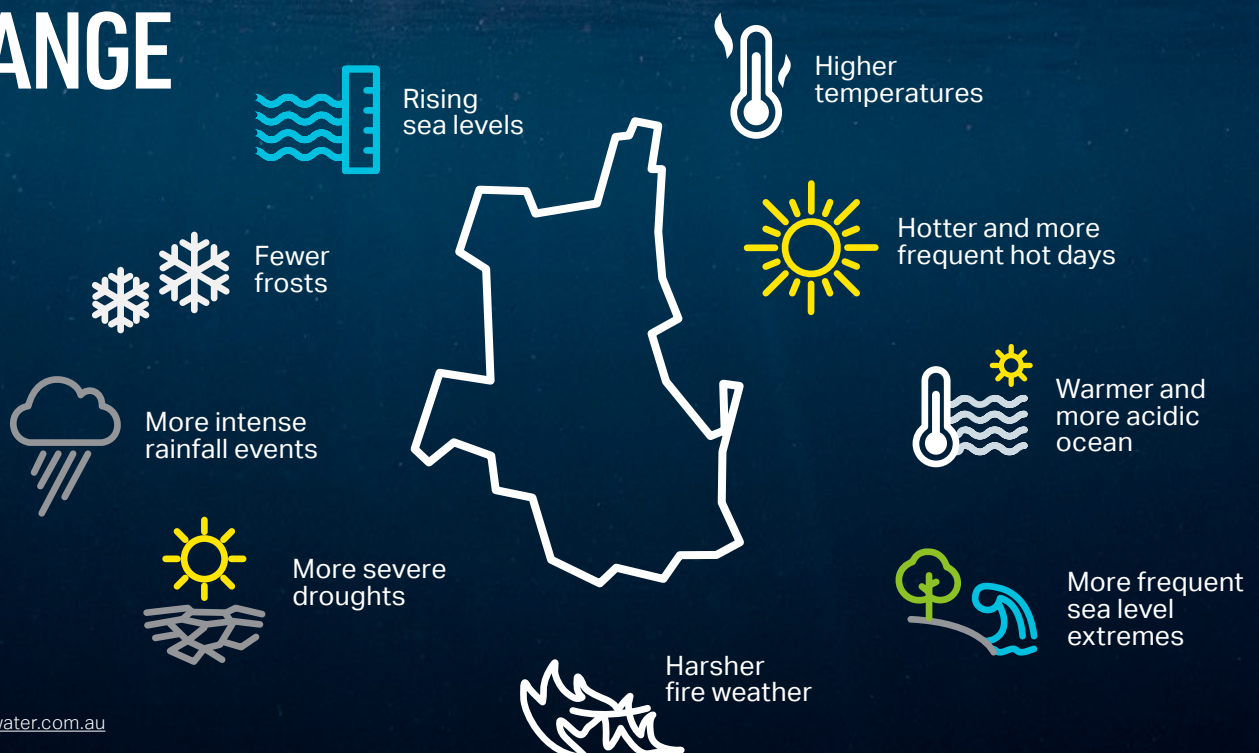


## BUILDING RESILIENCE TO CLIMATE CHANGE AND WATER SCARCITY

- We need to stimulate enhanced public engagement and debate about the future of water as a critical asset with significant economic, social and environmental value. This should drive adoption of recycled water for potable reuse as a staged requirement i.e. initially surface water storages would be sustained with recycled water. Eventually, the operational costs of this practice would be optimised with direct potable reuse.
- Increased competition for water and recycled supplies are emerging as an essential source of supply for water-intensive practices. Planning should include the assessment of sustainable demand thresholds for populations, industry and agriculture – balanced with environmental functions to include the potential for managed and subsidised transition from unsustainable practices within the context of the regional setting. We need to address unsustainable practices and safeguard the health of environments.
- We should reclassify wastewater as 'reclaimed water', a valuable resource within water cycle management. To meet the challenges by 2040, the industry needs to adapt to new technologies (especially those that have been accepted elsewhere). For example, decentralised water solutions: smart-water systems and water reuse in residential developments, such as those by South East Water in Victoria. We also need to implement solutions to address emerging contaminants.
- Our environment works hard to provide us with the conditions we need for habitation. Landscapes around water catchments provide natural pre-filtration of water. This is part of the 'ecosystem services' idea, where the outcomes require investment if the ecosystem contribution is lost (for example, in the case of fires in New South Wales and Victoria where forests were lost and ash was washed into water catchments).

# CLIMATE CHANGE

## WHAT DOES IT MEAN FOR SOUTH EAST QUEENSLAND?



Source: [seqwater.com.au](http://seqwater.com.au)

# THE BENEFITS OF CHANGE

The benefit of change is an opportunity to deliver something different. A bold new strategic vision and integrated regional planning for water is an asset and a robust and proactive measure to ensure we can maintain the levels of supply to sustain growing communities, the economy and the environment.

## A DIFFERENT APPROACH OFFERS THE POTENTIAL FOR A RANGE OF TRANSFORMATIONAL BENEFITS TO HELP SEQ GROW BETTER:



Widespread awareness of the value of water as an asset, supported by long-term community investment in 'advanced infrastructure'.



Demand reduction through the (mandatory) adoption of long-overdue water-smart technologies, supported by a clear value proposition to address short-term cost concerns.



Security of supply through a more diverse and resilient network, including recycled drinking water.



A balanced approach to demand between communities, the economy and the environment, through a comprehensive recalibration of demand and pricing to match supplies.



Communities characterised by enhanced shade and climate-responsive environments, achieved through improved irrigation.



Smarter cycling and storage of water within local networks to harness value from water for urban cooling, and to stimulate local economic development through sustainable water-based businesses.



Networks of productive landscapes within communities to enhance social connections, local food production, economic participation and deliver enhanced health and wellbeing.



The establishment of SEQ as a region of smart, sustainable growth and resilient communities, designed and managed to unlock the potential of water as an asset.

Our existing approach to water was designed and regulated in response to a public health crisis derived from rapid urbanisation. This generic approach in developed economies has served us well, but it has delivered an inflexible, fragmented and industrialised approach that is no longer fit for purpose. Patterns of climate change and population growth demand that we now rethink our approach to water in response to different acute challenges to our health and wellbeing – at a time when the old infrastructure is wearing out and current strategies are no longer affordable for renewal. We need to question our existing approach to provide what communities need now and will need into the future.

Cape Town recently faced a significant threat to the water supply for the population of 4.5 million.

Enduring droughts in Australia at the end of 2019 required supply to be maintained for some communities with water truck deliveries. Many global cities including Beijing, Moscow, London and Tokyo – are at significant risk of water shortages in the near future.

These challenges create the obligation and permission for us to rethink and reimagine our relationship with water. We need to establish a bold long-term vision for an SEQ region that is significantly water-smarter and sets a new global benchmark for community participation and healthy sustainable growth. We need to value water differently.

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# CALL TO ACTION

# WATER IS CRITICAL TO OUR SURVIVAL. WHAT WILL YOU DO TO ENSURE ITS SUPPLY IN THE FUTURE?





# SOUTH EAST QUEENSLAND

## PLANNING FOR A BRIGHT FUTURE

South East Queensland (SEQ) is estimated to grow to 5.3 million people by 2040. That will mean more people, new housing and additional jobs for the region. This growth will provide challenges and opportunities that require governments, industry and the community to come together now, so we can grow better.

Developed through internal workshops and 18 interviews with industry leaders, SEQ2040 – Growing Better explores Leadership and Governance, Water to Grow, Health & Wellbeing, the Economy of the Future, and the need for a more Connected Region. It examines the issues and provides propositions to address the challenges, de-risk them and create opportunities for a better, more liveable and productive region.

The initiatives we propose are shaped from listening to, learning from and synthesising a diverse range of perspectives and are built from commitments currently being considered by governments and industry which need to be recognised as real enablers for future change.

We want *SEQ2040 – Growing Better* to open a multi-faceted discussion about the future of the SEQ region, providing an opportunity to rethink our current course and future actions. Being bold, ambitious and strategic, with long-term integrated thinking. The time is now to question whether a different approach is required.

How can we shape the future of SEQ as a region that will *grow better*?

### RECOMMENDATIONS



#### LEADERSHIP & GOVERNANCE

- Ambition
- Coordination
- Regional governance



#### WATER TO GROW

- Climate and resilience
- Health and wellbeing
- Economic potential



#### HEALTH & WELLBEING

- Prevention
- Integrated place-based approaches
- Economic and social imperative



#### ECONOMY OF THE FUTURE

- Competitive advantage
- Polycentric growth
- Commitment to integrated long-term thinking



#### CONNECTED REGION

- Resilience
- Connected living
- Smart investment synergies



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# PRINCIPLES

With ambition, SEQ can learn valuable lessons from other places that have already experienced the challenges of reactive growth without change.

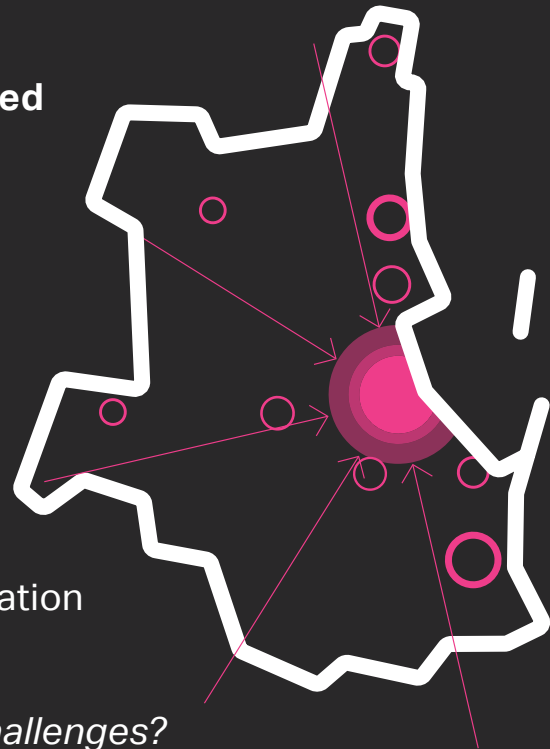
A broader regional perspective for SEQ can deliver a legacy of benefits at the regional scale.

This is the difference between just growing, or growing better.

## NOW Centralised

Regional  
Concentration

*Building  
Future Challenges?*



# GROWING BETTER

**Ambitious  
Leadership  
& Governance**

**Integrated  
Longterm  
Thinking**

**Resilient  
Polycentric  
Growth**

**Community  
Legacy**



## CONCEPTUAL NETWORK

Polycentric  
Region

Resilient Legacy  
of a Connected  
& Integrated  
Regional Eco-System





# WITHOUT LIMITS

**Imagine it. Delivered.**

## ABOUT AECOM

AECOM is the world's premier infrastructure consulting firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to program and construction management. We partner with our clients in the public and private sectors to solve their most complex challenges and build legacies for generations to come. On projects spanning transportation, buildings, water, governments, energy and the environment, our teams are driven by a common purpose to deliver a better world.

AECOM is a Fortune 500 firm and its Professional Services business had revenue of approximately \$13.6 billion in fiscal year 2019.

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