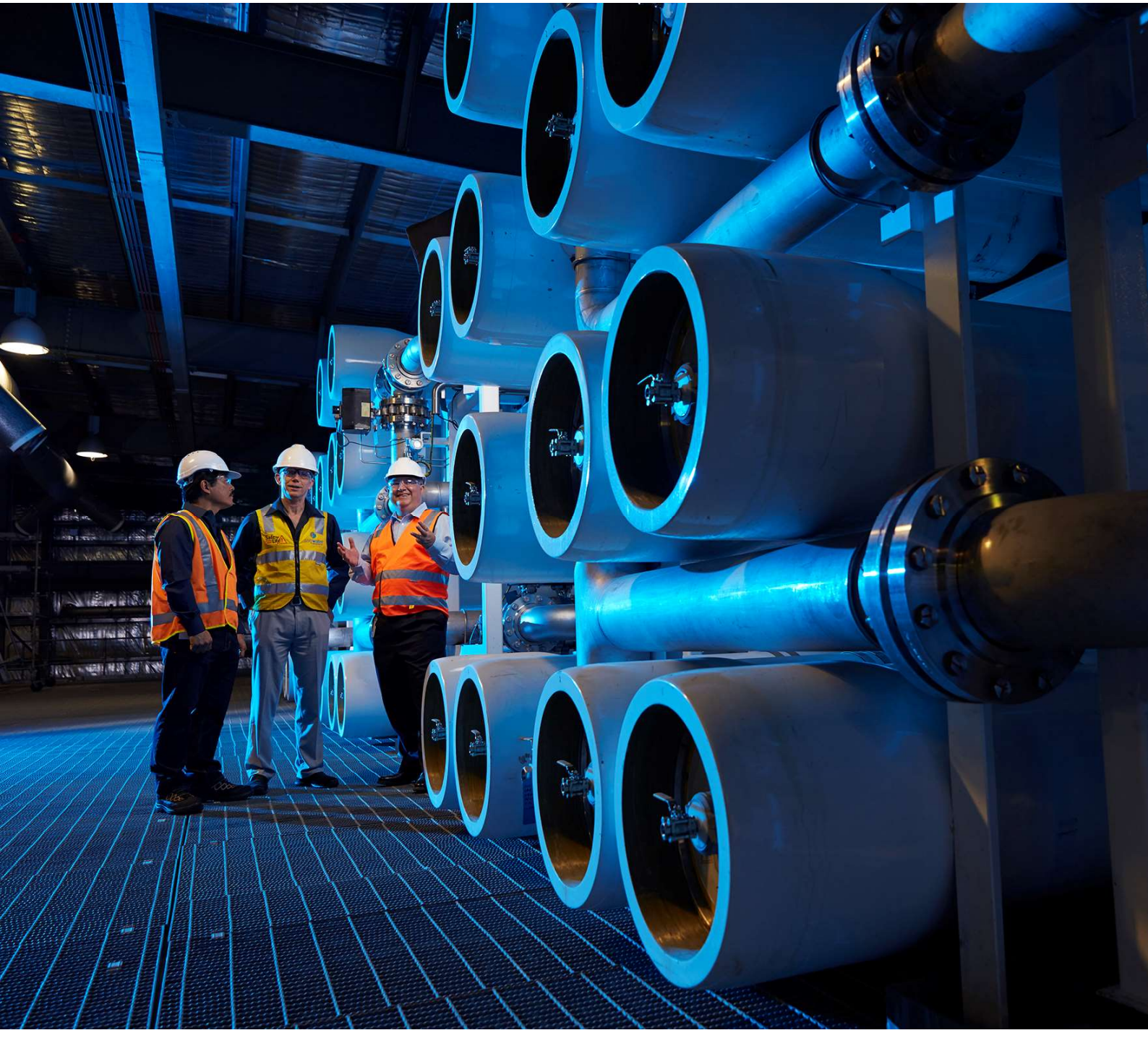
Climate Related Expenditure
Submission to QCA discussion paper



seqwater
WATER FOR LIFE

SOURCE STORE SUPPLY

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Introduction

Seqwater concurs that climate change is one of society's greatest challenges. Seqwater acknowledges that the climate is changing and that historical climate conditions are unlikely to represent the conditions under which Seqwater will need to operate in the future. Therefore, climate change constitutes a significant risk to Seqwater's ability to meet South East Queensland's (SEQ) future water needs.

Seqwater's product of bulk water is food. With human health at stake in the bulk water service provided to the community of SEQ, risk management needs to be considered differently to other regulated utilities and infrastructure – level of service standards is not something to achieve, rather something to not to fall below. In the context of climate change, the risks in the short term (one day to a few years) of say a flood event and in the long term of say a drought are unforgiving in hindsight. The operating and capital cost decisions made today, on the improvements to the water grid servicing SEQ to meet the impacts of climate change and population growth do not have the benefit of hindsight (ex ante).

The QCA is undertaking a review on climate change related expenditure. The QCA is concerned that these climate change related risks may result in, "capital expenditure being ill-planned, ill-timed, not fit for purpose or made obsolete".

It is therefore timely to consider whether the QCA's regulatory framework is sufficiently robust and flexible to:

- support appropriate climate change related expenditures by entities; and
- provide the right incentives for such expenditures to be undertaken in a prudent and timely manner.

In doing so, the QCA is seeking to develop a framework that provides guidance to regulated businesses.

Seqwater welcomes this review and sees it as an important opportunity to ensure the QCA's economic regulatory framework helps to incentivise businesses to respond prudently and efficiently to the challenges posed by climate change, to deliver better outcomes for consumers.

While we believe the key principles espoused in this submission are applicable to all regulated sectors, we have focused on the specific regulatory framework that applies to Seqwater.

The risk and drivers of climate change

To ensure the regulatory framework appropriately addresses climate change risks in each sector, it is vital to recognise that, in the water industry at least, climate change risks are about much more than managing the impact of severe weather events on infrastructure assets.

Importantly, these physical climate risks encompass both discrete severe weather events (e.g. floods and cyclones) and gradual longer-term shifts in climate patterns (e.g. a reduction in long-term average rainfall or an increase in average temperatures).

It is noteworthy to remind that Seqwater and the water delivery assets connected by a grid of pipes and pumps, were created as a result of the climate change event known as the millennium drought of the 2000's. Following the flood of 2011 was a period of lower rainfall that by 2021 was clearly a drought, for which the SEQ Water Grid was well prepared with drought resilient components of desalination and recycled water. The drought broke with the severe rainfall of February 2022. This does not make the investment decisions in the 2000's to create the SEQ Water Grid imprudent, rather it demonstrates the prudency in that had the drought persisted in 2022 then there is high confidence that water supply service standards would have been met.

Seqwater's ability to perform its fundamental role in providing long-term water security for the SEQ region is critically dependent on managing climate change risks, which potentially affect both the availability and quality of bulk water supply, the demand for water from its customers, and the resilience and operation of key assets. Climate change can have a slow but significant impact on the performance of the bulk water supply system. The regulatory treatment of prudent and efficient adaptation expenditure is critical to ensuring Seqwater can manage these climate change risks.

In addition, the treatment of mitigation expenditure will affect Seqwater's ability to reduce its Scope 1 emissions (e.g. those associated with wastewater treatment) and Scope 2 emissions (e.g. purchases of electricity produced by energy generators) to appropriately contribute to a greenhouse gas emissions target of net zero emissions by 2050, in line with Queensland Government policy.

Seqwater has a number of strategies and planning documents which relate to managing the risk of climate change. These relate to both climate adaptation and mitigation. While seeking to achieve mitigation is important, in terms of quantum of expenditure, adaptation is much the bigger issue for Seqwater.

In broad terms, our strategies and plans relating to climate change adaptation involve firstly developing our understanding of the risks, and then developing and applying strategies and decision-making frameworks to underpin adaptation investment and expenditure to best manage these risks. A key feature of climate related risks is that the potential consequences of low probability but high consequence events can be very significant or even catastrophic (e.g. in the water sector the economic and social costs of running out of water or of a dam collapse are enormous).

Seqwater is also developing a balanced approach to mitigation which seeks to do its part in reducing emissions whilst balancing impacts on our customers' bills.

Does the regulatory framework appropriately support climate change expenditure?

For the purposes of considering whether the regulatory framework creates appropriate incentives, or does not create disincentives, for Seqwater to efficiently manage risks associated with climate change, we have identified three key elements:

- Ex ante assessment of expenditure proposals
- Ex post review of capex
- Mechanisms for managing uncontrollable and unforeseeable events that may occur during the regulatory period.

Ex ante assessment of expenditure proposals

The QCA applies a prudency and efficiency test to both capital expenditure and operating expenditure proposed by Seqwater in its pricing submissions, which entails assessing:

- Scope—are the works needed?
- Standard—are the works of an appropriate standard and not over-designed?
- Cost—are the costs reasonable for the work done?

In our view the QCA's broad approach to assessing prudency and efficiency remains appropriate when explicitly considering adaptation or mitigation expenditure, the issue is more one of how it is applied in practice.

In considering adaptation expenditure, the 'need' or driver relates to the need to manage climate-related risks and inherent uncertainty.

Contrary to the suggestion in the QCA's discussion paper, there is not, or should not be, a "trade-off between efficiency and least cost, and robustness and resilience". This is because efficiency and least cost are not synonymous: the least-cost option will not necessarily provide the appropriate level of resilience that is in the long-term interest of customers – particularly when a climate-related event might take a decade or more to manifest.

A key implication is that in assessing prudency and efficiency, prudent and efficient expenditure should incorporate an 'efficient' level of resilience across a range of potential climate scenarios. Thus, it is essentially about what is prudent given knowledge of the future potential risks and consequences at the time of the decision to incur expenditure/make the investment.

While this has generally been recognised by the QCA in assessing expenditure proposals in the past (e.g. it has accepted that expenditure undertaken in accordance with Seqwater's Water Security Program is prudent), it is not clear that the current approach will always ensure that resilience is embedded within the QCA's prudency and efficiency assessment. This may particularly be the case in situations where the link between proposed expenditure and an ex post outcome may be indirect and not immediate (e.g. catchment protection activities).

In relation to mitigation expenditure, again a key issue in assessing prudency is identifying the need or driver of the expenditure. In this case the 'drivers' for this expenditure are the need for Seqwater to:

- manage regulatory and policy risks: i.e. ensure Seqwater is well-placed to respond with proactive measures and approaches in consultation with the Queensland Government; and
- manage reputational risk as part of maintaining its 'social licence' to operate by playing its part in reducing greenhouse gas emissions.

The QCA has recognised that future prudent and efficient incremental costs include those reasonably required to achieve broadly accepted changes in community expectations in relation to corporate responsibility (such as commitment to climate change mitigation). Bearing in mind the community expectations by which Seqwater is judged are not those at the time the investment decisions are made, but future expectations often years later.

While Seqwater considers this to be an appropriate position, it is important to balance the impact of mitigation activities on customers' bills. Seqwater is developing a balanced approach to reducing greenhouse gas emissions which ensures it does its part towards achieving emissions reductions targets.

Ex post review of capex

The QCA is required (under its Ministerial Direction Notice) to review historical capex for prudency and efficiency before allowing this capex to be rolled forward in the RAB for the next regulatory period.

While Seqwater accepts the need for appropriate independent scrutiny of its capital expenditure proposals, this relatively open-ended review exposes Seqwater to considerable risk that prudent capital spending on adaptation or mitigation activities will subsequently not be permitted to be recovered via bulk water prices.

In particular, adaptation expenditure is characterised as seeking to manage a range of potential future uncertain outcomes. Any ex post review which sought to disallow expenditure made in good faith using fit-for-purpose risk assessment methodologies but which turned out (with the benefit of hindsight) not to be required because certain events did not occur, has potential to undermine incentives to make such expenditure. This may discourage appropriate expenditure on pre-emptive adaptation activities, which would not be in the long-term interests of customers.

The open-ended ex post review of capex also provides a bias towards opex rather than capex spending on climate-related (and other) activities, as operating expenditure once approved ex ante is not subsequently subject to ex post review.

This suggests that any ex post review of capital expenditure should be more tightly constrained so that it provides appropriate independent scrutiny of how efficiently Seqwater has managed its capital investment programs but does not penalise it for investment decisions which were assessed to be prudent and efficient with the information available at the time they were made.

Review event mechanism

In recognition that a regulated business, like other businesses, can be exposed to risks beyond its control, which may have a material impact on its costs, Seqwater's regulatory framework includes a review mechanism that captures unanticipated costs (or savings) from certain 'Review Events'. The defined review events which applied to Seqwater's most recent price review included several which potentially relate to climate change events:

- A drought response event
- A feedwater quality event
- An emergency event
- A law or government policy review event

The incremental efficient costs (or savings) associated with these review events are captured as an adjustment to the Price Path Debt mechanism at the next review period (to the extent they are assessed as 'prudent and efficient' ex post).

The QCA has previously stated that as it is difficult to predict the likelihood of these events occurring and to forecast the cost impacts, it is likely to be more efficient to pass through costs to end customers after such events occur, rather than to provide Seqwater with an upfront allowance to take on the risk.

These review events have been an important mechanism to enable Seqwater to recover unanticipated costs arising from events beyond its control.

However, in Seqwater's view some aspects of the operation of the review event mechanism have the potential to undermine the incentives for prudent and timely climate related expenditure.

The first issue relates to the definition of the review events. Because of their inherently unpredictable nature, there is a risk that an event occurs which does not fit within the prespecified definitions of the eligible review events, leaving no avenue for Seqwater to seek to recover prudent and efficient costs it incurs in responding to that event.

A related problem is that the definition or interpretation of eligibility for a review event claim may be too narrow, or uncertain.

An additional problem is that the definitions themselves are not clearly set out in one place; often the definitions need to be traced back over multiple determinations.

A major problem with all of the review event mechanisms is that they are subject to ex post review, and in most cases these are relatively open-ended.

How can the regulatory framework better accommodate climate change considerations?

In Seqwater's view the existing regulatory framework is broadly sound and does not need to be overhauled fundamentally to accommodate climate change considerations. Rather, the key challenge is to ensure the regulatory framework is applied appropriately to ensure climate change risk is managed prudently and efficiently – in the context of Seqwater's bulk water level of service expectations of the community, which may be a less forgiving risk environment than other utilities or infrastructure services.

Key to this will be providing regulatory certainty. Greater clarity on expected regulatory treatment of future cost recovery of climate-related expenditure could positively influence the incentives for regulated businesses to:

- undertake proactive expenditures to manage the potential risks of climate change impacts on their ability to provide services and
- respond quickly and appropriately to any events which do occur.

As a general rule, ex ante (rather than ex post) approval of expenditure provides more certainty to regulated entities that they will be able to recover their costs and so provides stronger incentives to undertake pre-emptive climate related expenditure.

In addition, approaches which rely on the QCA being satisfied that the decision-making frameworks adopted by Seqwater to establish climate-related expenditure proposals are robust – rather than the QCA undertaking detailed scrutiny of individual capital projects or operating expenditure items – are more likely to provide appropriate incentives to undertake timely adaptation and mitigation expenditure.

Clear guidance on the QCA's expectations in relation to how these will be assessed would also enhance regulatory certainty to underpin investments in adaptation and mitigation.

The following outlines our initial views on potential improvements to the current regulatory framework to better accommodate climate change risks.

Prudency and efficiency review should embed resilience

Any assessment of prudency and efficiency by definition should embed resilience. That is, prudent and efficient expenditure should incorporate an 'efficient' level of resilience across a range of potential climate scenarios. Moreover, in doing so, a key principle in assessing prudency should be whether a decision was prudent based on the information available at the time – not with the benefit of hindsight.

We therefore suggest that approaches to assessing the prudency and efficiency of climate-related expenditure should focus on the robustness of the underlying decision-making processes and techniques.

In order to embed resilience into the ex-ante assessment of climate-related expenditure, there are three key steps:

1. Recognition and where possible quantification of climate change physical risk scenarios and natural disaster exposures to Seqwater's assets and service deliverability
    a. the Queensland Government provides science-based guidance on physical risk exposure from climate changes
    b. the regulated entity takes those future scenarios and assesses what this means for its particular assets and service provision capability (e.g. as occurs in developing the WSP)
2. Application of best practice tools and techniques to make investment decisions under conditions of climate risk and uncertainty
    a. There is a range of analytical frameworks and methodologies which are adopted in the water sector to inform decision-making under uncertainty, including scenario analysis and real options analysis. Such techniques, for example, are key inputs into the development of Seqwater's Water Security Program.
3. Develop an adaptive program which seeks to best manage these risks in the long-term interests of customers and the broader community by drawing links from the underlying climate risk drivers to the investment and expenditure proposal for climate-related expenditure while engaging closely with key customer and other stakeholders.

QCA's ex ante prudency and efficiency review should be largely about whether the regulated business has followed its systems and processes for identifying and managing climate-related risk, rather than seeking to prescribe the precise scenarios or techniques which businesses should adopt.

Upfront guidance that the QCA will follow such an approach would help to underpin regulatory certainty and therefore facilitate prudent and efficient climate-related investment.

This ex ante assessment should be complemented with limited ex post review.

Limit ex post review of capex

While Seqwater accepts the need for appropriate independent scrutiny of its capital expenditure proposals, the open-ended nature of the ex post review of capital expenditure exposes Seqwater to considerable risk that prudent capex spending on adaptation or mitigation activities will subsequently not be permitted to be recovered via bulk water prices. This in turn may discourage appropriate expenditure on adaptation activities designed to pre-empt potential future impacts from climate change.

We therefore suggest that any ex post review of capex should be more tightly constrained and in particular:

- Any capex included in the original pricing submission expenditure proposal, and which was approved as 'prudent' ex ante, should not be revisited for prudency ex post (i.e. any review of such capex should be limited to an assessment of 'efficiency').
- Any ex-post review of capex which was not included in the original submission expenditure proposal should assess prudency based on the information available at the time the decision was made to incur the expenditure, not with the benefit of hindsight (as per above with ex ante assessment of expenditure). Such expenditure is likely to be associated with responding to an unexpected event (given it was not included in Seqwater's planned capex proposal). An example of this was urgent expenditure incurred in replacing Sparkes Hill reservoir roof following its collapse during the 2017-22 regulatory period.
- More guidance about how the QCA will approach any such ex-post review would provide greater regulatory certainty to the business (e.g. decision-making processes which if evidenced would be taken as prima facie evidence of prudency). This should include explicit reference to the need for the assessment to consider information available at the time.

Improve operation of review event mechanism

We propose:

- Consideration could usefully be given to introducing a broader 'catch all' mechanism which refers to events beyond Seqwater's reasonable control.
- The scope of ex post review under all of the review event mechanisms be explicitly constrained to considering information available at the time the decision was made to incur the expenditure, along the lines of the QCA's proposal to revise the definition of the drought response event.
- More guidance about how the QCA will approach any such ex post review would provide greater regulatory certainty to the business (e.g. decision-making processes which if evidenced would be taken as prima facie evidence of prudency).

Extend use of contingency allowances

One option would be to explore the potential for extending the use of contingency allowances, rather than review event mechanisms.

For example, one possibility might be to extend the use of such contingency allowances to spell out a broad range/spectrum of potential events e.g. different levels of drought, different levels of flood etc with associated pre-approved expenditures, occurs, thus providing more ex ante certainty.

Contingency allowances would provide more certainty than review event mechanisms, where Seqwater has no assurance that it will be able to be recover its costs, which acts as a disincentive for expenditure

These costs would not necessarily need to flow through immediately to prices in the period in which the event occurs.

As occurs now, contingency allowances could be supplemented with a review event mechanism to address any difference in costs which vary because of the precise nature of the event which occurs (subject to a prudency and efficiency assessment, based on information available at the time of the decision).

1 Introduction

Seqwater concurs that climate change is one of society's greatest challenges. Seqwater acknowledges that the climate is changing and that historical climate conditions are unlikely to represent the conditions under which Seqwater will need to operate in the future. Therefore, climate change constitutes a significant risk to Seqwater's ability to meet South East Queensland's future water needs.

Seqwater's product of bulk water is food. When considering the regulation of a bulk water utility, it is tempting to view it in the same breath as utility or infrastructure. We must remember that the service of bulk water must not only meet the standards for dams, pipes and water treatment plants, but more importantly meet National and State jurisdictional food and health standards; these standards are not something Seqwater must achieve, but with human health at stake the standards are not something Seqwater must have a goal of not falling below. In other words, Seqwater must always be above the level of service line not below that line aiming to achieve it.

The extent to which regulated infrastructure is resilient to climate change depends, at least in part, upon the extent to which the regulatory framework allows businesses to make investments that can adapt their assets to climate change. The Commonwealth and State Governments climate change information points to higher risks of the impacts of climate change in future decades than experienced in recent decades. Where recent decades have seen weather events some of the most extreme on record.

The QCA is concerned that climate change related risks may result in, "capital expenditure being ill-planned, ill-timed, not fit for purpose or made obsolete". The QCA is undertaking a review on climate change related expenditure. In doing so, the QCA is seeking to develop a framework that provides guidance to regulated businesses.

It is therefore timely to consider whether the QCA's regulatory framework is sufficiently robust and flexible to:

- support appropriate climate change related expenditures by entities; and
- provide the right incentives for such expenditures to be undertaken in a prudent and timely manner.

Seqwater welcomes this review and sees it as an important opportunity to ensure the regulatory framework I incentivises businesses to respond prudently and efficiently (including through appropriate infrastructure resilience) to the challenges posed by climate change, to deliver better outcomes for consumers.

While we believe the key principles espoused in this submission are applicable to all regulated sectors, we have focused on the specific regulatory framework that applies to Seqwater.

2 About Seqwater

2.1 Our role

Seqwater is the bulk water provider to the South East Queensland (SEQ) region. It owns and operates the region's bulk water supply system, including dams and weirs, water treatment plants, major pipelines, the Gold Coast desalination plant and the Western Corridor Recycled Water Scheme (WCRWS), which collectively is known as the SEQ Water Grid.

Seqwater is responsible for providing a safe, secure and cost-effective bulk water supply for a population of just less than 4 million. It also undertakes water security planning for SEQ, regularly publishing Water Security Programs setting out the way Seqwater intends to achieve its level of service (LOS) developed by the Queensland Government.

In addition to urban bulk water supply, we supply irrigation water to about 1,200 farmers and growers through seven schemes. We also have arrangements in place to supply water to Toowoomba and Gympie regional councils and to several power stations.

We also provide flood mitigation services, catchment management and recreation facilities.

That is what Seqwater is today. Looking back over the last two decades, Seqwater was created in response to the water supply crisis due to the Millennium Drought and was the largest urban drought response in Australia at that time. Its foundation bulk water assets (water treatment plants, dams, reservoirs, pumping stations and pipes) were owned by multiple local councils and were not interconnected, significantly impacting water supply to the region. Following the accelerated construction of a network of bulk water pipelines, the State Government assumed ownership and operational responsibility for the integrated Network in 2008, through a number of bulk water authorities with different functions. After further consolidation in 2013, the SEQ Water Grid is now owned by a single bulk water supplier, Seqwater. This included investment in new drought resilient sources of water to improve the diversity and security of supply – the Gold Coast Desalination Plant and the Western Corridor Recycles Water Scheme.

One of our key roles is to provide water security for SEQ. To do this, we must actively plan for the future by considering the region's potential water needs and future water supply options, as well as design, operate and maintain our assets to manage fluctuations in weather conditions and water demand.

The Millennium Drought led the State Government to create a major infrastructure investment program to build the SEQ Water Grid. As noted recently by the Queensland Government the establishment of the SEQ Water Grid as an interconnected system has been critical to enhancing water security in the region:

> *Following the 'Millennium Drought' stretching from 1996 through to 2010, which was the worst drought period on record, Queensland invested $6 billion into ensuring future water security through a program of initiatives in recycling, desalination, and large-scale interconnection of the pipeline networks across South-East Queensland. Underpinning the investment was a major program of industry reform that consolidated the region's bulk water businesses and unlocked future sector productivity growth. Following this, and more than a decade of strong population and industrial growth, South East Queensland's water security (serving 80% of the state's population) is rated as medium-high, demonstrating the strength of the network[1].*

Ultimately, our efficient costs, as reflected in bulk water prices, will be driven by our LOS objectives, along with our other key regulatory obligations.

[1] Queensland's Commitment to Positive Environmental, Social and Governance (ESG) Outcomes February 2021, Contributing to a sustainable and competitive economy.

2.2 Regulatory obligations

In addition to the Water Security Planning discussed above, we comply with a wide range of legislative and regulatory requirements in order to provide our services. These include:

- Dam Safety: we need to make sure our dams do not pose unacceptable risks to downstream communities. This can require capital and operating expenditure to improve the structures and/or make changes to the way we store and release water.
- Flood operations and notifications: our major incident and emergency services work to reduce the severity of flooding.
- Water entitlements and resource management: we must manage water entitlements from our dams and store and release water in accordance with the water planning framework.
- Development conditions: many of our newer assets have significant development conditions attached that must be complied with. These include environmental monitoring, fish passage, vegetation offsets and provision of recreation services.
- Noxious weeds and pests: we are one of the largest landholders in SEQ and must meet our obligations for controlling noxious weeds and pests on this land.
- Environmental obligations and licensing: we have extensive obligations to ensure our activities do not do harm to the environment.

In addition, in recent years there has been an increase in corporate regulatory obligations targeting large corporations, some of which impact Seqwater. This increased regulation is targeted at addressing sustainability, including environmental, social, and governance (ESG) issues throughout corporate Australia and is being led by a Government response to greater public and governmental awareness of ESG benefits, increased scrutiny of corporate action, and calls for greater corporate accountability.

As the evolving global accounting standards for corporate disclosures on sustainability and ESG are confirmed and the regulations for Australian corporates become established, Government-owned entities such as Seqwater will be required to track progress on sustainability and ESG initiatives against the State's targets and report on these in the annual *Queensland Sustainability Report* and through the annual report process.

3 The risks and drivers of climate action

3.1 Climate change impacts Seqwater in a myriad of ways

Seqwater concurs that climate change is one of society's greatest challenges. It constitutes a significant risk to Seqwater's ability to meet South East Queensland's future water needs.

The QCA discussion paper rightly identifies the physical risks of more frequent severe weather events – and the potential for damage to infrastructure - as a key risk for regulated infrastructure businesses. It also recognises the transition risks relating to changes in demand for products such as coal, and the evolving policy settings and community expectations for reducing greenhouse gas emissions.

However, to ensure the regulatory framework appropriately addresses climate change risks in each sector, it is vital to understand that, in the water industry at least, climate change risks are about much more than managing the impact of severe weather events on infrastructure assets.

Indeed, Infrastructure Australia has observed that of all the forms of infrastructure, the potential risks and costs of climate change are greatest in the water sector:

> *As with other forms of infrastructure, the water sector has faced mounting challenges from factors such as population growth, climate change and changing user expectations.*
>
> *However, of all the forms of infrastructure, the potential risks and costs of climate change are greatest in the water sector. The water sector relies heavily on rainfall to replenish storages, streams and groundwater, and on vibrant ecosystems to support a reliable water cycle. Higher temperatures can also increase the volume of water in storage lost through evapotranspiration. Extreme weather events such as floods, cyclones and bushfires, as well as rising sea levels and increased coastal inundation, can also damage assets or disrupt wastewater treatment processes. These bring heightened risks for the health of our waterways, management of wet weather flows and contaminants in residential areas[2].*

Some of the key physical risks include:

- Decreased rainfall, drought and water scarcity
- Increased rainfall intensity and flooding
- Higher temperatures and extreme heat
- Bushfires
- Sea level rise

Importantly, these physical climate risks encompass both discrete severe weather events (e.g. floods and cyclones) and gradual longer-term shifts in climate patterns (e.g. reductions in long-term average rainfall or increase in average temperatures).

These risks manifest not just in impacts to the integrity of key infrastructure assets, but also affect the quantity and quality of water, and demand for Seqwater's services. For example, recent floods in South East Queensland have impacted water supply by suddenly changing source water quality (reducing water treatment capacity), causing equipment to fail, breaking water mains, and cutting power (constraining water treatment and transport). Some of these events (e.g. dirty water events arising from flooding) can have long-lasting impacts.

[2] Infrastructure Australia 2019, An Assessment of Australia's Future Infrastructure Needs - The Australian Infrastructure Audit 2019, p.601

As noted by the Water Services Association of Australia (WSAA, climate change poses a number of risks to the urban water industry, including:

- Reducing the availability of water for cities and communities
- Affecting the condition and performance of water industry infrastructure
- Reducing water quality in urban waterways and receiving waters[3].

On the mitigation side, Seqwater also faces transition risks around policy settings and customer and community expectations for reducing emissions.

3.2 Managing climate change risk is core business for Seqwater

Our business and operating environment is characterised by uncertainty, including a changing climate. Managing climate related risks is not new for the water sector – it simply amplifies the task. As noted by WSAA:

> *"Water utilities can expect the challenges associated with climate change in protecting assets and providing consistency and quality of service, to increase in both frequency and magnitude as warming progresses. Water utilities will have to cope with events not previously experienced. It is clear that the past is not a reliable indicator of the future as the probability of extreme events is rapidly changing, making conventional approaches to the estimation of risks unreliable. This has major implications and challenges for water industry planners and decision makers"[4].*

Seqwater's ability to perform its fundamental role in providing long-term water security for the SEQ region is critically dependent on managing climate change risks, which potentially affect both the availability and quality of bulk water supply, the demand for water from its customers, and the resilience and operation of key assets. Climate change can have a slow but significant impact on the performance of the bulk water supply system. The regulatory treatment of prudent and efficient adaptation expenditure is critical to ensuring Seqwater can manage these climate change risks.

In addition, the treatment of mitigation expenditure will affect Seqwater's ability to reduce its Scope 1 emissions (e.g. those associated with wastewater treatment) and Scope 2 emissions (e.g. purchases of electricity produced by energy generators) to appropriately contribute to a greenhouse gas emissions target of net zero emissions by 2050, in line with Queensland Government policy.

As noted by the QCA, climate change responses and associated expenditures are generally categorised into:

- **Adaptation**: Enhancing the resilience of infrastructure in response to actual or anticipated events arising from climate change.
- **Mitigation**: Reducing carbon dioxide equivalent emissions.

We would however note the need for a holistic approach: for example, a key adaptation strategy in the water sector is to develop climate-independent sources of supply such as desalination, but many of these are energy intensive.

While seeking to achieve mitigation is important, in terms of quantum of expenditure adaptation is much the bigger issue for Seqwater.

[3] Water Services Association of Australia, Towards Resilience: Climate Change and the Urban Water Industry in Australia and New Zealand, November 2021, p.5

[4] Water Services Association of Australia, Towards Resilience: Climate Change and the Urban Water Industry in Australia and New Zealand, November 2021, p.5

Seqwater has a number of strategies and planning documents which relate to managing the risk of climate change. These relate to both climate adaptation and mitigation. The following sections summarise some of Seqwater's strategies for each of these broad types of climate response. However, the information is provided for general context and for QCA discussion purposes. It does not represent or infer details of Seqwater's future comprehensive market disclosures and formal sustainability reporting which will be developed to align with whole-of-government reporting under the Government's annual *Queensland Sustainability Report*[5].

3.3 Adaptive planning and investment is fundamental to our role

The QCA defines adaptation expenditure as involving enhancing the resilience for infrastructure in response to actual or anticipated events arising from climate change. In this sense, almost all of Seqwater's expenditure can be seen as adaptation expenditure.

Seqwater has a number of strategies and plans relating to climate change adaptation and undertakes adaptation activities across a number of its areas of operations affected by climate change[6]. In broad terms, these involve firstly developing our understanding of the risks, and then developing and applying strategies and decision-making frameworks to underpin adaptation investment and expenditure to best manage these risks.

Seqwater is continuing to develop frameworks and techniques for improving decision-making under uncertainty.

A key feature of climate related risks is that the potential consequences of low probability, but high consequence events can be very significant or even catastrophic (e.g. in the water sector the economic and social costs of running out of water or of a dam collapse are enormous).

Key areas of our adaptation activities and expenditure are summarised below.

3.3.1 Water security planning and investment

Seqwater is required under the Water Act 2000 to develop a water security program to facilitate the achievement of the desired level of service objectives for water security for the SEQ region or each part of the SEQ region[7]. The purpose of the water security program is to outline how the achievement of the Government's specified Level of Service (LOS) objectives will be facilitated through the arrangements, strategies and measures that Seqwater has in place.

Seqwater published its second WSP in 2017 (see Box 1). The Program is adaptive and proposes many ways in which we can respond to changing influences and continue to provide drinking water to our community. Seqwater is currently developing the next version of the WSP, due to be released shortly.

Box 1: The Water Security Program: an adaptive plan

The Water Security Program (WSP) is Seqwater's plan for providing the region's drinking water over the next 30 years, including during times of drought and flood. While the 2017 WSP sets out well-developed plans for managing both long-term and shorter-term water security in SEQ, the WSP itself stresses the importance of retaining sufficient flexibility to facilitate adaptive responses:

[5] See 2022-Queensland-Sustainability-Report-December-2022.pdf (treasury.qld.gov.au)

[6] Core areas of its operations affected by climate change and preliminary steps to build resilience and adaptive capacity were identified in Seqwater's Climate Change Adaptation Strategy in March 2020.

[7] Desired level of service (LOS) objectives for south-east Queensland are prescribed in the Water Regulation 2002 and detail the requirement to meet future projected demands and outline how long, how frequent and how severe water restrictions should be in times of drought.

> *"This Program is adaptive. It does not propose one water security solution with a set timeframe. Rather, it identifies ways we can respond to changing influences and sets triggers for implementing options or reviewing and changing our response.*
>
> *While our responses are planned in advance, investment decisions will be based on conditions at the time and depend on what options have been previously implemented.*
>
> *Adaptive planning aims to deliver the right option at the right time, leading to an optimised, whole-of-region solution"*[8].

An important element of the WSP relates to planning for drought. This includes specifying various actions to help manage the impacts of a potentially emerging or actual drought:

> *"Our drought response approach is adaptive to allow actions and triggers to adjust to demand, climate, severity of drought and other external factors. This flexibility is critical to a resilient region. Nevertheless, triggers should not be significantly delayed, or the benefit of the actions will be diminished. In a severe drought, delays could result in a serious risk to water security. Some actions may be brought forward if the drought is more severe than the supporting modelling has anticipated."*

The plans outlined in the WSP are the result of rigorous research, modelling and analysis, coupled with stakeholder, customer and community engagement. The WSP factors in climate change through changes to supply and demand base cases and sensitivity testing / scenario analysis. Shortlisted options were used to develop investment pathways – the sequence and timing of options, selected through an assessment framework, in accordance with differing investment strategies. Scenario analyses were applied to the alternative pathways to test their robustness and identify triggers for implementation of options or review of a preferred pathway.

Source: WSP2

3.3.2 Assets and infrastructure planning

Seqwater is working towards vulnerability assessments on low-lying assets and infrastructure to identify and prioritise key adaptation options and potential actions, considering a broad range of adaptation approaches at a site and system level. It also considers interdependencies and risks of supply chain disruptions.

In relation to new infrastructure, Seqwater identifies key decisions within the asset lifecycle to incorporate climate change projections into planning assessment and decisions.

Seqwater has a number of asset planning and investment plans and processes including:

- the Asset Portfolio Master Plan (APMP) that drives our capital planning and investment. Our APMP is focused on renewing aging assets critical to operations at the most efficient time in the asset lifecycle and delivering capacity enhancement projects at the optimal time for end customer benefit and efficient investment in infrastructure.
- our Integrated Master Plan (IMP) which guides decision making on proposed capital expenditure and operation for the Water Grid over a 30-year planning horizon,
- Capital Investment Lifecycle Framework including the Gateway framework, governance process and decision-making requirements, and establishing support tools for consistent application

[8] Seqwater (2017) *Water for life South East Queensland's Water Security Program 2016-2046*, p.5

Our gateway process provides a formal review and approval framework that ensures industry standard governance and quality assurance is upheld in our capital planning and delivery processes.

One specific example of adaptation expenditure in the water sector identified in QCA's discussion paper was of *"a dam operator seeking to enhance or accelerate its dam safety program and expenditures, on the basis that climate change is leading to more intense and more frequent major rainfall events in south-east Queensland, thereby altering the risk profile of its infrastructure assets"* (see Box 2).

Box 2: Dam safety improvement program

Under the Water Act 2000 and the Water Supply (Safety and Reliability) Act 2008, Seqwater is responsible for the safety of its dams. Dam failures, while rare, can be catastrophic.

Dams are therefore highly regulated. The Department sets standards which place emphasis on life safety (i.e. where a dam failure would cause substantial damage or the loss of many lives, the dam should be designed to a higher standard than a dam whose failure would result in less damage or fewer lives lost). The risk associated with failure of dams can change over time for example, due to downstream population growth.

All our dams go through a rigorous risk assessment and prioritisation process to determine the highest priority dams for safety upgrades by the safety risks that they pose. Changes to dam safety guidelines by the dam safety regulator may necessitate investment to maintain compliance.

While the need or drive for the dam safety improvement program is the need to comply with regulatory requirements, climate change can affect the risk tolerance parameters (e.g. severe flooding may increase concerns for the structural integrity of dams). This in turn may necessitate upgrades to existing dams to ensure risks of failure remain within tolerable levels.

In this sense, Seqwater's Dam Improvement Program could be viewed at least in part as adaptation expenditure in the order of billions of dollars over safety improvements to multiple dams in the next decade.

This program may also result in changes to dam full supply levels, thus creating a potential trade-off between water supply and flood mitigation.

Source: Seqwater

3.3.3 Research on climate change risks

Considerable work occurs in understanding potential impact of climate change on key variables such as inflows. We undertake research projects that improve our understanding of how climate change will impact long-term water security planning and other activities. An immediate focus is to understand how climate change will affect rainfall patterns in the region and identify potential impacts on water quantity and quality.

Seqwater utilises the most up to date, relevant climate change projections that apply to our area of operations – currently this is the Queensland Department of Environment and Science's future climate projections. It has also established corporate climate change emissions scenarios for planning and adaptation purposes based on scenarios published by the IPPC.

Examples of strategic research projects on other climate-related issues include:

- A study to investigate the impact of low lake levels on water quality risks

- A study to better understand how extreme events (floods or droughts) and catchment degradation may reduce the capacity of green infrastructure to provide natural in-river water treatment services in the mid-Brisbane River
- A study of how sedimentation, which could potentially reduce water storage capacity, could be affected by inflow and wind events
- Several studies using paleoclimate data to better understand and manage drought in SEQ
- A study by the University of Adelaide of the temperature-related climate risks to Seqwater's business, which found that of the identified risks the highest risks were associated with heatwaves, rainfall and bushfires.

3.3.4 Emergency management

The growing risks of increased frequency, scale and duration of emergency events arising due to climate change (extreme weather, floods, bushfire) informs planning for Seqwater's emergency management and resilience.

3.3.5 Resilient catchments

Catchments play a vital role in supplying safe drinking water. Climate change considerations are important in planning for catchment interventions to manage changes to source water quality.

The main objective of our capital natural assets program is to reduce water quality risks and manage future water treatment costs by improving the condition of SEQ catchments, thus reducing the risks to water quality received at treatment facilities via prioritised and targeted catchment management activities. While this includes management of our own land, given we own less than 5% of the source water catchments, it predominantly involves programs to support investment by other land holders. The actions range from weed control and fire management to gully and channel rehabilitation and land management extension schemes.

This investment can also lead to efficiencies in the water treatment capital program, enabling the deferral or avoidance of upgrades of treatment facilities, along with reduced operating costs.

3.3.6 Insurance

As noted by the QCA in its discussion paper, adaptation expenditure can mitigate some, but not all, of the risks regulated entities face from climate change in providing their services.

Regulated entities therefore seek to insure against the risks created by climate change. Seqwater insures its assets to the tune of hundreds of millions of dollars per single event.

Climate change is one factor which affects the accessibility to insurance[9]. These worsening climate impacts are already affecting the affordability and availability of insurance in Australia (most notably property insurance and general liability insurance), particularly in areas most exposed to perils such as bushfires, flooding, and cyclones.

Over the past 10 years, insurers have reduced capacity and coverage; and increased premiums and deductibles. The period from 2018 – 2022 has been particularly challenging and there is no immediate relief in sight. In Australia, the 2022 flood event was the largest loss in Australian history, estimated in excess of $5B. Overseas, Hurricane Ian is currently estimated at $US 52B, making it the second largest loss in global history.

[9] The other signification factor which is affecting the availability of insurance is those industries involved "Coal" in particular "Thermal" coal. A number of Insurers and reinsurers around the global have declared that they will no longer support the coal industry.

Property renewals will face one of the most challenging markets in 2023. Significant catastrophe losses, the impact of core and social inflation, supply chain issues, stressed asset valuations, foreign exchange rate effects and the recent withdrawal of capacity by some insurance providers creates difficult conditions.

Seqwater still can access property insurance in the market – though at an increased premium, increased deductibles, and with some reduction in the terms of coverage

Seqwater periodically considers alternatives to the status quo but has taken the position that they are either high risk (self-insurance) for property coverage given our large asset values, or they are otherwise impractical (compared with the status quo

3.4 Seqwater is developing a balanced approach to mitigation

3.4.1 Seqwater's emissions

While the water sector is only a moderate contributor to greenhouse gas emissions, its emissions continue to increase and it faces ongoing pressures to reduce its emissions[10]. Greenhouse gas emissions present substantial business risks. Seqwater needs to manage regulatory and policy risks to ensure it is well-placed to respond with proactive measures and approaches to reducing emissions in consultation with the Queensland Government. It also needs to manage reputational risk as part of maintaining its 'social licence' to operate by playing its part in reducing greenhouse gas emissions.

Seqwater's estimated emissions were 178,400 t CO2-e in 2021,[11] made up of:

- Scope 1 emissions[12] of 2,400 t CO2-e including as a result of fuel burning, wastewater treatment and fugitive gas emissions; and
- Scope 2 emissions[13] of 176,000 t CO2-e including purchases electricity for pumping, and desalination production.

Scope 3 emissions[14] are related to Seqwater's customers and suppliers. Seqwater will engage with these stakeholders as appropriate to abate these emissions.

Seqwater's Scope 1 and 2 emissions could grow under certain climate scenarios

Seqwater may experience growing scope 2 emissions under certain climate scenarios. Drivers of this include:

- Energy demand: As energy demand grows to service Seqwater's customers, so too will Seqwater's scope 2 emissions; and

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10 As noted by WSAA, overall, the water industry's activities contribute just under 1% to Australia's total annual emissions, they are increasing. The urban water industry has committed to achieve Net Zero greenhouse gas emissions by 2050 or earlier. See Water Services Association of Australia, November 2021, *Towards Resilience: Climate Change and the Urban Water Industry In Australia And New Zealand, p.26.*

11 Seqwater's data submitted to the National Greenhouse Emissions Reporting Scheme for 2020-21.

12 Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level.

13 Scope 2 greenhouse gas emissions are the emissions released to the atmosphere from the indirect consumption of an energy commodity.

14 Scope 3 emissions are indirect greenhouse gas emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business.

- Drought: South-east Queensland may experience more drought which will drive energy use and potentially scope 2 emissions further.[15]

Seqwater's GHG footprint represents a source of risk for the business, especially when considered against rapidly evolving policy settings regarding climate mitigation. Seqwater's recorded Scope 1 emissions may increase if further sources of GHGs (e.g. emissions from storages) are recognised by NGERS. Seqwater is undertaking work to understand these risk drivers.

3.4.2 Policy settings on mitigation are evolving

The Australian Government is committed to climate change mitigation

In 2022 the Australian Government committed to cut greenhouse gas emissions to 43% below 2005 levels by 2030, and the reach zero net emissions by 2050, when it passed the Climate Change Act 2022 and the Climate Change (Consequential Amendments) Act 2022. This sets in law Australia's latest Nationally Determined Contribution (NDC) to the global Paris Agreement on climate change.

In legislating emissions reduction targets, the Climate Change Act sends a strong signal to business, investors, trade partners and the community, and so increases business confidence in Australia's decarbonisation trajectory. The Climate Change (Consequential Amendments) Act starts the process of embedding the targets into government policies and decision-making.

These pieces of legislation will help Australia achieve its current NDC. But, as the world continues to limit warming to 1.5°C, Australia will be expected to lift its ambitions further so that it can play its full part in implementing the Paris climate goals.

The Australian Government's climate legislation provides a framework and prescribes an end-goal, rather than legislating particular solutions. This complements targets and actions being taken by State governments, the private sector, and wider community. Supporting these priorities, the Australian Government has released a consultation paper on the development of an Australian climate risk disclosure framework which it expects to be mandatory for large entities and phased in over time.[16]

Queensland is acting on climate change mitigation

The Queensland Government has also developed and committed to a comprehensive set of sustainability goals and priorities. In its latest Sustainability Report, the Queensland Government states that:[17]

> *Queensland's climate is already changing, caused by increased greenhouse gas concentrations in the atmosphere and resultant increases in global average temperatures. There is a significant risk that without stabilisation of the climate system Queensland will experience major impacts to its*

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15 Queensland Government, *Climate change in the South East Queensland region*, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjSy86TrvP7AhXBO3AKHWIwBJIQFnoECBAQAQ&url=https%3A%2F%2Fwww.qld.gov.au%2F__data%2Fassets%2Fpdf_file%2F0023%2F67631%2Fseq-climate-change-impact-summary.pdf&usg=AOvVaw22t7kGOejJvsKE0tShAtnO

16 Australian Government 2022, *Climate-related financial disclosure consultation paper*, https://treasury.gov.au/consultation/c2022-314397

17 Queensland Government 2022, *Queensland Sustainability Report 2022*, p. 15, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiNntnFgfj7AhXwslYBHaP3Cr4QFnoECBQQAQ&url=https%3A%2F%2Fwww.climateworkscentre.org%2Fresource%2Fstate-and-territory-climate-action-leading-policies-and-programs-in-australia%2F&usg=AOvVaw00Qf-iTZn13BDjZ2-GoyOG https://www.treasury.qld.gov.au/programs-and-policies/esg/

> *economy, ecosystems and community amenity. The Queensland Government is committed to playing its part in the global effort to address climate change.*

Supporting its commitments, the Queensland Government has set bold but achievable targets for reducing GHG emissions. It has committed to:[18]

- 30% emissions reduction below 2005 levels by 2030;
- zero net emissions by 2050; both supported by
- 50% renewable energy target by 2030;
- 70% renewable energy by 2032; and
- 80% renewable energy by 2035.

Queensland's climate policies are broadly in line with other states and territories. All Australian state and territory governments are now committed to net zero emissions by 2050 or earlier. These commitments cover all emissions produced within Australia's borders. The majority of states and territories have also set interim emissions targets. Current state and territory interim targets combined translate to an estimated 37-42 per cent reduction on 2005 emissions Australia-wide by 2030.[19]

Collectively, these targets, commitments and pieces of legislation provide a strong and clear signal to Australian business to think clearly about their own decarbonisation targets and actions. For example, the water industry, represented by the Water Services Association of Australia (WSAA), has also committed to a target of Net zero greenhouse gas emissions by 2050 or earlier where it aligns with customer expectations:[20]

> *To contribute to global and national efforts to limit climate change by keeping global temperature rise this century well below 2 degrees Celsius, and preferably to 1.5 degrees Celsius, the urban water industry will achieve net zero greenhouse gas emissions at the latest by 2050.*

In discussing its position, the WSAA notes that, increasingly, the industries shareholders, customers and communities are even more ambitious and want it to achieve its mitigation targets much earlier than 2050.[21]

Seqwater is ready to play its part in consultation with the Queensland Government

Seqwater has a corporate greenhouse gas emissions target of net zero emissions by 2050, in line with both the Queensland Government policy and community expectations. To work towards that target, Seqwater's initial focus is to reduce emissions relating to its electricity consumption, and during the year put arrangements in place to commence abatement from 2022-23.[22] This target was included in the Operational Plan 2021-22 approved by the responsible Ministers in June 2021.

The rationale for setting a target and commencing abatement, is twofold:

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18 Queensland Government, *Climate Action Plan*, https://www.des.qld.gov.au/climateaction

19 ClimateWorks 2021, *State and territory climate action: leading policies and programs in Australia,* October,

20 Water Services Association of Australia 2022, *Urban water industry climate change position,* May, https://www.wsaa.asn.au/publication/wsaa-industry-climate-change-position

21 Water Services Association of Australia 2022, *Urban water industry climate change position,* May, https://www.wsaa.asn.au/publication/wsaa-industry-climate-change-position

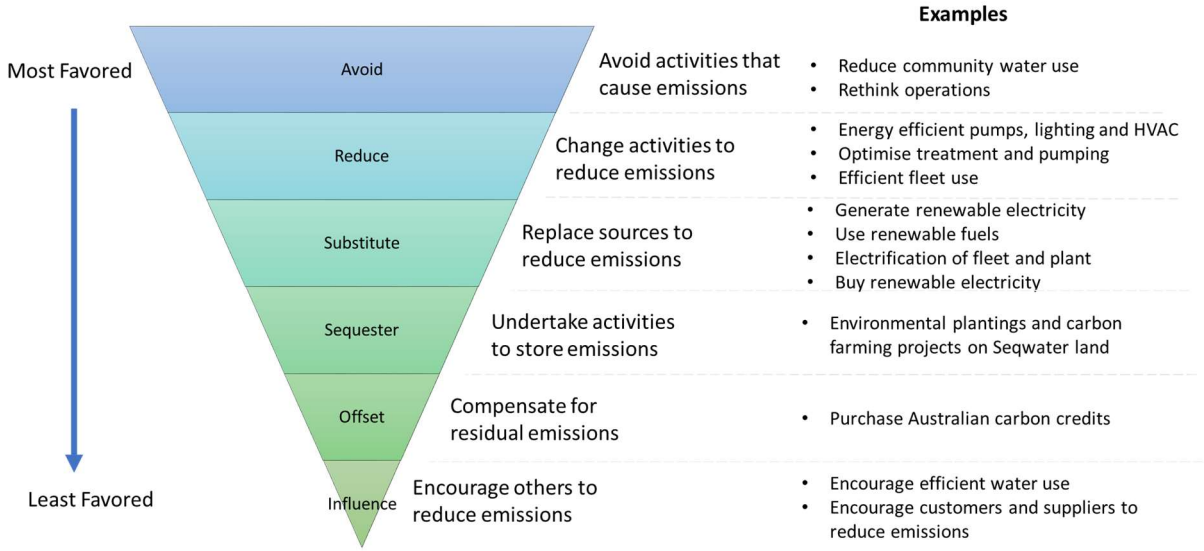
22 Seqwater 2022, Seqwater Annual Report 2021–22, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjzsf-Zjvj7AhURQfUHHdkdBYkQFnoECA8QAQ&url=https%3A%2F%2Fwww.seqwater.com.au%2Fsites%2Fdefault%2Ffiles%2F2022-10%2FSeqwater%2520Annual%2520Report%25202021-22.PDF&usg=AOvVaw2TMG0amILRRxCLVuSFpAgM

- **Regulatory and policy risk reduction** – setting a target and taking steps to abate emissions ensures Seqwater is well placed to respond in consultation with the Queensland Government; and
- **Strategic** – Sustainability is a key theme of Seqwater's organisational strategy. Climate change issues require a response, by way of Seqwater becoming part of the solution and not part of the problem. It needs to manage reputational risk as part of maintaining its 'social licence' to operate by managing water security risks associated with climate change and also playing its part in reducing greenhouse gas emissions, given the extent of Seqwater's, use of energy and emission-intensive water sources.

Seqwater has developed an Energy Strategy which has key strategic objectives to support the achievement of sustainability targets, ensure energy security, and use energy more efficiently.

Seqwater's approach to emissions reduction follows its emissions reduction hierarchy (**Figure 1**).[23] As discussed by the WSAA, working towards Net Zero is not always least cost, and therefore requires engaging with customers and communities to achieve a balance between climate change action costs and outcomes, including respecting the needs of current and future generations.[24] As noted by the QCA and its expert advisors, 'this approach aligns with international best practice.'[25]

Figure 1: **Seqwater emissions reduction hierarchy**



Source: Seqwater

Looking forward, Seqwater is standing ready to play its part in climate change mitigation in consultation with government while also remaining mindful of the need the balance customer bill impacts of any climate change mitigation expenditure.

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23 QCA, *Final report Seqwater bulk water price review 2022–26*, p, 25.

24 Water Services Association of Australia 2022, *Urban water industry climate change position,* May, p. 2, https://www.wsaa.asn.au/publication/wsaa-industry-climate-change-position

25 QCA, *Draft report Seqwater bulk water price review 2022–26*, p, 28.

4 Does the regulatory framework appropriately support climate change expenditure?

While the regulatory framework is broadly sound, it is timely to consider whether it is fit-for-purpose given the emerging challenges associated with climate change.

4.1 What does 'appropriate' support look like?

In order to assess the merits of the current regulatory arrangements and any possible changes, we propose a number of well-accepted principles of economic regulation:

- **Cost recovery**: The regulated entity should have a reasonable opportunity to be able to recover the prudent and efficient costs of providing its services whilst complying with its legal and regulatory obligations. Prudency should be assessed as at the time the investment or expenditure decision is made.
- **Customer bills**: prices should not enable the business to recover inefficient or excessive costs or costs which are not incurred prudently.
- **Incentives and risk allocation**: The pricing framework should provide incentives for businesses to deliver services efficiently in the long-term interests of customers. There should also be an appropriate allocation of risk between the regulated business and its customers.
- **Certainty**: there should be clarity as to what costs will be allowed to be recovered and the process for determining this, and should not be arbitrary changes in regulatory decision making unless there is valid reason.
- **Congruence**: The regulatory frameworks should be internally consistent and should also form a logical part of the Government's broader policy context.

These principles apply equally when focusing on climate-related expenditure as to any other expenditures by regulated businesses, in order to:

- support appropriate climate change related expenditures by entities and
- provide the right incentives for such expenditures to be undertaken in a prudent and timely manner.

Key to this will be providing regulatory certainty: greater clarity on future cost recovery of climate-related expenditure will enhance the incentives for regulated businesses to undertake both proactive expenditures to manage the potential risks of climate change impacts on their ability to provide services or, as well as to respond quickly and appropriately to any events which do occur.

4.2 Key elements of current regulatory framework for Seqwater

The Queensland Government sets the price for Seqwater's bulk water prices, but directs the Queensland Competition Authority (QCA) to investigate the pricing practices through periodic reviews relating to Seqwater's bulk water monopoly business activity. These reviews occur every 3 to 4 years.

The referral notice for the most recent review requested that the QCA recommend prices for the regulatory period that allow Seqwater sufficient revenue to recover the prudent and efficient costs of providing bulk water services and to repay 'price path debt ' by 2027–28 under 'normal operating conditions'. In establishing the level of allowed costs to be recovered in prices the QCA adopts a 'building block' approach including a return on and

of a regulatory asset base (RAB) together with forecast operating expenditure. Actual capex for the most recent regulatory period is added to the RAB for the start of the next regulatory period, subject to an ex post review of its prudency and efficiency by the QCA.

Prices are then set in a manner designed to recover this total revenue requirement over the regulatory period based on a 'normal conditions' scenario.

The framework also includes some 'ex post' risk management mechanisms for expenditure which is not anticipated or covered by the allowance.

Along with recommending the bulk water price to apply in normal operating conditions, the QCA also recommends a drought allowance to provide Seqwater with total revenue sufficient to recover the prudent and efficient costs associated with operating under drought conditions

For the purposes of considering whether the regulatory framework creates appropriate incentives for Seqwater to efficiently manage risks associated with climate change, we have identified three key elements:

- (Ex ante) Assessment of expenditure proposals
- Ex post review of capex
- Mechanisms for managing uncontrollable events which occur during the regulatory period.

4.3 (Ex ante) assessment of expenditure proposals

One of the key elements of the regulatory framework is an independent assessment of the prudency and efficiency of expenditure by the regulator. At issue is whether this approach is fit-for-purpose in relation to climate-related expenditure.

4.3.1 Current arrangements

The QCA applies a prudency and efficiency test to both capital expenditure and operating expenditure proposed by Seqwater in its pricing submissions, which entails assessing:

- Scope—are the works needed?
- Standard—are the works of an appropriate standard and not over-designed?
- Cost—are the costs reasonable for the work done?

In applying this test, in assessing the prudency of Seqwater's capex, the QCA considers whether the proposed capex can be justified by reference to an identified need or cost driver—for example, investment required as a result of a legal or regulatory obligation (compliance), growth, replacement or renewal of existing infrastructure, or achieves an outcome that is explicitly endorsed or desired by customers, external agencies, or participating councils—for example, improved reliability or quality of supply of services. In assessing efficiency, the QCA considers whether the scope of the works represents the best means of achieving the desired outcomes after having regard to the options available, including non-network solutions, and substitution possibilities between operating expenditure (opex) and capex.

A similar prudency and efficiency test applies to proposed operating expenditure. In its 2020 review of Seqwater, the QCA moved to assessing operating expenditure at an overall level rather than separately assessing fixed and variable costs. In doing so, the QCA adopts a 'base step trend' approach to forecast operating expenditure comprised of three key components:

- Base – the efficient recurring expenditure required each year, typically based on the most recently available 'full year' of actual expenditure.

- Step – changes that are typically the result of new requirements or new ways of doing things, so past expenditure (including expenditure in the base year) or trends cannot predict this change in expenditure.
- Trend – the predictable (and efficient) change in recurring expenditure over time due to input price changes, population/demand growth and improvements in productivity.

Notably, the QCA has stated that in considering the prudency of capex and any proposed 'step' changes in opex it would consider prudent and efficient costs that were:

> *"reasonably required to achieve an outcome that is explicitly endorsed by customers (for example, specific reliability outcomes) or broadly accepted changes in community expectations in relation to corporate responsibility (such as commitment to climate change mitigation)".*

4.3.2 Assessment of current approach

The QCA asks whether the QCA's standard approach to assessing the prudency and efficiency remain suitable for assessing climate change related expenditures? And do they provide the right incentives for entities to appropriately have regard to climate change considerations—and alternative ways of achieving the desired objectives—when undertaking expenditure? Further specific questions include:

- the extent to which our processes encourage service providers to develop and implement risk management frameworks and asset management plans that have appropriate regard to risks arising from climate change
- the extent to which the processes remain fit for purpose in an environment where regulated entities may need to prepare for and/or respond to more frequent or more severe climate change related significant weather events—such as cyclones, floods, major rainfall events and heatwaves
- how effectively these processes operate in an environment where businesses face increased uncertainty around the need to undertake adaptation expenditures, to respond to climate change related risks and opportunities.

In our view the QCA's broad approach to assessing prudency and efficiency remains appropriate when explicitly considering adaptation or mitigation expenditure: the issue is more one of how it is applied in practice.

Adaptation expenditure

Given the pervasive impact of climate change risk on Seqwater's ability to provide its regulated services, the vast majority of its capital and operating expenditure could be considered to constitute 'adaptation expenditure'.

The QCA presented a potential scope, standard, and cost framework to assessing climate change mitigation expenditures in its discussion paper, replicated below in **Figure 2**.

Figure 2: **The prudence and efficiency of climate change adaptation expenditure**

Source: Adapted from QCA.

In addressing the question of 'scope' for the prudency test under the QCA's framework, the key question is whether there is an identified need or cost driver. In considering adaptation expenditure, the 'need' or driver relates to the need to manage climate-related risks and inherent uncertainty.

Thus, for example, in Seqwater's case expenditure proposals relating to maintaining short and long-term water security in the face of uncertain future inflows etc are driven by the need to provide sufficient resilience in water supply to customers. Contrary to the suggestion in the QCA's discussion paper, there is not, or should not be, a "trade-off between efficiency and least cost, and robustness and resilience". This is because efficiency and least cost are not synonymous: the least cost option will not necessarily provide the appropriate level of resilience that is in the long-term interest of customers. The QCA itself defines adaptation expenditure as involving enhancing the resilience of infrastructure in response to actual or anticipated events arising from climate change. It therefore follows that an efficient level of adaptation expenditure must by its very nature embed an appropriate level of robustness and resilience.

A key implication is that prudent and efficient expenditure should incorporate an 'efficient' level of resilience across a range of potential climate scenarios. Thus it is essentially about what is prudent given knowledge of the future potential risks and consequences at the time of the decision to incur expenditure or make the investment.

While this has generally been recognised by the QCA in assessing expenditure proposals in the past (e.g. it has accepted that expenditure undertaken in accordance with the Water Security Program is prudent), it is not clear that the current approach will always ensure that resilience is embedded within the QCA's prudency and efficiency assessment. This may particularly be the case in situations (e.g. catchment protection activities) where the link between proposed expenditure and an ex post outcome may be not direct or immediate.

Under the QCA's current approach it typically undertakes a deep dive assessment of several example capital projects. Given that a key part of providing resilience is the development of an integrated supply network, it is not clear that this approach will adequately take into account the role of individual assets as part of a diversified portfolio.

That said, we note that a key part of the QCA's ex ante assessment of the prudency and efficiency of Seqwater's proposed capex is to examine governance processes, capital planning and asset management frameworks, forecasting methods, underlying assumptions, investment drivers, and other relevant factors. We also note that the QCA has flagged the potential merits of moving away from extensive and interrogative reviews of forecast capital expenditure to approaches which can best foster accountability while presenting Seqwater with appropriate incentives. In relation to assessing the prudent and efficiency of adaptation expenditure this would imply a focus on the decision-making frameworks which are applied to establish the best

course of action in an environment of uncertainty, rather than a detailed review of individual expenditure proposals.

Mitigation expenditure

Mitigation expenditures are costs that a business may incur to limit or reduce its contribution towards climate change. The discussion paper notes that mitigation expenditure could involve:[26]

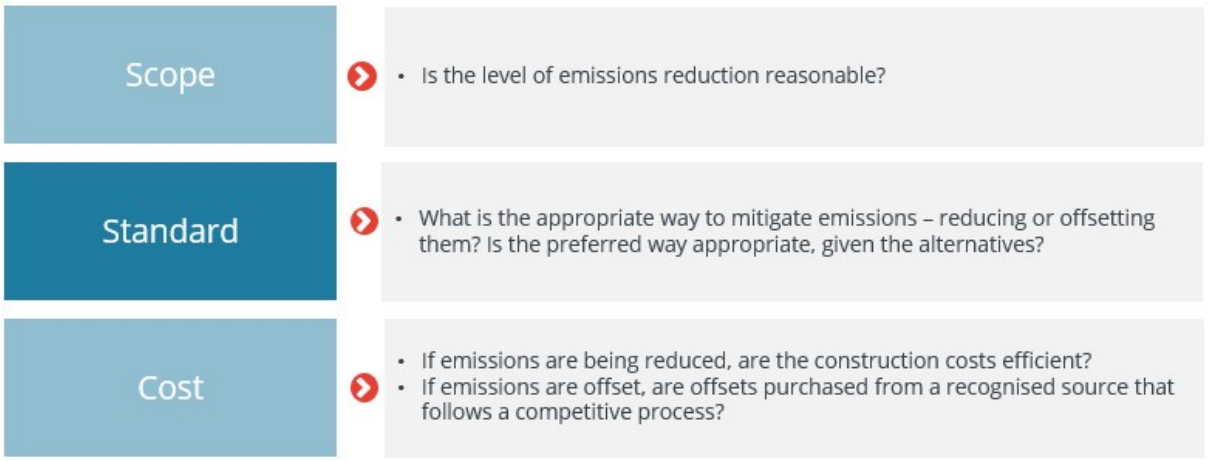
- reducing the flow of greenhouse gases into the atmosphere, by reducing sources of these gases, for example by switching to renewable energy or less intensive uses of fossil fuels; and/or
- purchasing carbon offsets that accumulate and store these gases (such as in the oceans, forests, and soil).

The discussion paper also notes that regulated businesses are increasingly considering mitigation expenditures, and that these considerations appear to be driven by a desire on the part of regulated businesses to "align their climate polices with those of the government" and/or in response to broader community expectations and pressure.

In its discussion paper the QCA suggested that it is not evident that its traditional approach to assessing prudency in terms of scope, standard and cost is directly applicable to entities seeking to undertake mitigation expenditure, particularly where there may be different alternatives to achieving the same level of net emissions. It also noted that there is also a threshold question of what level of mitigation expenditure is appropriate.

The QCA presented a potential scope, standard, and cost framework to assessing climate change mitigation expenditures in its discussion paper, replicated below in **Figure 3**.

Figure 3: **The prudence and efficiency of climate change mitigation expenditure**



Source: Adapted from QCA.

In considering whether the framework remains applicable to mitigation expenditure it is helpful to consider the threshold issue (i.e., prudency or scope) and then the issue of efficiency (i.e., standard and cost).

Scope of mitigation expenditure

In addressing the question of 'scope' for the prudency test, the key question is whether there is an identified need or cost driver for the mitigation expenditures. As noted above, Seqwater is developing a balanced

[26] Discussion paper, p. 11.

approach to reducing greenhouse gas emissions which ensures it does its part towards achieving emissions reductions targets, consistent with the Queensland Government's targets and community expectations.

Seqwater's identified drivers behind its mitigation expenditure needs include the need to:

- manage regulatory and policy risks: i.e. ensure Seqwater is well-placed to respond with proactive measures and approaches in consultation with the Queensland Government)
- manage reputational risk as part of maintaining its 'social licence' to operate by playing its part in reducing greenhouse gas emissions.

We consider that, in principle, a regulated businesses' mitigation activities and expenditures should align with its operational characteristics, preferences of its customers and stakeholders, corporate risk management frameworks, and relevant policy, regulation, and legislation.

Maintaining Seqwater's social licence to operate – or the ongoing acceptance of Seqwater's standard business practices and operating procedures by its employees, stakeholders, and the general public – is partly influenced by its climate change mitigation activities. Seqwater's current greenhouse gas emissions target of zero net emissions by 2050 is in line with both Queensland Government policy and community expectations.[27]~~28~~

Mitigation expenditure can also act to manage transitional (regulatory and policy) risks around decarbonisation. As discussed in section 3.4, climate change mitigation expenditure is occurring against a backdrop of tightening emissions targets and growing stakeholder expectations. It is prudent for a regulated entity to ~~take steps~~ consult with key stakeholders and investigate options for potential future steps to decarbonise its business operations – for example, net zero commitments are now the norm for Australian companies with over 70% of the ASX200's collective market capitalisation adopting net zero commitments.[29]

However, a challenge with economy-wide emissions targets is that they do not necessarily translate to firm-specific mitigation actions. In relation to this, the QCA notes:[30]

> *In this environment of evolving targets and commitments, regulated entities may make long-term decisions on expenditure, expansions or other projects, which involve assets with long life spans (potentially extending beyond 2050). There is a risk of asset stranding or asset obsolescence in such circumstances, particularly where asset investments do not anticipate further tightening of climate commitments by governments or organisations on which the regulated entities rely.*

Regulated businesses must understand the nature of their carbon footprints, options and costs to decarbonise their business, and be funded to develop prudent risk management strategies and manage climate change transitional risks. The QCA may consider reviewing the prudency of these processes as part of its regulatory reviews against best practice.

The QCA would then need to determine whether the proposed expenditure is efficient (i.e. that the regulated business has identified the least-cost mitigation option). That is, under the circumstances described above, mitigation expenditure could be assessed within the QCA's existing prudency and efficiency framework, without appealing to public interest considerations.

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27 Seqwater 2022, *Seqwater Annual Report 2021–22*, p. 6, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiu0q6Vuvr7AhWi4DgGHavIDkgQFnoECA4QAQ&url=https%3A%2F%2Fwww.seqwater.com.au%2Fsites%2Fdefault%2Ffiles%2F2022-10%2FSeqwater%2520Annual%2520Report%25202021-22.PDF&usg=AOvVaw2TMG0amILRRxCLVuSFpAgM

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29 ACSI 2022, *ASX climate ambition encouraging, but action must follow – ACSI research, July 25, https://acsi.org.au/media-releases/asx-climate-ambition-encouraging-but-action-must-follow-acsi-research/#:~:text=Key%20findings%3A,capitalisation%20adopting%20net%20zero%20commitments.*

30 QCA 2022, *Discussion paper approach to climate change related expenditure,* October, p. 12.

Standard and costs of mitigation expenditure

As noted in QCA's discussion paper, various options are available for a regulated entity to reduce net emissions, including (at a broad level):

- Reducing emissions directly; or
- Not reducing emissions directly, but instead purchasing offsets.

The QCA considers in its discussion paper that it is likely to have regard to a range of factors when assessing mitigation expenditure, including:

- Whether the choice of mitigation expenditure should be simply the least cost approach to mitigating net emissions;
- Considerations beyond up-front cost alone that may affect the choice of particular types of mitigation expenditure (e.g., purchasing emissions offsets may be more flexible, particularly in an environment where governments' climate commitments are evolving and are generally becoming stricter); and
- The extent to which the QCA should (as an economic regulator) involve itself in attempting to consider the effectiveness or otherwise of particular offset schemes.

The QCA may consider endorsing an ex ante approach to climate change mitigation activities, providing enough discretion for a regulated business to make operational decisions to implement mitigation measures. For example, in its Seqwater Bulk Water Price Review 2022–26 the QCA appeared to endorse Seqwater's emissions reduction hierarchy as a tool for guiding the choice of mitigation tools that should be considered first.[31]

Provided the scope of mitigation expenditures are supported, the QCA should review a regulated businesses' mitigation actions against its own framework for decarbonising its scope 1 and 2 operations. In doing so, the QCA may be well positioned to review the cost effectiveness of such expenditure as it does with other capital and operating expenditure reviews.

It is important to balance mitigation expenditures with the impact on customers' bills. Seqwater has commissioned market research on customer attitudes towards mitigation actions and expenditure. This indicated that the vast majority of SEQ residents believe it is important to reduce greenhouse gas emissions when producing drinking water and would like to see Seqwater take action. However, only 26% were prepared to pay more on their bills, and for these customers they are only prepared to pay a relatively small amount extra.

4.4 Ex post review of capex

The QCA is required (under its Ministerial Direction Notice) to review historical capex for prudency and efficiency before allowing this capex to be rolled forward in the RAB for the next regulatory period.

This review is open-ended, apart from a direction that this review should focus on items with a material impact, and that any findings on the prudency and efficiency of sampled projects should not be extrapolated to un-sampled projects.

This relatively open-ended review exposes Seqwater to considerable risk that capex spending on adaptation or mitigation activities will be subsequently not be permitted to be recovered via bulk water prices.

A particular concern with the QCA's current approach is that in contrast to its approach in assessing capex ex ante which recognises inherent uncertainty in forecasting the cost required to adapt to changing circumstances,

31 QCA 2022, *Seqwater Bulk Water Price Review 2022–26*, March, p. 25.

the ex post review process explicitly provides for reviewing the prudency of an investment decision with the benefit of hindsight:

> *Rather than striving for precision when estimating prudent and efficient capex, we consider the forecast should represent a reasonable overall allowance that provides flexibility for Seqwater to respond to changing circumstances. Seqwater is best placed to define its capital program and manage its delivery. We would expect the business to prudently reallocate resources within this funding envelope as required to deliver on its priorities and obligations at any given time.*
>
> *In contrast, the ex post assessment of actual historical capex lends itself to more decisive findings on prudency and efficiency. This is because actual costs are known with certainty, and investment decision-making and project delivery can be assessed with the benefit of hindsight and complete information*[32]*.*

This approach is particularly inappropriate for adaptation expenditure which is characterised as seeking to manage a range of potential future uncertain outcomes.

Any ex post review which sought to disallow expenditure made in good faith using fit-for-purpose risk assessment methodologies but which turned out (with the benefit of hindsight) not to be required because certain events did not occur, has potential to undermine incentives to make such expenditure. This may discourage appropriate expenditure on pre-emptive adaptation activities, which would not be in the long-term interests of customers. It would tend to encourage regulated businesses to under-invest in resilience and expose customers to service disruptions (e.g. in Seqwater's case, water shortages with very large economic and social costs for the region).

The open-ended ex post review of capex also provides a bias towards opex rather than capex spending on climate-related (and other) activities, as opex once approved ex ante is not subsequently subject to ex post review.

This suggests that any ex post review of capital expenditure should be more tightly constrained so that it provides appropriate independent scrutiny of how efficiently Seqwater has managed its capital investment programs but does not penalise it for investment decisions which were assessed to be prudent and efficient with the information available at the time they were made.. Our suggestions for doing so are set out in section 5.3.

4.5 Mechanisms for managing uncontrollable events which occur during the regulatory period

As noted in the QCA's discussion paper, climate change can lead to unpredictable and severe events.

The current regulatory framework provide for several mechanisms by which Seqwater can seek to recover the efficient costs of responding to such events, namely:

- Drought allowance
- Review event mechanism

In principle, it would also be open to Seqwater to apply to the Government for a mid-period review if an event occurred which was of such severity that Seqwater was unable to manage the revenue or prudent and efficient cost implications.

[32] Queensland Competition Authority, Final Report, Seqwater Bulk Water Price Review 2022-2026, March 2022, p. 34

4.5.1 Drought allowance

Along with recommending the bulk water price to apply in normal operating conditions, in the most recent price review for Seqwater QCA also recommended a drought allowance to provide Seqwater with total revenue sufficient to recover the prudent and efficient costs associated with Drought operating conditions (defined as operating at or below the 'drought response' trigger in the Water Security Program (WSP) for the length of the regulatory period).

This was a new element of the regulatory framework introduced in the last price review.

The drought allowance is a form of a contingency allowance. Such a mechanism is typically seen as most appropriate where the cost of the event can be reasonably estimated in advance.

Seqwater considers that the establishment of a drought allowance is consistent with emerging regulatory practice in other jurisdictions and is an efficient and effective means of recovering the costs (and foregone revenue) associated with drought. It also provides regulatory certainty to Seqwater which removes any disincentive to incur expenditure to prudently manage a drought as it emerges. In this regard, it provides considerably more certainty than a review event (discussed below), where Seqwater has no assurance that it will be able to be recover its costs, which acts as a disincentive for expenditure. It also sends a timely price signal to end customers as to the scarcity value of water during drought.

4.5.2 Review event mechanism

In recognition that a regulated business, like other businesses, can be exposed to risks beyond its control, which may have a material impact on its costs, Seqwater's current regulatory framework includes a review mechanism that captures unanticipated costs (or savings) from certain 'Review Events'. The incremental efficient costs (or savings) associated with these review events are passed through as an adjustment to the Price Path Debt mechanism at the next review period (to the extent they are assessed as 'prudent and efficient' ex post).

The defined review events which applied to Seqwater's most recent price review included several which potentially relate to climate change events:

- A drought response event: this provided for ex post recovery of drought response costs which Seqwater may incur in the event it needs to undertake actions and incur expenditure related to drought which are not reflected in the regulated prices for Seqwater's services which are predicated on 'normal operating conditions'.
- A feedwater quality event: this provided for ex post recovery of costs associated with dirty water event which adversely affect the quality of feedwater.[33]
- An emergency event: to recover costs arising from events such as floods, which can trigger the activation of emergency response plans, staff overtime and rectification costs.
- A law or government policy review event: this provided for recovery of additional costs arising from new government policy or regulatory obligations.

The QCA has previously stated that as it is difficult to predict the likelihood of these events occurring and to forecast the cost impacts, it is likely to be more efficient to pass through costs to end customers after such events occur, rather than to provide Seqwater with an upfront allowance to take on the risk. In the QCA's view, the current review event mechanism strikes a reasonable balance between the allocation of risk between Seqwater and end customers: customers bear operating cost risk associated with a limited number of review events, but an ex post cost assessment protects against the pass-through of inefficient costs.

[33] In its Final Report the QCA acknowledged that extreme events (such as cyclones, floods or terrorist or criminal acts) may lead to a sustained and severe deterioration in feedwater quality

In addition to assessing claims for costs against these review events, at each price review the QCA reviews the mechanism itself and recommends changes to review events which should apply at the next review. For example, in its 2022 review of Seqwater's prices, the QCA recommended that the review event mechanism be retained, but proposed a number of changes for future price reviews including:

- Changes in the definition of the drought response event to provide for a more flexible and holistic assessment approach to determining eligibility for a claim to be considered rather than eligibility based on strict compliance with the WSP[34].
- Broadening the definition and name of the emergency review event to include "extraordinary or extreme" events (such as cyclones, floods or terrorist or criminal acts)
- Removal of the 'feedwater quality' review even' as these could be accommodated within the 'emergency event' component via a change in the definition of this term (see above)[35].
- Amending the definition of the law or government policy event to make all claims subject to an ex post assessment for prudency and efficiency.
- Introducing a new review event relating to the recommissioning, operating, and/or decommissioning of Luggage Point AWTP.

These review events have been an important mechanism to enable Seqwater to recover unanticipated costs arising from events beyond its control. For example, in the 2022 price review the QCA approved Seqwater's claim under the feedwater quality review event to recover $2m associated with four separate rainfall events that reduced water quality and increased treatment costs. It also eventually approved Seqwater's revised claim for $43.3m of additional costs incurred in preparing for, and proactively managing drought at both the drought readiness and drought response stages. The major cost items related to Seqwater's two manufactured water assets—the Gold Coast Desalination Plant and the Western Corridor Recycled Water Scheme.

That said, in Seqwater's view some aspects of the operation of the review event mechanism have the potential to undermine the incentives for prudent and timely climate related expenditure.

The first issue relates to the definition of the review events. Because of their inherently unpredictable nature, there is a risk that an event occurs which does not fit within the prespecified definitions of the eligible review events, leaving no avenue for Seqwater to seek to recover prudent and efficient costs it incurs in responding to that event.

A related problem is that the definition or interpretation of eligibility for a review event claim may

Box 3: Drought response review event definition

The ministerial referral for the 2018 price review provided for the QCA to review the efficiency of any additional costs for drought response, where these occur in accordance with the Water

[34] The QCA recommended the following definition for the drought response review event:

- A change in prudent and efficient costs caused by Seqwater taking drought readiness or drought response actions, having regard to the following:
  - whether Seqwater has already been compensated for the relevant actions, for example, through allowances for drought or operating costs, or through insurances or the rate of return
  - whether Seqwater has acted in accordance with relevant water security planning requirements
  - whether the actions were approved by the Seqwater Board as prudent considering all of the circumstances at the time the decision was made and, where reasonable, any change in circumstances during the implementation of the actions.

[35] • While it acknowledged that extraordinary or extreme events which are difficult to forecast such as cyclones and floods could lead to a sustained and severe deterioration of feedwater quality, the QCA considered that these could be accommodated with the 'emergency event' component via a change in the definition of this term.

Security Program and the costs are material. However, this referral did not provide a precise definition of 'drought response'.

During the last regulatory period water storages fell significantly. As storages dropped below the 70% "drought readiness" level towards the 60% 'drought response' trigger[36] Seqwater incurred some expenditures on drought readiness activities which it subsequently sought to recoup via a claim for a drought response review event.

In considering this claim, the QCA proposed two alternative approaches:

- A 'narrow definition' approach which interprets the words "cost of drought response" as pertaining only to actions explicitly documented in the Water Security Program (WSP) as relating to the specific (60%) trigger called 'drought response' in the WSP.
- A 'broader definition' which focuses on assessing the prudency and efficiency of the costs incurred by Seqwater in preparing for and proactively managing drought on behalf of SEQ at both the readiness and drought response stages (as reflected in its review event claim).

As argued by Seqwater at the time, adopting the narrower definition may discourage Seqwater from prudent drought readiness actions in the interests of customers and the broader SEQ community. This could potentially lead to the need for even more severe restrictions or costly investments in the future. The economic and social costs of these actions in a severe drought may be significant and represent many multiples of the cost of taking pre-emptive action.

Even the fact that the potential differing interpretations of the review event definitions arose during the course of the price review has the potential to unnecessarily constrain or adversely influence an adaptive response to an emerging drought.

In its Final Report the QCA found that rather than determining eligibility based on compliance with the WSP, a more flexible and holistic assessment approach to determining eligibility promotes a prudent and efficient drought management response. It recognised that no water planning document can precisely determine the optimal approach to prepare for and respond to drought, reflecting the relevant circumstances. It proposed a change in the definition of this review event to better accommodate this in the future.

Source: Seqwater analysis drawing on QCA Final report Seqwater Bulk Water Price Review 2022–26 March 2022

An additional problem is that the definitions themselves are not clearly set out in one place; often the definitions need to be traced back over multiple determinations.

A major problem with all of the review event mechanisms is that they are subject to ex post review, and in most cases these are relatively open-ended.

While we accept that in situations where the cost of responding to an event cannot be established with any accuracy in advance means that there is a need for an ex post review, there would seem to be scope for reducing the uncertainty by limiting the scope of the review and providing advance guidance as to how any such review would be undertaken. In this regard the QCA's proposed changes to the definition of the drought

[36] in the 2017 WSP, there were a number of different modes or circumstances under which Seqwater operates, depending on storage levels at the time. These can be broadly described as:

1. Normal operating conditions (broadly corresponding to when storages are above 70%).
2. Drought readiness (broadly corresponding to when storages are between 60% and 70%).
3. Drought response (when storages are below 60%).

response review event to explicitly state that the prudency test should be assessed "considering all of the circumstances at the time the decision was made" is particularly pertinent.

Finally, Seqwater strongly supports retention of the review event relating to law or government policy events element of the review mechanism. This is particularly relevant in the context of climate change policy which is evolving rapidly. For example, such a review event should enable Seqwater to recover costs associated with a new binding regulatory obligation on emissions reductions which goes beyond Seqwater's current plans.

5 How can the regulatory framework better accommodate climate change considerations?

5.1 Introduction

The key purpose of the QCA's discussion paper is to canvass opportunities to refine its regulatory approaches, given the climate change risks and opportunities that now confront regulated entities. The overarching question is how the frameworks could be improved to create appropriate incentives for regulated entities to efficiently manage risks associated with climate change.

More detailed questions raised by the QCA include:

- Whether ex ante approval or ex post approval of funding is more appropriate, given the need for efficient incentives to undertake timely adaptation and mitigation expenditure
- The evidentiary burden to support the approval of such expenditure, and processes to expedite approvals
- Mechanisms to provide greater confidence that appropriate climate change related expenditure will be approved
- Mechanisms to facilitate consideration of trade-offs between repairing and upgrading assets in an environment of increasing climate events
- The relevance of the resilience of the regulated business and customers' willingness to pay for this
- The balance and trade-offs between regulated businesses' costs (capital and maintenance) and service levels
- The merits of proactive versus reactive expenditure.

As a general rule, ex ante (rather than ex post) approval of expenditure provides more certainty to regulated entities that they will be able to recover their costs and so provides stronger incentives to undertake pre-emptive climate related expenditure.

In addition, approaches which rely on the QCA being satisfied that the decision-making frameworks adopted by Seqwater to establish climate-related expenditure proposals are more likely to provide appropriate incentives to undertake timely adaptation and mitigation expenditure than approaches which entail detailed scrutiny of individual capital projects of operating expenditure items.

Clear guidance on the QCA's expectations in relation to how these will be assessed would also enhance regulatory certainty to underpin investments in adaptation and mitigation.

The following outlines our initial views on potential improvements to the current regulatory framework to better accommodate climate change risks.

5.2 Prudency and efficiency review should embed resilience

As discussed in section 4.3, particularly in relation to adaptation expenditure, any assessment of prudency and efficiency by definition should embed resilience. That is, prudent and efficient expenditure should incorporate an 'efficient' level of resilience across a range of potential climate scenarios. Moreover, in doing so, a key principle in assessing prudency should be whether decision was prudent based on the information available at the time – not with the benefit of hindsight.

We note that the QCA has flagged the potential merits of moving away from extensive and interrogative reviews of forecast capital expenditure to approaches which can best foster accountability while presenting Seqwater with appropriate incentives. In relation to assessing the prudency and efficiency of adaptation expenditure this

would imply a focus on the decision-making frameworks which are applied to establish the best course of action in an environment of uncertainty, rather than a detailed review of individual expenditure proposals.

We therefore suggest that approaches to assessing the prudency and efficiency of climate-related expenditure should focus on the robustness of the underlying decision -making process and techniques. In order to embed resilience into the ex ante assessment of climate-related expenditure, there are three key steps:

1. Recognition and where possible quantification of climate change physical risk scenarios and natural disaster exposures to Seqwater's assets and service deliverability
    a. the Queensland Government provides science-based guidance on physical risk exposure from climate changes
    b. the regulated entity take those future scenarios and assesses what this means for its particular assets and service provision capability (e.g. as occurs in developing the WSP)
2. Application of best practice tools and techniques to make investment decisions under conditions of climate risk and uncertainty
    a. there is a range of techniques for doing this in the water sector to inform decision-making under uncertainty, including scenario analysis and real options analysis. Such techniques, for example, are key inputs into the development of Seqwater's Water Security Program. Infrastructure Australia also notes that there are different types of analysis, mitigations and tools which are suited to considering and responding to risk and uncertainty[37].
3. Develop an adaptive program which seeks to best manage these risk in the long-term interests of customers and the broader community by drawing links from the underlying climate risk drivers to the investment and expenditure proposal for climate-related expenditure while engaging closely with key customer and other stakeholders.

QCA's ex ante prudency and efficiency review should be largely about whether the regulated business has followed its systems and processes for identifying and managing climate-related risk, rather than seeking to prescribe the precise scenarios or techniques which businesses should adopt.

Upfront guidance that the QCA will follow such an approach would help to underpin regulatory certainty and therefore facilitate prudent and efficient climate-related investment.

This ex ante assessment should be complemented with limited ex post review (see below).

One option which the QCA canvasses in its discussion paper is whether its approach to assessing self-insurance could be used to assess adaptation expenditure (see Box 4).

Box 4: QCA approach to assessing self-insurance

In assessing a regulated businesses proposal for self-insurance, the QCA has stated that the service provider must:

- identify the specific risks and define the specific events that it proposes to self-insure for
- identify those risks that are not already covered by self-insurance
- demonstrate that self-insurance is the most efficient and practical approach to addressing these risks

[37] Infrastructure Australia, Guide to risk and uncertainty analysis, Technical guide of the Assessment Framework, July 2021

- demonstrate its commitment and financial capacity to meet the costs of a self-insured event without undue delay.

In such circumstances, we envisage that the self-insurance allowance would have regard to the costs and probability of an event occurring.

Insurers are increasingly taking a more technical approach to assessing an organisation's exposure to natural perils and the potential wider consequences of climate change. Whilst technical models exist to assess the baseline risk for physical risk (e.g. exposure models that can tell us if an asset is exposed; and loss models that can provide a loss exceedance probability for damage) from perils such as flood, bushfire, cyclone etc, the ability to assess and quantify the impacts of climate change are more challenging. At present, most of the climate models are limited to assessing the relative change in exposure due to climate change at different return periods, however, some provide risk quantification data that goes beyond the physical exposure risk.

It is not readily apparent that this approach translates well to the assessment of adaptation expenditure. The QCA's discussion paper appears to focus on a somewhat simplistic 'expected value' approach. As noted above, there is a range of analytical frameworks and methodologies which are adopted to inform decision-making under risk and uncertainty.

5.3 Limit ex post review of capex

While Seqwater accepts the need for appropriate independent scrutiny of its capital expenditure proposals, as discussed in section 4.4 , the open-ended nature of the ex post review of capital expenditure exposes Seqwater to considerable risk that prudent capex spending on adaptation or mitigation activities will subsequently not be permitted to be recovered via bulk water prices. This in turn may discourage appropriate expenditure on adaptation activities designed to pre-empt potential future impacts from climate change.

We therefore suggest that any ex post review of capex should be more tightly constrained so that it provides appropriate independent scrutiny of how efficiently Seqwater has managed its capital investment programs but does not penalise it for investment decisions which were assessed to be prudent and efficient with the information available at the time they were made. In particular we propose:

- Any capex included in the original pricing submission expenditure proposal and approved as 'prudent' ex ante should not be revisited for prudency ex post (i.e. any review of such capex should be limited to an assessment of 'efficiency')
- Any ex post review of capex which was not included in the original submission expenditure proposal should assess prudency based on the information available at the time the decision was made to incur the expenditure, not with the benefit of hindsight (as per above with ex ante assessment of expenditure). Such expenditure is likely to be associated with responding to an unexpected event (given it was not included in Seqwater's planned capex proposal). An example of this was urgent expenditure incurred in replacing Sparkes Hill reservoir roof following its collapse during the 2017-22 regulatory period.
- More guidance about how the QCA will approach any such ex post review would provide greater regulatory certainty to the business (e.g. decision-making processes which if evidenced would be taken as prima facie evidence of prudency). This should include explicit reference to the need for the assessment to only consider information available at the time (along the lines of the new definition the QCA proposed in relation to the drought response review event mechanism).

We note that a number of other regulatory frameworks have much more limited provisions for ex post review of capex.

5.4 Extend use of contingency allowances

One option would be to explore the potential for extending the use of contingency allowances, rather than review event mechanisms.

For example, one possibility might be to extend the use of such contingency allowances to spell out a broad range/spectrum of potential events e.g. different levels of drought, different levels of flood etc with associated pre-approved expenditures, thus providing more ex ante certainty.

Contingency allowances would provide more certainty than review event, where Seqwater has no assurance that it will be able to be recover its costs, which acts as a disincentive for action and associated expenditure.

These costs would not necessarily need to flow through immediately to prices in the period in which the event occurs.

As occurs now, contingency allowances could be supplemented with a review event mechanism to address any difference in costs which vary because of the precise nature of the event which occurs (subject to a prudency and efficiency assessment, based on information available at the time of the decision).

5.5 Improve operation of review event mechanism

As noted in section 4.5.2 , while the review event mechanism has enabled Seqwater to recover unanticipated costs arising from events beyond its control, some aspects of the operation of the review event mechanism have the potential to undermine the incentives for prudent and timely climate related expenditure.

In particular, definition of ‘review events’ is too narrow and could exclude legitimate climate-related events outside control of Seqwater. Even the QCA’s proposed expended definition of the ‘emergency’ review event may be insufficient to pick up events which have ongoing impacts (e.g. dirty water event from flooding).

We propose:

- Consideration could usefully be given to introducing a broader ‘catch all’ mechanism which refers to events beyond Seqwater’s reasonable control.
- The scope of ex post review under all of the review event mechanisms be explicitly constrained to considering information available at the time the decision was made to incur the expenditure, along the lines of the QCA’s proposal to revise the definition of the drought response event.
- More guidance about how the QCA will approach any such ex post review would provide greater regulatory certain to the business (e.g. decision-making processes which if evidenced would be taken as prima facie evidence of prudency).

A Responses to QCA Questions

(1) To what extent are the risks of more frequent or severe extreme weather events already impacting the businesses of regulated entities? Please provide evidence where available and appropriate.

Our business and operating environment is characterised by uncertainty, including a changing climate. Managing climate related risks is not new for the water sector – it simply amplifies the task.

Seqwater's ability to perform its fundamental role in providing long-term water security for the SEQ region is critically dependent on managing climate change risks, which potentially affect both the availability and quality of bulk water supply, the demand for water from its customers, and the resilience and operation of key assets.

Climate change can have a slow but significant impact on the performance of the bulk water supply system.

Importantly, these physical climate risks encompass both discrete severe weather events (e.g. floods and cyclones) and gradual longer-term shifts in climate patterns (e.g. reductions in long-term average rainfall or increase in average temperatures).

Further detail on the climate risks and how we are managing them is provided in section 3 of the submission.

(2) Is there evidence to suggest that regulated entities are facing difficulties in accessing insurance for their assets or accessing insurance at reasonable cost? Is self-insurance thereby becoming a more prudent option for these businesses?

Climate change is one factor which affects the accessibility to insurance. These worsening climate impacts are already affecting the affordability and availability of insurance in Australia (most notably property insurance and general liability insurance), particularly in areas most exposed to perils such as bushfires, flooding, and cyclones.

Seqwater still can access property insurance in the market – though at an increased premium, increased deductibles, and with some reduction in the terms of coverage.

Further details are provided in section 3.

(3) Most organisations, including regulated entities, now have detailed climate change strategies and planning documents in place. To what extent are these strategies a response to government policies, and to what extent are they externally driven (e.g. in response to financing requirements or shareholder activism)? Do these external drivers put pressure on businesses to exceed the minimum requirements of government policies?

Seqwater has a number of strategies and planning documents which relate to managing the risk of climate change. These relate to both climate adaptation and mitigation.

The QCA defines adaptation expenditure as involving enhancing the resilience for infrastructure in response to actual or anticipated events arising from climate change. In this sense, almost all of Seqwater's expenditure can be seen as adaptation expenditure. In broad terms, strategies and plans relating to climate change adaptation involve firstly developing our understanding of the risks, and then developing and applying strategies and decision-making frameworks to underpin adaptation investment and expenditure to best manage these risks.

In relation to mitigation, Seqwater has a corporate greenhouse gas emissions target of net zero emissions by 2050, in line with both the Queensland Government policy and community expectations. To work towards that target, Seqwater's initial focus is to reduce emissions relating to its electricity consumption, and during the year investigate options to put arrangements in place to commence abatement from 2022-23. The rationale for setting a target and commencing abatement, is twofold:

- **Regulatory and policy risk reduction** – to ensure Seqwater is well-placed to respond with proactive measures and approaches in consultation with the Queensland Government; and
- **Strategic** – to manage reputational risk as part of maintaining our 'social licence' to operate by playing our part in managing water security risks associated with climate change and reducing greenhouse gas emissions.

Further details are provided in section 3 of the submission.

(4) Are regulated entities being encouraged or pressured by their customers to take further action on climate change? For example, do customers want regulated entities to reduce their scope 2 emissions by using an increasing proportion of renewable energy in their businesses? How do customers value actions taken by regulated entities that might provide for the customers to claim reduced scope 3 emissions in their supply chains?

Seqwater's customers have expressed a preference for it to undertake climate change mitigation expenditure. For example, in a recent survey commissioned by Seqwater it was found that 80% of SEQ residents are supportive of Seqwater achieving zero net emissions

Further details are provided in Section 3 of the submission.

(5) Do the QCA's existing regulatory frameworks create appropriate incentives for regulated entities to efficiently manage risks associated with climate change? If not, how might the frameworks be improved in this regard?

In Seqwater's view the existing regulatory framework is broadly sound and does not need to be overhauled fundamentally to accommodate climate change considerations. Rather, the key challenge is to ensure the regulatory framework is applied appropriately to ensure climate change risk is managed prudently and efficiently – in the context of Seqwater's bulk water level of service expectations of the community, which may be a less forgiving risk environment than other utilities or infrastructure services.

Key to this will be providing regulatory certainty. Greater clarity on future cost recovery of climate-related expenditure positively influence the incentives for regulated businesses to:

- undertake proactive expenditures to manage the potential risks of climate change impacts on their ability to provide services and
- respond quickly and appropriately to any events which do occur.

As a general rule, ex ante (rather than ex post) approval of expenditure provides more certainty to regulated entities that they will be able to recover their costs and so provides stronger incentives to undertake pre-emptive climate related expenditure.

In addition, approaches which rely on the QCA being satisfied that the decision-making frameworks adopted by Seqwater to establish climate-related expenditure proposals are robust – rather than the QCA undertaking detailed scrutiny of individual capital projects or operating expenditure items – are more likely to provide appropriate incentives to undertake timely adaptation and mitigation expenditure .

Clear guidance on the QCA's expectations in relation to how these will be assessed would also enhance regulatory certainty to underpin investments in adaptation and mitigation.

Further details are provided in sections 4 and 5 of the submission.

(6) Are existing mechanisms in the QCA's regulatory frameworks for dealing with newly arising expenditure requirements (e.g. pass-through mechanisms, review events and draft amending access undertaking (DAAU) processes) sufficient to deal with climate change related expenditure? If not, how might these mechanisms need to be amended?

As noted in the QCA's discussion paper, climate change can lead to unpredictable and severe events.

The current regulatory framework provide for several mechanisms by which Seqwater can seek to recover the efficient costs of responding to such events, namely the drought allowance and the review event mechanism.

Seqwater considers that the establishment of a drought allowance is consistent with emerging regulatory practice in other jurisdictions and is an efficient and effective means of recovering the costs (and foregone revenue) associated with drought. It also provides regulatory certainty to Seqwater which removes any disincentive to incur expenditure to prudently manage a drought as it emerges.

The review events have been an important mechanism to enable Seqwater to recover unanticipated costs arising from events beyond its control. That said, in Seqwater's view some aspects of the operation of the review event mechanism have the potential to undermine the incentives for prudent and timely climate related expenditure.

We propose several changes to Improve operation of the review event mechanism:

- Consideration could usefully be given to introducing a broader 'catch all' mechanism which refers to events beyond Seqwater's reasonable control.
- The scope of ex post review under all of the review event mechanisms be explicitly constrained to considering information available at the time the decision was made to incur the expenditure, along the lines of the QCA's proposal to revise the definition of the drought response event.
- More guidance about how the QCA will approach any such ex post review would provide greater regulatory certain to the business (e.g. decision-making processes which if evidenced would be taken as prima facie evidence of prudency).

Another option would be to explore the potential for extending the use of contingency allowances, rather than review event mechanisms.

Further detail is provided in sections 4 and 5 of the submission.

(7) The QCA's standard approach to assessing the prudency and efficiency of capital expenditure claims by regulated entities involves applying frameworks that assess scope, standard and cost. Are these existing frameworks suitable for assessing climate change related expenditures? And do they provide the right incentives for entities to appropriately have regard to climate change considerations - and alternative ways of achieving the desired objectives - when undertaking expenditure? If not, how should they be enhanced? For example, in considering the prudency of capital expenditure, is there a trade-off between efficiency and least cost, and robustness and resilience? If so, how can these trade-offs be managed?

In our view the QCA's broad approach to assessing prudency and efficiency remains appropriate when explicitly considering adaptation or mitigation expenditure, the issue is more one of how it is applied in practice.

Contrary to the suggestion in the QCA's discussion paper, there is not, or should not be, a "trade-off between efficiency and least cost, and robustness and resilience". This is because efficiency and least cost are not synonymous: the least cost option will not necessarily provide the appropriate level of resilience that is in the

long-term interest of customers – particularly when a climate-related event might take a decade or more to manifest.

A key implication is that in assessing prudency and efficiency, prudent and efficient expenditure should incorporate an 'efficient' level of resilience across a range of potential climate scenarios. Thus it is essentially about what is prudent given knowledge of the future potential risks and consequences at the time of the decision to incur expenditure/make the investment.

We therefore suggest that approaches to assessing the prudency and efficiency of climate-related expenditure should focus on the robustness of the underlying decision -making process and techniques. In order to embed resilience into the ex ante assessment of climate-related expenditure, there are three key steps:

1. Recognition and where possible quantification of climate change physical risk scenarios and natural disaster exposures to Seqwater's assets and service deliverability

a. the Queensland Government provides science-based guidance on physical risk exposure from climate changes

b. the regulated entity take those future scenarios and assesses what this means for its particular assets and service provision capability (e.g. as occurs in developing the WSP)

2. Application of best practice tools and techniques to make investment decisions under conditions of climate risk and uncertainty

a. there is a range of techniques for doing this in the water sector to inform decision-making under uncertainty, including scenario analysis and real options analysis. Such techniques, for example, are key inputs into the development of Seqwater's Water Security Program. Infrastructure Australia also notes that there are different types of analysis, mitigations and tools which are suited to considering and responding to risk and uncertainty .

3. Develop an adaptive program which seeks to best manage these risk in the long-term interests of customers and the broader community by drawing links from the underlying climate risk drivers to the investment and expenditure proposal for climate-related expenditure while engaging closely with key customer and other stakeholders.

QCA's ex ante prudency and efficiency review should be largely about whether the regulated business has followed its systems and processes for identifying and managing climate-related risk, rather than seeking to prescribe the precise scenarios or techniques which businesses should adopt.

Upfront guidance that the QCA will follow such an approach would help to underpin regulatory certainty and therefore facilitate prudent and efficient climate-related investment.

This ex ante assessment should be complemented with limited ex post review.

Further details are provided in sections 4.3 and 5.2 of the submission.

(8) Are processes in the regulatory frameworks that are designed to provide regulated entities with a degree of certainty to make investment decisions (e.g. provisions that allow for pre-approval of the scope of projects or customer vote mechanisms) sufficiently flexible to enable climate change related investments to proceed where appropriate?

As noted above, greater clarity on future cost recovery of climate-related expenditure could improve the incentives for regulated businesses to:

- undertake proactive expenditures to manage the potential risks of climate change impacts on their ability to provide services and
- respond quickly and appropriately to any events which do occur.

While Seqwater accepts the need for appropriate independent scrutiny of its capital expenditure proposals, the relatively open-ended review exposes Seqwater to considerable risk that prudent capex spending on adaptation or mitigation activities will subsequently not be permitted to be recovered via bulk water prices. A particular concern is that the ex post review process explicitly provides for reviewing the prudency of an investment decision with the benefit of hindsight.

Similarly, a major problem with all of the review event mechanisms is that they are subject to ex post review, and in most cases these are relatively open-ended.

We therefore suggest that any ex post review of capex should be more tightly constrained and in particular:

- Any capex included in the original pricing submission expenditure proposal and approved as 'prudent' ex ante should not be revisited for prudency ex post.
- Any ex post review of capex which was not included in the original submission expenditure proposal should assess prudency based on the information available at the time the decision was made to incur the expenditure, not with the benefit of hindsight.
- More guidance about how the QCA will approach any such ex post review would provide greater regulatory certain to the business (e.g. decision-making processes which if evidenced would be taken as prima facie evidence of prudency).

We also propose similar changes to the operation of the review event mechanisms.

Further details are provided in sections 4 and 5 of the submission.

(9) How should differences between regulated entities' willingness to supply and customers' willingness to pay for adaptation and/or mitigation expenditure be reconciled? What if the willingness to pay differs among customers or groups of customers? In considering these matters, how should potential externalities be assessed? This includes positive externalities that may accrue to the broader community from increased mitigation activities.

Seqwater's investment in climate change adaptation expenditure relates to the need to manage climate-related risks and inherent uncertainty in providing its services. In Seqwater's case expenditure proposals relating to maintaining short and long-term water security in the face of uncertain future inflows etc are driven by the need to provide sufficient resilience in water supply to customers. Seqwater is required to develop a water security program (WSP) to facilitate the achievement of the desired level of service objectives for water security specified by the Queensland Government. The plans outlined in the WSP are the result of rigorous research, modelling and analysis, coupled with stakeholder, customer and community engagement.

A balanced approach is required to ensure that mitigation expenditures meet customers' and community expectations. As discussed by the Water Services Association of Australia, working towards Net Zero is not always least cost, and therefore requires engaging with customers and communities to achieve a balance between climate change action costs and outcomes, including respecting the needs of current and future generations. Seqwater has had regard to wider community expectations on its climate change mitigation action through reference to the Queensland Government's 2050 net zero climate commitments.

Further details are provided in sections 3 and 4 of the submission.

(10) How do organisations justify climate change related expenditures to their boards and other internal stakeholders? To what extent can these processes inform the QCA's assessment of this type of expenditure?

Board and internal delegations of authority review climate related expenditure in three categories:

- Asset Portfolio Master Plan – the APMP is approved by the Board and all capital expenditure is reviewed through a stage gate process, that incorporates climate related risks

- Drought event expenditure – all operating and capital expenditure related to defined drought event triggers are approved through a formal committee process
- Climate mitigation – all climate mitigation operating and capital expenditure comes under an overarching plan approved by the Board, then implemented through the normal business stage gate process

The QCA should be able to rely on the integrity of the information provided to it resulting from these processes in demonstrating the prudency and efficiency of climate change related expenditure. Analysis and review are conducted on all materials supplied to Seqwater's Board. Board sign-off on frameworks, strategies and climate action initiatives should provide assurance to inform QCA's review of scope, standard and cost.

(11) How do organisations consider different types of mitigation expenditures? How do they decide between alternative options (e.g. direct mitigation versus purchase of offsets) and justify those decisions? What lessons can be learned for the QCA's regulatory processes?

Seqwater's approach to emissions reduction follows its emissions reduction hierarchy. As noted by the QCA and its expert advisors in its investigation of Seqwater bulk water prices 2022–26, Seqwater's emissions reduction hierarchy approach aligns with international best practice.

We suggest that the QCA should be open to regulated entities developing their own frameworks for prioritising the type and level of climate change mitigation activities and expenditures as it relates to their particular business, customer, and community needs. This approach will best ensure that the operational characteristics of the regulated entity are appropriately reflected in expenditure decisions. In order to provide regulatory certainty, the QCA may then choose to review the frameworks against best practice to inform its assessment of expenditure prudency and efficiency when reviewing future pricing arrangements. We consider this to be a formalisation of the approaches the QCA recently adopted in its investigation into Seqwater's bulk water prices 2022–26.

Further details are provided in section 3 of the submission.

(12) What lessons can be learned from the insurance industry's assessment of climate change related risks? How should the QCA approach the assessment of actuarial information provided to it as part of future expenditure claims? Does the QCA's approach to assessing self-insurance claims provide a model for assessing proposed climate change related spending? What might the criteria be for a climate change related application? What types of supporting material should an entity provide?

Insurers are increasingly taking a more technical approach to assessing an organisation's exposure to natural perils and the potential wider consequences of climate change. Whilst technical models exist to assess the baseline risk for physical risk (e.g. exposure models that can tell us if an asset is exposed; and loss models that can provide a loss exceedance probability for damage) from perils such as flood, bushfire, cyclone etc, the ability to assess and quantify the impacts of climate change are more challenging. At present, most of the climate models are limited to assessing the relative change in exposure due to climate change at different return periods, however, some provide risk quantification data that goes beyond the physical exposure risk.

It is not readily apparent that this approach translates well to the assessment of adaptation expenditure. The QCA's discussion paper appears to focus on a somewhat simplistic 'expected value' approach. There is a range of analytical frameworks and methodologies which are adopted in the water sector to inform decision-making under uncertainty, including scenario analysis and real options analysis. Such techniques, for example, are key inputs into the development of Seqwater's Water Security Program.

We therefore suggest that approaches to assessing the prudency and efficiency of climate-related expenditure should focus on the robustness of the underlying decision-making processes and techniques, agree upfront on climate change scenarios and key assumptions etc.

Further discussion is provided in section 5.2.

(13) Do stakeholders have experiences with other regulatory work or frameworks, in Australia or overseas, that the QCA ought to have regard to in undertaking this climate change project? If so, what lessons could be learned from such experiences?

We have not undertaken a review of regulatory frameworks in Australia or overseas. However, we do observe that a number of other regulatory frameworks have much more limited provisions for ex post review of capex.