Queensland bulk water opportunities statement

December 2018 Update
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Summary

The Queensland bulk water opportunities statement (QBWOS) is the bulk water security strategy and direction statement for the state. This strategic infrastructure document provides a framework through which the Queensland Government can support and contribute to sustainable regional economic development through better use of existing bulk water infrastructure, and planning and investment in new infrastructure.

There has been heightened public interest in new water infrastructure due to:

- increased incidence of extreme weather events in many parts of Queensland, including prolonged drought and significant flooding
- the perception that new water infrastructure can drive regional economic growth
- responses to various state and federal initiatives, including the Queensland Government’s State infrastructure plan and the Australian Government’s National Water Infrastructure Development Fund.

Queensland is well serviced by a major bulk water infrastructure portfolio that supports communities and businesses across the state and is a key driver of economic growth in many regions. Construction and utilisation of bulk water infrastructure (dams, weirs, pipelines etc.), and the accompanying contribution to local economies, has varied over time across the state. There are more than 400 dams, weirs and barrages in Queensland. Significant periods of construction for this infrastructure occurred after World War II, during the 1970s and 1980s to support regional economic growth and, later, the large-scale development of the resources sector. The need to upgrade dams to maintain safety standards is currently driving another significant period of investment.

An assessment updated for QBWOS 2018 found that there are more than 280,000 megalitres per year of uncommitted water across the state and approximately 865,000 megalitres per year of under-utilised allocations in the 42 water supply schemes across Queensland. Combined, these amounts are more than triple the total allocations from Wivenhoe Dam (approximately 286,000 megalitres). These are significant quantities of water that could be used for economic development without the need for new bulk water supply infrastructure. However, this water may not be available where the demand is, or with suitable reliability to meet current or future development needs.

The key issue for government is how to invest in the best opportunities for the future, support growth and meet the needs of our regional communities. It is imperative that governments spend ever more wisely on ideas and projects that provide economic benefits, while at the same time not impeding the ability of the private sector or commercial bulk water service providers to pursue projects that are commercially viable.

The QBWOS provides a clear statement of the Queensland Government’s objectives for bulk water supply when considering the investment of scarce public funds. These objectives are:

- safety and reliability of dams and urban water supplies
- use existing water resources more efficiently
- support infrastructure development that provides a commercial return to bulk water providers
- consider projects that will provide regional economic benefits.

To support these objectives, clear principles have been identified that should be applied when considering investment in infrastructure.

The QBWOS identifies opportunities for our regional communities and the state as a whole. The focus is on maximising the use of, and benefits from, existing investments and carefully considering the benefits and costs of new infrastructure.

It is important to take into account the challenges and limitations of constructing more bulk water infrastructure. These projects can be expensive (up front and on an ongoing basis) and often require careful environmental management. In a time of constrained budgets and changing agricultural and resource commodities futures, significant investments for new bulk water supply infrastructure need to demonstrate a high degree of certainty about economic value, environmental acceptability and a broader contribution to the community. In particular, any proposed water infrastructure projects...
adjoining the Great Barrier Reef must pay particular consideration to potential impacts on the Reef, from both infrastructure development and the end uses of the water (such as agriculture, mining, industry and urban development).

The focus of the QBWOS is therefore on reducing the barriers to using available water within existing bulk water supply infrastructure and considering new projects that demonstrate economic benefits within the context of competing budget and environmental constraints.

The QBWOS presents a framework for achieving a balance between making better use of what we already have and committing to new projects in the future. Elements of least cost planning are integral to this approach, where needs and opportunities analyses consider alternative supply and demand side management options as part of maximising the economic, social and environmental benefits of existing and new infrastructure.

The QBWOS provides details of existing bulk water infrastructure in Queensland, details of recently completed projects and details of water infrastructure projects that are currently, or have recently been, the subject of feasibility or environmental assessments. Importantly, the QBWOS also outlines water availability from existing infrastructure (based on an assessment of volumes of water utilised in all water supply schemes in Queensland).

This document also clarifies the roles and responsibilities of government agencies, bulk water entities (such as SunWater) and other water service providers in the provision of bulk water to the state.

The QBWOS provides a timely reminder that the approaches to developing bulk water infrastructure projects in the past may not be the most appropriate into the future. There have been, and will continue to be, new, innovative and more cost effective approaches to addressing water needs across the state.

It is intended that future versions of QBWOS will update Queensland’s priority list for new water infrastructure, together with progress statements for previously identified opportunities and reports on significant changes to the state’s broader water infrastructure planning space.
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Introduction

Purpose and content

The Queensland bulk water opportunities statement (QBWOS) provides a framework for sustainable regional economic development through better use of existing bulk water infrastructure and effective investment in new infrastructure. It also provides a focal point for discussion with the community and the water sector about water security planning in Queensland including demand management, optimal use of existing supplies and future bulk water infrastructure supply options to support growth and economic development in regional communities.

The QBWOS provides:
• a clear statement of the state’s objectives for its investment in bulk water supply infrastructure
• principles to guide bulk water investment decision-making, if state government investment is to be considered
• key infrastructure and policy initiatives and opportunities to promote an understanding of the water sector.

The QBWOS also provides background and contextual information, including:
• the policy environment, planning complexities, unique risks and general considerations
• a description of bulk water entities and their infrastructure
• a summary of bulk water supplies, including latent capacity and reserves
• the roles and responsibilities of various entities.

The QBWOS also outlines key infrastructure initiatives that are currently in progress to support the state’s objectives, examines risks and explains key policy initiatives and opportunities.

The QBWOS focuses on raw water supplied from bulk water supply systems that primarily access surface water resources.

High-level information on groundwater and non-traditional water supply sources has also been included to support development utilising these sources.

The QBWOS consists of this document, a story map and a layer in Queensland Globe to provide more detailed data to project proponents and other stakeholders.

The story map provides a visual (spatial and graphical) representation of existing bulk water supply infrastructure and current activities across Queensland. It provides details of water entitlements and availability, and useful climate-related data. It also provides details of bulk water infrastructure projects currently and recently under investigation.

The bulk water infrastructure layer in Queensland Globe provides an interactive online tool with a detailed graphical display of key information for Queensland bulk water supply infrastructure information that is integrated with other Queensland Globe layers.

This is the second version of QBWOS. QBWOS will be reviewed and updated regularly to include the most current information on community and stakeholder feedback, potential economic development opportunities, investigations into new bulk water supply, sources, technologies, infrastructure, latent capacity and progress on initiatives identified in the statement.
Context

In late 2015, it was identified that a coordinated approach to the planning, assessment and development of bulk water supply infrastructure would benefit the state. Work commenced on a document that has evolved into the Queensland Bulk Water Opportunities Statement.

In early 2016, the State infrastructure plan was released with a commitment to an infrastructure reform agenda. As part of the implementation of the plan, the Department of Natural Resources, Mines and Energy (DNRME) was tasked with developing a water security strategy to inform regional planning and guide the state’s investment in bulk water supply infrastructure. The QBWOS satisfies these requirements, providing clear direction for strategic infrastructure decisions taking into account the need to achieve a balance between making better use of what we have and committing to new projects in the future.

State infrastructure plan

The QBWOS is one of five strategic infrastructure documents outlined in the State infrastructure plan (released in March 2016).

These five strategic infrastructure documents are designed to provide a clear policy direction for strategic infrastructure decisions across transport, water, energy, digital and social asset classes.

A key objective of these five documents is to inform future regional plans. In setting the strategic direction for each asset class, these documents also strive to achieve the broader social, economic and environmental outcomes sought by the Queensland Government.

Figure 1: The five state strategic infrastructure documents
1. Objectives, principles and initiatives

1.1 Bulk water supply objectives

The Queensland Government develops frameworks that support and enable the efficient and effective delivery of bulk water supplies across the state to support growth and underpin economic development. A critical component of these frameworks is a clear statement of the government’s objectives for bulk water supply. The objectives are supported by clear principles to guide the state’s decisions regarding investment in bulk water supply infrastructure.

The Queensland Government supports commercially viable infrastructure development that does not place a financial burden on the state’s budget. It is preferable that proponents, water users and water service providers work together to determine water needs and come to an agreement on a suitable solution through commercial negotiations. The Queensland Government’s role in such cases is to ensure the frameworks are in place so proponents can advance their project, including appropriate processes for regulatory approvals.

In instances where there is a public or economic benefit, but market failure or the scale of the problem or solution is such that private proponents and service providers are unable to advance their project on a commercial basis, there may be a role for the state government. The QBWOS provides information on the circumstances that could trigger government involvement, and the associated objectives and principles for potential state government consideration of water projects.

Objectives

The Queensland Government’s objectives for bulk water supply are as follows:

1. Safety and reliability of dams and urban water supplies—As a dam owner and regulator, the Queensland Government has an obligation to keep its dams safe, consistent with national standards and state regulatory requirements through the Queensland Water Supply (Safety and Reliability) Act 2008 (the Water Supply Act). The Water Supply Act also protects community interests by establishing obligations for water service providers to deliver safe water and ensure continuity of supply.

2. Use existing water resources more efficiently—Significant volumes of uncommitted and under-utilised water are currently available in Queensland that could be used for economic development without the need to construct new bulk water supply infrastructure. Governments at every level are experiencing fiscal constraints, and a prudent response is to fully and better use the substantial water resources and bulk water supply infrastructure already available before investing in new infrastructure.

3. Support infrastructure development that provides a commercial return to bulk water providers—The Queensland Government supports commercially viable infrastructure development that does not place further burden on the state’s budget.

4. Consider projects that will provide regional economic benefits—These projects would be identified on a case-by-case basis through a standardised best practice assessment process. To be considered, they must provide significant economic benefits to the state over the long term.

The hierarchy of the objectives are driven by safety and efficiency first, followed by the need for further investment (Figure 2).

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1 Refer to p. 27 for stocktake of under-utilised water.
## Queensland bulk water supply objectives

1. Safety and reliability of dams and urban water supplies
2. Use existing water resources more efficiently
3. Support infrastructure development that provides a commercial return to bulk water providers
4. Consider projects that will provide regional economic benefits

**Figure 2:** Queensland’s bulk water supply objectives hierarchy

### Boundary conditions
A range of boundary conditions were considered during development of the objectives, including the following:

- Queensland has a well-established water resource planning process in place that sustainably manages the allocation of water to meet the state’s current and future water needs. Infrastructure proposals must be compatible with the relevant Water Plan.
- Dam owners are responsible for dam safety.
- Drinking water service providers are responsible for the provision of water that is safe in quality.
- Under the Water Supply (Safety and Reliability) Act 2008, responsibility for urban water supply security (continuity of supply) lies with water service providers. In South East Queensland this is the responsibility of Seqwater. Outside South East Queensland, this responsibility generally lies with local governments.
- All investment of public funds must minimise risks and costs to the government and community, maximise outcomes for Queensland, and must be considered in the context of all competing budget demands.
- Queensland has a well-established project assessment framework in place that must be considered when preparing evaluations, particularly concerning environmental, social and financial sustainability.
- Bulk water supply infrastructure proposals must satisfy all requirements for environmental, cultural heritage and other approvals.

### Considering economically beneficial projects
A key initiative for the Queensland Government will be a better process for considering projects that provide an economic benefit to the state (see Section 6.1). While some projects may not provide a full commercial return to a bulk water provider, they may enable job creation and broader benefits such as investment and financial returns from industry and agriculture. Together, these may result in a net economic benefit for the state.

The decision tree overleaf (Figure 3) can be used as a filter to determine how to treat economically viable projects as distinct from pathways for commercially viable projects. When integrated with the required project assessment frameworks, the decision tree process provides key points of consideration to better guide relevant agencies when assessing commercially viable or economically beneficial projects. There are many types of investigations required before making a decision on whether to construct new infrastructure—including engineering assessments, environmental impact assessments, demand studies, social impacts and economic costs and benefits. Further discussion on project assessment is provided in Section 6.5.
Does the water infrastructure have potential to deliver a net economic benefit? (Cost–benefit analysis)

Yes

Is the water infrastructure commercially viable? (Financial analysis based on secure demand)

Yes

Bulk water provider develops business case

No

Has customer commitment (demand and willingness to pay) been confirmed?

Yes

Secure customer commitment before progressing

No

Will customers pay all future scheme costs or is the government willing to commit to an ongoing operating subsidy?

Yes

Develop business case

No

End project analysis or re-scope the project

Is the required government investment acceptable? Is there adequate customer demand to pay the capital balance?

Yes

Develop business case

No

End project analysis or re-scope the project

End project analysis or re-scope the project

Does the water infrastructure have potential to deliver a net economic benefit? (Cost–benefit analysis)

No

End project analysis or re-scope the project

Figure 3: Decision tree to support investment assessment processes
1.2 Principles for investment

Increasingly, there is an expectation that bulk water supply infrastructure should be paid for by customers and beneficiaries, consistent with the principles of the National Water Initiative. If this can’t be achieved directly and a contribution is requested from the state government, then the economic benefits (including social and environmental) need to be demonstrated and considered by government through a process that allows prioritisation of expenditure across a range of proposals.

The following principles have been developed to guide bulk water investment decision-making if state government investment is to be considered (for projects that may not be commercially viable but may provide regional economic benefits).

The application of these principles will help ensure that all relevant options and risks are meaningfully assessed by stakeholders—including potential customers, proponents and decision-makers—when considering potential infrastructure projects.

These principles should be read in conjunction with existing government guidance on investment decision-making, including the Project Assessment Framework developed by Queensland Treasury and the Business Case Development Framework developed by Building Queensland (refer to Appendix 2).

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**Principles for state government investment in proposed bulk water supply infrastructure**

1. State government investment should only address a market failure that cannot be addressed by proponents, local governments or other stakeholders. If projects are economically beneficial but not commercially viable, state government investment should be considered on a case-by-case basis. These investment decisions will be made in conjunction with consideration of the state’s budget constraints and other government priorities.

2. Proposed investments should provide the highest net benefit of all options considered according to best practice assessment of proposals, including options analysis, demand assessment, transparent cost sharing and cost–benefit analysis.

3. Economic assessments that underpin potential investment in new water infrastructure should:
   a. consider environmental and social implications using the best available information
   b. consider the potential wider benefits to the Queensland community
   c. systematically address risks, including the risk of overestimation of benefits such as forecast revenues and wider benefits to the community.

4. For proposals with a significant urban supply component, there should be a local government financial contribution as a default.

5. For proposals with a significant industrial or agricultural component, there should be strong private sector support with financial contributions if appropriate.

6. Projects should align with the National Water Initiative principles, including appropriate cost recovery. If full cost recovery is not deemed feasible (including capital), any federal, state or local government subsidies should be transparent to the community.

7. If the state government makes the majority investment in infrastructure, it should own and manage the assets either directly or through its statutory authorities or government-owned corporations.
1.3 Summary of initiatives

A number of policy initiatives are being progressed to achieve the Queensland Government’s objectives for bulk water supply (as outlined in Section 1.3). These initiatives commenced in the 2017–2018 financial year. Table 1 below provides a summary of these initiatives and full progress reports can be found in Section 6. In addition, a number of infrastructure initiatives are being progressed, details of these are provided in Section 4.

Table 1: Summary of QBWOS policy initiatives and opportunities

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Policy initiatives and opportunities</th>
</tr>
</thead>
</table>
| Safety and reliability of dams and urban water supplies | • State entities (including SunWater and Seqwater) will continue to direct significant capital funds to dam safety upgrades for relevant dams.  
• DNRME will continue to develop Regional Water Supply Security Assessments (RWSSAs) with local governments to support urban water security.  
• The Department of Local Government, Racing and Multicultural Affairs (DLGRMA) and the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) are enhancing local government funding programs to encourage consideration of alternative water supply options and fit-for-purpose solutions. |
| Use existing water resources more efficiently | • DNRME will lead a project to supply customers and investors with proactive assistance, integrated advice and online services to provide better access to water information and available water entitlements.  
• DNRME is reviewing and enhancing market and trading arrangements to better suit Queensland conditions, and improve the way market information is provided to make the most of existing infrastructure.  
• DNRME will remove constraints to accessing water associated with existing infrastructure by assessing processes to achieve greater and more effective movement of water within a water supply scheme.  
• DNRME is developing a process for release of unallocated water to improve uptake of unallocated water reserves.  
• DNRME is developing options for allowing alternative use of water currently reserved for strategic infrastructure needs.  
• DNRME will provide better public access to data and information on available volumes of water and bulk water infrastructure assets across Queensland (through the QBWOS story map and Queensland Globe).  
• DNRME, DSDMIP and Department of Agriculture and Fisheries (DAF) will promote active consideration of new technologies and approaches in water security planning.  
• SunWater is developing an integrated strategy to better use latent capacity of existing assets (including pricing to support the use of latent capacity, making water products better suit business needs and removing constraints).  
• SunWater is developing options to better support the government’s objectives for regional economic development. |
### Objectives

<table>
<thead>
<tr>
<th>Support infrastructure development that provides a commercial return to bulk water providers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>State entities will continue to develop infrastructure proposals for commercial return.</td>
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</table>

<table>
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<tr>
<th>Consider projects that will provide regional economic benefits</th>
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<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>DNRME is evaluating and prioritising new bulk water infrastructure proposals for government consideration.</td>
</tr>
<tr>
<td>DNRME and Queensland Treasury is developing a best practice infrastructure assessment process with stakeholders to ensure appropriate management of risks, such as demand and environmental impacts.</td>
</tr>
<tr>
<td>DNRME will continue to coordinate National Water Infrastructure Development Fund project activities.</td>
</tr>
</tbody>
</table>

### QBWOS—Planning to Maximise Economic Benefit

QBWOS initiatives that explore regional solutions, demand and supply side options such as the QBWOS bulk water prioritisation project, the SunWater initiatives and the RWSSAs are part of a coordinated approach to achieving the Queensland Government’s objectives for bulk water supply.

Elements of least cost planning are integral to an approach designed to maximise economic benefit from existing and new infrastructure. An example of this is the assessment process for major projects, including the feasibility work being carried out by Building Queensland on the Nullinga Dam proposal. A needs and opportunities analysis of alternative supply and demand side management options was undertaken as part of the assessment and all options are compared in economic, social and environmental terms.

As the bulk water prioritisation project continues, further details will be provided on how alternative supply and demand options are considered together with infrastructure options when assessing water needs and opportunities through case studies and/or pilots.

(Refer to Section 6.1 for more on project prioritisation, Section 6.5 for best-practice project assessment, Appendix 2 for project assessment frameworks, Section 6.7 for the SunWater initiatives, Section 2.4 for urban water supply security assessments.)
2 Background and current considerations

2.1 History of bulk water in Queensland

Water is extremely valuable to both Indigenous and non-Indigenous peoples, and is used for many different purposes. Water is also important to both for different reasons. Indigenous peoples’ water values are regionally diverse and complex, but there are some commonalities. In particular, Indigenous peoples’ relationships with water are holistic—combining land, water, culture, society and economy. As well as underpinning social and economic wellbeing, Indigenous peoples’ relationship with water, land and the resources of each is crucial to cultural vitality and resilience.2 Access to, and management of, water by Indigenous peoples is provided for under the National Water Initiative (to which Queensland is a signatory). Queensland also has laws in place to protect Indigenous peoples’ cultural heritage, including their property, land, sea and water rights, which must be integrated into decision-making for new infrastructure.

Following settlement, Queensland’s water supply sources were initially developed to support early economic and population growth. Later, development promoted and supported growth in the agricultural sector via irrigation schemes and supported the rapid expansion of mining in the 1960s to 1980s.

From the early 1940s, water resource development was driven through the Department of Local Government, which was given responsibility for town water supply, sewerage and urban drainage works. The Irrigation and Water Supply Commission was established in 1947 and was responsible for water supply, conservation and irrigation. Over the next 50 years, small-scale water resource development (weirs) occurred across the state, and major dams were constructed at key sites from the 1970s through to the early 2000s. In 1978, the Queensland Water Resources Commission was established, with the additional functions of allocating water rights, planning, monitoring and managing the state’s water resources.

In the 1980s, regional growth and, to a lesser extent, mining industry expansion drove water resource development in Queensland. The 1980s were the beginning of a period of significant change in Australia, with sweeping economic reform, increasing exposure to international competition and increasing environmental consciousness reflected in new environmental protection legislation. For water supply planning, this meant environmental impacts needed to be considered and addressed in detail to obtain approval for new dams. At the same time, planning for new dams and management of existing dams also evolved to embrace a new understanding of the potential impacts of high rainfall events.

In the mid 1990s, federal and state government leaders committed to a further program of economic reforms known as the National Competition Policy. In 1994, the Council of Australian Governments (COAG) adopted a water reform framework informed by this policy. These reforms covered pricing, rural water schemes, water trading, resource management, institutional reform and public consultation.

In Queensland, this led directly to the development of the Water Act 2000, which underpins water resource planning and management. Bulk water service providers (SunWater and SeqWater) were separated from the state agencies responsible for water resource management and for protecting public health and safety, and an independent pricing regulator was established (Queensland Competition Authority). In 2004, COAG agreed to the National Water Initiative as the blueprint for water reform into the future.

Beyond the COAG reforms, the severity of the Millennium Drought of the 2000s brought a renewed focus to urban water security. A more conservative approach to water supply security planning was adopted in South East Queensland based on level of service (LOS) objectives—these are broadly defined

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in terms of the acceptable frequency, severity and duration of water restrictions, and are fundamental to the estimation of the supply yield of a system. This approach is now being progressed across the rest of the state, with RWSSAs discussed in more detail in Section 2.4.

From late 2010 until early 2011, a series of flood events occurred in Queensland resulting in the declaration of 78% of the state as a disaster zone. As a result of the very significant impacts of the floods, the Queensland Floods Commission of Inquiry was established. Its focus was wide ranging, considering floodplain management, planning instruments, development, essential services, emergency responses and dam operations. The implementation of the inquiry’s recommendations has clarified responsibilities and accountabilities for flood risk management and has led, for the first time, to integrated regional consideration of water resource planning, water supply security, weather forecasts, dam operations, flood mitigation and dam safety matters (Section 5.3 has more on dam safety and managing drought is discussed in Section 2.5).

2.2 Current policy environment

Queensland has a well-established project assessment framework in place, including guidance on investment decision-making provided by Queensland Treasury, Building Queensland and other entities (see Appendix 2). There are a range of legislative instruments to consider when planning and assessing potential infrastructure projects, both on a state and federal level. These include planning, environmental, cultural heritage and financial sustainability requirements.

State and federal initiatives

In March 2016, the Queensland Government released the State infrastructure plan and committed to an infrastructure reform agenda. As part of the implementation of the plan, the (then) Department of Energy and Water Supply was tasked with developing a Queensland future water security strategy—the QBWOS.

Water infrastructure projects typically involve long-life assets that are complex and expensive to build, own and operate. The QBWOS is an important step in building a framework that stands the test of time, supporting better use of existing infrastructure and informing construction of new infrastructure if and when appropriate.

In mid 2015, the Australian Government announced the establishment of the National Water Infrastructure Development Fund (NWIDF). The NWIDF arose from the federal Our north, our future: white paper on developing northern Australia and agricultural competitiveness. It provides funding to accelerate the detailed planning and construction of water infrastructure projects to enhance water security and help stimulate regional economic growth, including irrigated agriculture. In 2016, 15 Queensland-based proposals were awarded funding for feasibility studies under the NWIDF, and one project, Rookwood Weir, was identified for capital funding should it prove feasible. In 2017 the detailed business case for Rookwood Weir found that the project should proceed when there is greater certainty on potential demand. This was subsequently achieved and the Queensland and Australian governments have committed to co-funding the project’s $352 million capital cost.

All other feasibility projects funded through the NWIDF will conclude by June 2019. In late 2018, additional funds were announced by the Australian Government, however full details of these projects have not been announced at the time of printing the QBWOS.

The Queensland Government is committed to ensuring that consideration of water infrastructure projects includes rigorous technical, environmental, social and economic assessments, and ensuring the demand for water is proven.

Government support for economic development

There is a general acknowledgment that governments of all levels should consider the benefits of investing in infrastructure to support growth and regional economic development. Much of the recent bulk water infrastructure development in the state, particularly during the resources boom, readily demonstrated a commercial return. However, following the global financial crisis of 2007–2008 and ensuing global economic downturn, there now needs to be broader consideration of the long-term economic and social benefits of new water infrastructure.

While consideration of the commercial viability of infrastructure projects is important, and still the
priority, the state government also has a role to facilitate and support projects demonstrated to be in the best overall interests of the state (economically viable).

The focus has shifted to reducing the barriers to using available water within existing bulk water supply infrastructure and considering new projects with demonstrable economic benefits within the context of all competing budget constraints.

2.3 Planning complexity

The process of planning and constructing water supply infrastructure is complicated, with many uncertainties and risks to be managed in association with demand, supply, cost, environmental, cultural and social impacts. Key risks and uncertainties include:

- The long life of some bulk water infrastructure and associated high investment costs means that demand risks tend to be more significant than for some other infrastructure planning activities. A dam may have a design life of more than 100 years, yet predicting demand for water (even 20 years into the future) involves considerable uncertainty—some demands may be expected to continue into the future (such as agriculture), whereas a mine development will have a limited life. Predicting revenue to cover operational costs and provide a return on capital over 100 years is even more difficult.

- Demand forecasting is complicated by the fact that significant variation in demand can occur from year to year, often with an inverse relationship between demand and supply. That is, when a dam is full (such as when there has been significant rainfall and inflows) demand for water is often lower, especially from the agricultural and urban sectors (through reduced outdoor water use).

- Water infrastructure is unique in that supply risks remain after construction. Unlike a bridge for example, where full capacity is available after commissioning, a dam’s utilisation capacity is always subject to the uncertainty of rainfall and streamflow conditions from year to year and over longer periods. Even with the largest dams, during low inflow periods there may be, at times, less water available than needed.

- Cost risks can be very significant for bulk water infrastructure projects due to the large expenditure involved, the long planning and construction periods, and the long life of the asset. A medium to large dam may cost upwards of $500 million in planning and construction costs, and will have ongoing operation and maintenance costs in the millions of dollars per annum. Dams can also incur large capital upgrade costs if there are significant changes to populations downstream or if ‘worst-case’ rainfall events are predicted to increase with consequent design risk implications (discussed further in Section 5.3).

Water supply planning for urban needs can be further compounded by uncertainties such as the following:

- Residential water-use behaviour—Household water demand has a very significant discretionary component that is difficult to estimate at times. Much of the last two decades in Queensland have been spent in a state of drought or flood, making estimations from past records difficult—particularly where there were varying degrees of water restrictions in place.

- Changes in population and economic growth—In general, as the number of people in a community increases, so too does the demand for water for both household and business use. It can be difficult to accurately predict the level of population change in a community or region, as it can be affected by surrounding businesses and industry and influenced by factors such as unpredictable demand for a local commodity or the closure of a significant employer. Similarly, any increase in economic activity within or near a community can lead to an increase in water demand, either directly through water needs of the commercial or industrial activity, or indirectly through increased population from greater employment opportunities. Proposed large developments can rely (at least partially) on the same water source as a community, creating uncertainty for the community’s future water supply performance. Factors such as electricity costs and global markets can impact commercial activities, particularly mining and agriculture, leading to significant fluctuations in water demands.

- Climate—Extreme events such as floods and droughts can have significant impacts on the reliability of water supplies and the demand for water. Flooding can cause physical damage to water storage, treatment and supply infrastructure, as well as increase water treatment complexity in the short term. While water security may be high
during normal circumstances, the adequacy of a water supply is tested during drought. Communities that rely on regular seasonal rainfall to replenish their water supplies are likely to be most affected by extreme events and climate change. High-quality planning is needed for such circumstances so that, at a minimum, urban water supplies can be maintained to a community. Pre-planning for climate resilience should result in well thought out, appropriate responses—as opposed to reactive measures that can often be more expensive and less effective. Decisions also need to be made about how often communities are willing to be on water restrictions balanced by how willing they are to pay for higher levels of water security. Section 5.1 contains further discussion on planning for climate uncertainty.

Like many other large infrastructure projects, bulk water supply works frequently have significant environmental and social impacts. The impacts and often large geographical areas involved mean that a greater variety of studies and impact assessments may be required compared to other forms of infrastructure. Typically these assessments include hydrology, environmental flow, transmission loss, aquatic ecology, fluvial geomorphology, geotechnical, flora and fauna, Indigenous and European heritage, land capability, fish passage and socio-economic impacts.

Unlike many sectors, developing bulk water supply infrastructure is complicated by the requirement to assess an extensive number of factors that might impact viability. For example, while the assessment of telecommunications or transport infrastructure has to consider uptake scenarios and associated revenue projections (and there can be domestic factors that affect these), water infrastructure with agricultural, industrial and resource sector demands is perhaps uniquely and particularly exposed to unpredictable and changing domestic and international market circumstances.

2.4 Drivers of bulk water use

Queensland has a dynamic climate—from dry and hot in the west to tropical in the north, and some of the highest and lowest rainfalls in the country. Throughout Queensland’s history, water supplies have been developed to meet urban, industrial and agricultural demands, and to support communities and economic development. Drivers for the development of water supplies have changed significantly over time, most recently to meet the rapid urban development and population increases of the last 20 years, the significant growth of the resource sector and the push to develop northern Australia (particularly in support of agricultural development).

A recent history of flooding of urban areas across Queensland, has put a focus on flood mitigation and operational strategies for managing dams. Reducing or mitigating the social, environmental and economic impacts of floods is likely to be an increasing driver for investment in bulk water storage infrastructure (see Section 5.2). All dams can, in some circumstances provide a limited mitigating effect on floods. However, only a small number of Queensland dams have been specifically designed to provide significant flood mitigation in addition to providing water supplies (See Section 5.2).

Water for urban needs

The provision of safe, secure and affordable drinking water supplies underpins the social wellbeing, economic prosperity and development of our communities. About 9.5% of Queensland’s total water use is for urban supply. Overall, Queensland’s population growth has slowed in recent years and the population profile also continues to change—the rate of population ageing is slowing, and the difference in growth rate between South East Queensland and regional Queensland has narrowed significantly. While some regions have experienced reduced growth resulting from the downturn in the resources sector, other regions are growing with increases in tourism and other industries.

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To protect public health, the Queensland Government closely monitors and regulates the provision of drinking water in Queensland—this has quality and quantity components. Water service providers involved in treating, transmitting or reticulating water for drinking purposes are required to have an approved drinking water quality management plan in place, and comply with the details of that plan.

In South East Queensland, water supply planning and bulk water infrastructure management for the entire region is undertaken by Seqwater. This regional approach is driven by the physically interconnected South East Queensland Water Grid, which was built in response to the Millennium Drought. Seqwater is required to develop and maintain a water security program that describes how they aim to provide bulk drinking water to the region for the next 30 years including in response to extreme weather events such as flood and drought. The desired level of service (LOS) objectives for water security for the SEQ region are prescribed by the state. The program carefully considers and balances demand for water, resource supply availability and infrastructure operation to facilitate achievement of the objectives. The water security program and annual reports are available at www.seqwater.com.au/waterforlife.

Outside South East Queensland, the responsibility for urban water supply planning lies with local drinking water service providers — in most regional areas this is the local council. Local water service providers have the best knowledge of a community’s water supply and future demand needs. They generally own and operate the water supply infrastructure, and this allows town planning and water supply planning to be undertaken together.

It is essential that water supply planning is timely, cost-effective and appropriate for a community’s needs. To help support these efforts, DNRME is partnering with councils across Queensland to undertake RWSSAs and evaluations (RWSSEs) for identified communities. These studies identify the likelihood, timing and magnitude of potential future water supply challenges for the community.

The RWSSAs and RWSSEs build on the local knowledge of councils to assess water supply risk using analyses techniques with varying degrees of complexity. The result is a shared understanding of the level of current and future water supply source security. Local governments and water service providers remain responsible for deciding what should be done and implementing actions to provide an appropriate level of water security for their communities. This includes decisions around the LOS objectives for their water supplies and the priorities for future water supply investments.

The development of RWSSAs and RWSSEs can assist councils to progress the development of specific LOS objectives for their community. Water security LOS objectives set out the desired performance to be achieved. The LOS objectives commonly include statements about:

- how much water the supply system will typically be able to supply
- how often, how severe and for how long water restrictions might occur
- the likelihood that emergency actions will be required due to a prolonged drought, such as reducing water demand to essential minimum needs.

These transparent statements help to align the level of investment in water supply infrastructure with community expectations and needs. DNRME has produced guidelines to assist councils to develop water security LOS objectives.

An overview of the findings of 16 published RWSSAs is provided in Appendix 3. A further six RWSSAs are under development—Atherton, Capricorn Coast, Chinchilla, Cloncurry, Kingaroy and Mount Isa. It is important to note that every RWSSA is a point-in-time assessment based on the best available information at that time. RWSSAs and RWSSEs will be periodically reviewed and updated, as needed. Reviews are likely to focus on updated water demand forecasts and changes to the performance of the water supply system.

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5 While both the RWSSAs and RWSSEs forecast growth in water demand and analyse historical inflow records, the RWSSAs also use advanced hydrological modelling to assess supply risks with their current water sources.

Water for agriculture

Rural water use accounts for approximately 63% of the state's total water use. Water is essential for much of the state's rural production, particularly agricultural irrigation and stock grazing.

State government investment in large-scale irrigation development began in the Mareeba–Dimbulah area on the Atherton Tableland in Far North Queensland, with the completion of the major storage (Tinaroo Dam) and supporting water supply scheme in 1958. Construction of water supply infrastructure by the state government followed in the Warrill Creek, Mary River, Callide Creek, Burnett River, Logan, St George, Emerald, Pioneer and Proserpine areas, and resulted in increases in the area of land under irrigation across the state. Many of these schemes also provided mining and/or urban water supplies. The largest water supply scheme in the state, the Burdekin Haughton Water Supply Scheme, is based on the Burdekin Falls Dam (completed in 1987), with construction of the channel scheme following. This water supply scheme supplies rural producers that irrigate around 45,000 hectares.

In addition to the state's bulk water infrastructure, landholders (particularly in the south-west of the state) have developed off-stream storages that can be filled by diversions from stream flood flows or overland flows. As well as surface water supplies, subartesian groundwater is also an important source of supply for irrigation in areas such as the Lockyer and Callide valleys and the Don and Burdekin river delta areas. Artesian groundwater from the Great Artesian Basin is critical to maintaining stock water supplies for much of Western Queensland.

The QBWOS recognises there is a push to develop 'greenfield' irrigation areas such as those considered in the Gulf basins (in addition to the bulk water infrastructure), major costs will be involved to establish the essential supporting and enabling infrastructure and services required to convert land currently used for grazing into areas of irrigated agriculture. Mega-scale greenfield irrigation developments (such as the Ord River Irrigation Scheme in Western Australia) can often be unpredictable, with a number of challenges to understand and overcome, including harsh climates, unique pests and difficulties getting product to market. By comparison, the development of an irrigation expansion area (i.e. an area near an existing irrigation area) is likely to have only marginally higher costs compared to the existing irrigation areas.

Water for industry

The availability of a reliable water supply is critical to support industry. The total volume of water used for mining, manufacturing, electricity and other industrial purposes is currently about 27% of the total water use in the state. Well-planned and timely water infrastructure development is critical to achieving Queensland’s 30-year vision for vibrant and prosperous communities supported by a strong and diversified economy offering a wide variety of employment opportunities. The core drivers of industrial water use into the future (excluding agriculture) are likely to continue to be manufacturing and mining.

Significant coal reserves are available in the state’s Bowen and Surat basins and in the yet-to-be-developed Galilee Basin. However, the timing of any potential developments in these areas is highly dependent on trends in international markets for coal and, in the case of thermal coal, concerns regarding the impacts of greenhouse gas emissions on the world’s climate and corresponding changes to governments’ policies. The volumes of additional water supply required to support mining developments and the timing of these requirements is therefore difficult to predict. A number of feasibility studies and environmental impact statements have been finalised for construction of dams that could support expansion of coalmining in Queensland, including Connors River Dam and Nathan Dam, if required.

8 Ash, A & Gleeson, T 2014, Northern Australia: food and fibre supply chain synthesis study, CSIRO/ABARES Australia.
9 Ash, A 2014, Factors driving the viability of major cropping investments in Northern Australia—a historical analysis, CSIRO, Australia.
Additional water demands for power generation are likely to be modest for the foreseeable future for a number of reasons. Technological improvements and the scarcity of water in the Surat Basin coal areas have resulted in the state’s recent base load power stations (Millmerran and Kogan Creek) being air-cooled rather than water-cooled. Additionally, the recent gas-fired power station developments in the state have a minimal water requirement for their operation. Although an expensive option, the availability of purified recycled water in South East Queensland (when the Western Corridor Recycled Water Scheme is operational) allows the Swanbank and Tarong power stations to use this resource during drought periods rather than using their normal surface water sources. Finally, the state’s renewable energy targets are encouraging increased power production from sustainable energy sources such as wind and solar that use little or no water, and potentially hydro-electricity that utilises bulk water storage dams. Consistent with this approach, the Queensland Government is investigating the potential to develop hydro-electricity generation capacity at Burdekin Falls Dam and has set aside $100 million to invest in a scheme if it proves feasible.

**Fisheries**

Healthy fisheries are a vital part of Queensland’s natural environment, lifestyle and economy. The commercial fishing and aquaculture sectors are estimated to produce about $300 million in gross value annually.11

The commercial, recreational and Indigenous fishing sectors of Queensland rely on healthy fisheries and these can be impacted by development, including bulk water supply infrastructure and the land use activities that are enabled by it.

Aquaculture industries such as prawning can also be significantly impacted by reduced freshwater flows connected to upstream water harvesting from dams. This is why impacts on Queensland’s unique fisheries are key considerations when assessing potential new bulk water supply infrastructure and associated development activities.

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2.5 Managing drought

Droughts are part of the normal climate cycle in Australia. Queensland has suffered through many severe droughts in the past, however in recent years, the community has had to manage the most widespread drought in its history, peaking with over 87% of the state drought-declared in the autumn of 2017. The second half of 2018 saw some easing of conditions in some locations with about 58% of Queensland officially in drought, however current climate outlooks suggest that a drier than average summer is expected for 2018/19 for most of the state.

The Queensland Government has a range of programs in place to help support rural businesses and communities to prepare for, manage and recover from the impacts of drought. Producers in drought-declared areas can access emergency water infrastructure rebates and freight subsidies for transporting fodder, water and livestock as part of the Queensland Drought Assistance Scheme. The state also waives annual water licence fees in local government areas that are drought-declared.

Queensland supports the National Drought Policy reform process agreed to between the federal, state and territory governments in 2014. The policy seeks to improve the drought preparedness of primary producers with the aim of moving from 'crisis' to 'risk' management and with a focus on 'preparedness' and 'self-reliance'. As part of the Queensland Drought and Climate Adaptation Program, the state is supporting research and development projects to improve seasonal forecasting, and provide tools and systems that will support producers and farm managers in their decision-making. Projects are managed and funded through a series of partnerships with government, university and industry partners (for more details refer to www.daf.qld.gov.au). Queensland Government drought assistance programs are also complemented by additional measures from the Australian Government including support to eligible farming households through community and not-for-profit groups, and direct support to councils whose communities are impacted by drought (for more details refer to www.agriculture.gov.au and www.regional.gov.au/regional/programs/).

The Queensland Government closely monitors and regulates the provision of drinking water in Queensland. A register of communities experiencing threats to continuity of supply is maintained and communities facing these threats are actively supported to maintain the provision of water.

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14 An official drought declaration is made by the Queensland Minister for Agriculture and Fisheries, based on the advice of local drought committees. It is an official acknowledgment by government that an area or individual property is affected by poor seasonal conditions.
3 Existing bulk water arrangements in Queensland

3.1 Accessing water

In Australia, water is controlled by governments that allow other parties to access and use it for a variety of purposes, including irrigated agriculture, industrial use, mining, servicing rural and urban communities, or for amenity values. The framework within which water is allocated attaches both rights and responsibilities to water users—a right to a share of the water made available for extraction at any particular time, and a responsibility to use this water in accordance with conditions set by government. Likewise, governments have a responsibility to ensure that water is allocated and used to achieve socially and economically beneficial outcomes in a manner that is environmentally sustainable and culturally appropriate.

3.2 Bulk water infrastructure

Queensland’s bulk water supply systems, including dams, weirs, pipes, channels and other assets, are largely owned and managed by bulk water entities (SunWater, Seqwater, Gladstone Area Water Board and Mount Isa Water Board), private entities (such as mining companies) and local councils (especially outside South East Queensland). Further components of associated urban water supply systems can include water treatment plants, manufactured water plants (desalination and recycled water) and distribution networks. These are owned and operated by a range of water service providers. In South East Queensland, Seqwater owns the bulk water supply infrastructure, including dams, weirs, water treatment facilities and bulk distribution networks. Seqwater is also responsible for long-term water supply planning for the region. Outside South East Queensland, SunWater owns most of the bulk water infrastructure. Some councils also own water supply infrastructure. Councils own most of the water treatment facilities and generally provide distribution and retail services to homes and businesses. Local councils are also responsible for the water supply planning for urban supplies. Figure 4 shows the division of responsibilities for bulk water supply, treatment, distribution and retail from source to end users.

![Diagram of bulk water infrastructure]

Figure 4: The division of responsibility for bulk water from source to end user
The QBWOS online story map provides a centralised, visual (spatial and graphical) representation of existing bulk water supply infrastructure, with current water information and infrastructure projects being considered across Queensland.

The state’s role

The Queensland Government is responsible for a number of bulk water entities that provide essential water supply services including critical water supply infrastructure such as dams and water treatment plants. The state’s bulk water entities include one government-owned corporation (SunWater), one statutory authority (Seqwater) and two Category 1 water authorities (Gladstone Area Water Board and Mount Isa Water Board). These entities support economic development by supplying bulk water to grow businesses and develop new enterprises. They can provide water from existing supplies or from new infrastructure, if required and justified. Queensland Treasury and DNRME jointly monitor the performance of SunWater and Seqwater.

Water authorities are established under the Water Act 2000 and are classified as either Category 1 or Category 2. Category 1 water authorities operate on a much larger scale than Category 2 authorities. DNRME monitors the performance of the state-owned Category 1 water authorities—Gladstone Area Water Board and Mount Isa Water Board. The state government is also responsible for the administration and oversight of Category 2 water authorities. The list of Category 2 water authorities is available at www.dnrme.qld.gov.au.

SunWater

SunWater is a bulk water infrastructure developer and operator, owning and managing more than $10 billion in water infrastructure assets and supplying approximately 40% of all water used commercially in Queensland. SunWater’s extensive network of water supply infrastructure supports mining, power generation, industry, urban development and irrigated agriculture throughout the state.

SunWater’s irrigation prices are determined by the state government on the advice of the Queensland Competition Authority. SunWater provides water services to irrigators operating within 23 water supply schemes and six distribution systems. SunWater deliver in excess of 1.3 million megalitres of water annually to over 5000 bulk water customers.

Irrigators account for the majority of SunWater’s customers and water use but represent less than 25% of SunWater’s revenue.

Of the four bulk water entities, SunWater alone is corporatised under the Government Owned Corporations Act 1993, which sets out the principles and framework for its operation. Under the governance framework, SunWater is required to operate on a commercial basis as far as practicable.

Proponent and owner-operator arrangements

With Queensland’s administration of the NWIDF, it has become necessary to clarify proponent and ownership arrangements for new water infrastructure. If the Queensland Government is the major investor in a project (either directly or acting through SunWater), then the government reserves the right to establish SunWater as the default proponent for the project and owner-operator of any resulting infrastructure. This means that for the bulk of projects (for which the state is to be the majority investor) outside South East Queensland and the Gladstone and Mount Isa areas, SunWater is to be the proponent and infrastructure owner-operator.

Seqwater

The Queensland Bulk Water Supply Authority (trading as Seqwater) is a statutory authority. Seqwater delivers a safe, secure and cost-effective bulk drinking water supply to the urban communities of South East Queensland, provides essential flood mitigation services and manages catchment health within the region. It also provides water for irrigation to about 1200 farmers and offers community recreation facilities.

Seqwater is responsible for managing and operating the South East Queensland Water Grid—an $11 billion network of bulk water supply assets extending from the New South Wales border to the base of the Toowoomba ranges and north to the Sunshine Coast. The existing water infrastructure was interconnected and expanded to form the water grid during the Millennium Drought, with the primary aim of improving water security to the region. The works included significant investment in the construction of major pipelines and two manufactured water supplies—
the Gold Coast Desalination Plant and the Western Corridor Recycled Water Scheme.

South East Queensland is the only region in the state where a standard of water security performance (i.e. LOS objectives) has been prescribed by government. Seqwater must undertake long-term planning to facilitate achievement of this specified level of performance and outline its plans in a Water Security Program. Seqwater’s bulk water and irrigation prices are determined by the state government on the advice of the Queensland Competition Authority.15

Gladstone Area Water Board and Mount Isa Water Board

The Gladstone Area Water Board (GAWB) was established in 1973 to help the Gladstone Town Council and Calliope Shire Council cope with the heavy financial demands imposed on them to upgrade the water supply system serving the area, as a result of high industrial growth. Similarly, the Mount Isa Water Board (MIWB) was established in 1974 to carry out water activities in the Mount Isa region. Both GAWB and MIWB are Category 1 water authorities under the Water Act 2000.

GAWB owns and operates Awoonga Dam on the Boyne River, along with a network of delivery pipelines, water treatment plants and other bulk water distribution infrastructure in the Gladstone region in Central Queensland. GAWB’s total asset base is valued at over $670 million. GAWB holds a water allocation of 78 000 megalitres per annum from Awoonga Dam on the Boyne River. Of the total water supplied by GAWB, 80% is delivered to industrial and power generation customers, while approximately 20% is supplied to the Gladstone Regional Council as treated drinking water.16

MIWB maintains $131 million of water supply and treatment infrastructure, including 86 kilometres of transmission pipeline from Lake Julius to Mount Isa. Each year, MIWB supplies nearly 20 000 megalitres of water from Lake Moondarra (the city’s primary water source) and Lake Julius to customers. MIWB is responsible for the supply of bulk water to industrial customers and drinking water to Mount Isa City Council, which reticulates drinking water to approximately 20 000 people.17

3.3 Bulk water supplies

In Queensland, water supply sources are generally classified as either supplemented or unsupplemented sources according to the scale of associated infrastructure and its operation:

- Supplemented water is provided in a regulated scheme, usually supplied from either a dam, weir or other improvements (e.g. barrage, off-stream storage), but can include natural stream flow. It generally has higher reliability than unsupplemented water. Supplemented water supply schemes are operated by a water service provider, with releases made from infrastructure to meet water demands while maintaining the needs of the environment.
- Unsupplemented water is available for use outside regulated schemes or from non-regulated sources where no in-stream improvements or transportation assets are supplied. Sometimes referred to as ‘run of river’, these water sources include rivers, creeks, overland flow and groundwater. Individual water users are usually responsible for building and operating any local-scale infrastructure required to access and distribute their individual water entitlement.

Bulk water supply systems consist of two main supply types:

- regulated water supply schemes—with associated water allocations identified and authorised through a water planning instrument
- standalone water supply infrastructure—typically developed at a local scale to provide for a single-purpose use, such as a town water supply.

Owners of infrastructure in regulated water supply schemes are responsible for managing the infrastructure to deliver the water entitlements associated with the scheme. There are 42 regulated water supply schemes in Queensland, covering 145 dams and weirs. Outside these schemes there are more than 100 additional dams, weirs and barrages

15 Outside SEQ, local governments and water service providers are encouraged to develop their own level of service objectives that are appropriate for the community they serve; the price of urban water supplies is set by the local water service providers.w
that are part of town water systems or operated as stand-alone water supply infrastructure.

The QBWOS focuses on raw water supplied from bulk water supply systems that primarily access supplemented surface water resources. Section 5.5 provides some discussion on alternative water supplies including groundwater, recycled water, coal seam gas associated water and desalination.

**Understanding potential available water across Queensland**

Water availability can be complex and is dependent on many factors. In Queensland, water availability is determined through the water planning process described in the Water Act 2000 and managed by DNRME. The water planning process is designed to manage the allocation and sustainable management of water to meet Queensland's current and future water needs. Water plans (previously water resource plans) and their supporting instruments (water management protocols, resource operations licences (ROL), water entitlement notices and operations manuals) set the water entitlements and the reliability, availability and environmental standards to be maintained within individual catchments. For more on these arrangements, visit the DNRME website at www.dnrme.qld.gov.au/land-water.

To understand water availability in existing bulk water supply systems, it is important to clarify the relationships within the surface water supply system (Figure 5). It is important to note that there may be interactions between surface and groundwater in some areas; however, the focus is on surface water.

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**Figure 5: Surface water supply system relationships**

<table>
<thead>
<tr>
<th>Available surface water*</th>
<th>Unallocated reserves#</th>
<th>Allocated water (entitlements)</th>
<th>Operational losses</th>
<th>Water available to customers (supplemented and unsupplemented)</th>
<th>Uncommitted water</th>
<th>Committed water</th>
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<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

* The QBWOS focuses on raw water supplied from bulk water supply systems that primarily access surface water resources.

# Generally require infrastructure development to access unallocated reserves.
The surface water available for use by end users from the water planning process (available surface water) is determined by considering the catchment’s natural climate and hydrology, key assets and current and potential water use developments. This available surface water is defined for use and either allocated to customers and bulk water supply system operators (water entitlements) or set aside as unallocated reserve for future use or to facilitate construction of storage. There are several types of reserves set aside in a water plan (previously a water resource plan)—general, strategic, town water supply, state and Indigenous—each with their own specific intended purpose.

Water users can hold their own water entitlements and bulk water supply system operators (such as SunWater) can contract, sell or lease their allocations (a specific type of tradable water entitlement) to end users—committed water. Water supply scheme operators also provide the ongoing storage and release services for delivery of supplemented water, including the management of system operational losses, for which specific non-saleable allocations are sometimes defined. Uncommitted water allocations are entitlements that are generally held by the bulk water system operator that have not yet been contracted, sold or leased. These uncommitted allocations may be available for temporary or permanent sale or contract, or may be held for future business opportunities. Water allocations are generally assigned a priority (essentially reliability) as either medium or high. High-priority water is commonly used to supply urban and industrial demands and some agriculture, as it is more reliable compared to medium priority, which is typically used by primary producers (irrigators). There are rules in water plans and associated instruments that determine the share of water available to each priority group in any water year.

Of the allocations that are held by bulk water users or customers (considered to be committed water), some may be used by the customer and some may be unused. Allocations may be unused in any given year for many reasons—infrastructure limitations (such as channel capacity), water performance might not match customer needs (the water availability is out of alignment with crop needs), changed or improved agricultural practices, or it may no longer be required as there is no market demand. It is also common practice for some customers to gain access to additional water allocations for use as insurance against dry times (particularly to protect high-value crops) or for other business reasons.

It is important to differentiate between the availability of water allocations (paper water) and the day-to-day, year-to-year availability of water for access under those allocations (wet water). While the total volume of water allocation (paper water) remains consistent, there are a number of factors that constrain access to wet water and the demand for water from a system on a year-to-year basis. These include:

- how much water is physically held in storage that can be delivered to customers—this is affected by the weather (rainfall patterns, evaporation, temperatures) and the rules for sharing the water
- characteristics of the entitlements, including volumes, reliability and water market arrangements (such as where can the allocation be traded)
- proposed application of the water and broader market factors—which may be affected by the viability and productivity of farming land (such as by salinity or recent drought) or the risks to sensitive environments (such as the Great Barrier Reef).

While the current Queensland water market arrangements have been developed with a clear intent to allow for water allocations that are under-utilised or not used to be permanently or seasonally traded, there remains opportunities to improve access to water allocations or maximise the value of water that is available seasonally and over the long term. Initiatives to improve current market trading arrangements for water are discussed in Section 6.3.

**Water storage capacity and entitlements**

For representational purposes, the state has been divided into eight bulk water supply regions (Figure 7). The regions were selected based on major drainage basins, with consideration of catchments, water plan areas, local government boundaries and other factors. It is important to note that the regions do not fully align with any one of these groups of information.

Table 2 provides a summary of the annual water entitlements associated with all of Queensland’s bulk water supply systems, apportioned to the eight QBWOS bulk water supply regions. Included are all the regulated water supply schemes as well as the town water systems that rely predominately
on supplemented surface water i.e. surface water captured in a dam or weir by constructed infrastructure. For simplicity, all water priority types have been added together for each region. Table 2 includes details of the state’s water reserves, volumes of uncommitted water and estimates of underutilised water (described in further detail following). Figure 6 provides a graphical summary of the statistics.

It is important to note that entitlements only give the right to a share of the available water. If there has been reduced rainfall and/or runoff and water in storage is below a pre-determined trigger, then the entitlement may result in a share of a reduced volume of water. The sharing of water is managed through the rules described in the water plans, Water Management Protocols and other water resource management instruments.

Appendix 1 provides details of the water entitlements from each of Queensland’s bulk water supply systems, including information on the infrastructure within each system, total water storage capacity, total volume of water entitlements and primary water users. Table A1 presents details of the surface water allocations available from the bulk water infrastructure that supplements the state’s regulated water supply schemes. Table A2 presents details of the town water supply systems that are reliant on bulk surface water that is supplied from constructed dams and weirs.
Table 2: Surface water statistics for Queensland for 2017/18*

<table>
<thead>
<tr>
<th>Bulk water supply region</th>
<th>Water storage capacity (ML)</th>
<th>Surface water entitlements (ML/a)</th>
<th>Loss entitlements (ML/a)</th>
<th>Committed to customers (ML/a)</th>
<th>Uncommitted water† (ML/a)</th>
<th>Delivered water (ML/a)</th>
<th>Underutilised committed water (ML/a)</th>
<th>Unallocated surface water reserves ‡ (ML/a)</th>
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</thead>
<tbody>
<tr>
<td>Far North</td>
<td>441 610</td>
<td>204 424</td>
<td>45 000</td>
<td>159 424</td>
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<td>117 912</td>
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<td>1 356 079</td>
<td>207 231</td>
<td>1 044 343</td>
<td>104 505</td>
<td>719 360</td>
<td>301 790</td>
<td>344 344</td>
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<td>North West</td>
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<td>75 150</td>
<td>2 500</td>
<td>61 800</td>
<td>10 850</td>
<td>19 166</td>
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<td>544 322</td>
<td>43 674</td>
<td>483 253</td>
<td>17 395</td>
<td>372 007</td>
<td>128 605</td>
<td>257 400</td>
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<td>Wide Bay Burnett</td>
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<td>South East</td>
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<td>0</td>
<td>281 318</td>
<td>192 300**</td>
<td>37 350</td>
</tr>
<tr>
<td>South West</td>
<td>666 301</td>
<td>243 182</td>
<td>38 626</td>
<td>203 556</td>
<td>1 000</td>
<td>158 970</td>
<td>29 290</td>
<td>4 600</td>
</tr>
<tr>
<td>West</td>
<td>4 770</td>
<td>2 612</td>
<td>0</td>
<td>2 492</td>
<td>120</td>
<td>1 746</td>
<td>460</td>
<td>3 300</td>
</tr>
<tr>
<td>Sub-total</td>
<td>10 845 500</td>
<td>3 574 007</td>
<td>390 977</td>
<td>2 902 981</td>
<td>280 049</td>
<td>1 892 439</td>
<td>865 716</td>
<td>2 265 440</td>
</tr>
</tbody>
</table>

TOWN WATER SYSTEMS#

|                          | 84 042                     | 73 598                            | 0                       | 73 598                        | 0                         | 36 949                | Not Applicable                     |

Queensland 10 929 542   3 647 605   390 977   2 976 579   280 049   1 929 388   865 716   2 265 440

---

* For simplicity, all water priority types have been added together. Refer to glossary for key definitions.

** Based on data from 2010/11 to 2017/18, does not include the Millennium Drought period.

† Some volume of this water may be available for supply by contract, sale or lease.

‡ Water held in reserve in a water plan that may be suitable to support bulk water supply systems, includes strategic, town water and strategic infrastructure reserves.

# Includes all town water systems that are reliant on surface water from a dam or weir that is not part of a water supply scheme.

Queensland’s major bulk water supplies

- **Storage capacity of Towns**: 10 845 500 ML
- **Unallocated surface water reserves**: 2 265 440
- **Committed to WSS customers**: 2 902 981
- **Uncommitted water**: 280 049

Figure 6: Summarised bulk water statistics for Queensland
The Rural Water Management Program (RWMP) was established to implement the Queensland Government’s response to the independent audit and contribute to meeting our Murray Darling Basin commitments, as a signatory to the Murray Darling Basin Compliance Compact.

The Rural Water Management Program is bringing a renewed focus on water measurement and compliance to rural water management in Queensland. The program provides an opportunity to deliver more transparent, sustainable and equitable rural water management systems.

What the RWMP aims to achieve

The RWMP provides an opportunity to develop better systems, policies and processes so that water is managed more effectively, efficiently and equitably. The program will deliver across four key themes in rural water management: appropriate regulatory frameworks, strengthened water measurement systems, transparent water information and robust compliance that builds community confidence.

Key projects within the program of works include an initiative to enhance transparency by publishing online information relating to water resource management, water use and compliance and a review of water measurement activities, including metering. The RWMP also has a focus on supporting water trading and the optimal use of unallocated water reserves to deliver economic benefits. Project activities, including implementation of new business-as-usual practices, are expected to be complete by 2020.

Key deliverables include:

**Water information systems**

The provision of useful and timely data to water users and the public will allow users to make informed decisions. The systems will provide the public with greater confidence in the management of water in Queensland.

**Water measurement**

A new water measurement policy is being developed. The policy deals with optimal measurement, where metering should be undertaken, standards for metering and how other water measurement systems and technology such as telemetry can be used. Telemetry would provide real-time water use data to assist water users in making informed decisions, help entitlement holders to meet their obligations by providing timely and transparent information systems and processes, and provide DNRME water managers with the information they need to ensure effective and equitable water access and management.

**Water markets, trading and unsupplemented water releases**

The trading and markets component of the RWMP will pursue opportunities to maximise the value of Queensland’s water resources by enhancing our water markets and trading regime, as well as releasing more unsupplemented water. This will enable optimal use of Queensland’s water entitlements by introducing mechanisms to mobilise water that is being underutilised not only in the supplemented schemes, but expanding on the original QBWOS initiative, to include unsupplemented catchment areas for both surface and groundwater resources of Queensland.

Further information on the Independent audit of Queensland non-urban measurement and compliance, the Government’s response, the Murray Darling Basin Compliance Compact and the RWMP are available at www.dnrme.qld.gov.au.
Figure 7: QBWOS bulk water supply region
Latent capacity in the bulk water supply system

There are significant water resources currently available in some Queensland regions that could be readily accessed to support economic development without any new bulk water storage infrastructure being developed. However, these water resources are not always located where the demands are. There may also be limitations to the current capacity of the distribution infrastructure, constraining the ability to deliver the desired volumes to potential customers.

Within existing water supply schemes, available water may exist as:

- **uncommitted allocations**—these are tradable water entitlements that have not yet been purchased, leased or otherwise committed to customers. In most cases, the bulk water provider and ROL holder for the scheme hold these entitlements. They are available to customers, however, in some instances they may be held by for future business opportunities and not be generally available.

- **under-utilised allocations**—these are water entitlements that have been committed (sold, leased or contracted) to customers but have never been used in the assessment period.

In consultation with bulk water service providers across the entire state, at November 2018 there was estimated to be in excess of 280,000 megalitres of uncommitted supplemented water that is available for contract, sale or lease within existing bulk water supply schemes. In addition, a stocktake of under-utilised water in all water supply schemes, found that approximately 865,000 megalitres of committed allocated water was under-utilised in the dry years when demand was high and water was available.

While this uncommitted, unused and under-utilised water is in different locations across the state and with different product attributes, when combined it totals more than 1,100,000 megalitres—almost equal to the annual allocations from the Burdekin Haughton Water Supply Scheme.

Access to the water associated with these uncommitted and under-utilised allocations will be dependent on the amount of water actually available seasonally, in accordance with established water sharing rules. Initiatives to support improved access to this water are discussed in Section 6.3.

Water reserves

Additional water resources could also be made available from unallocated water reserves to potentially support the future development of new or expanded bulk water supply infrastructure. Unallocated water is reserved under water planning instruments and can be made available for future use without compromising the security of existing users or the environmental values within a catchment. However, access to this water may require modification and/or development of new infrastructure—in some cases, significant investment may be required.

Water reserves have been identified in various statutory water plans developed by DNRME. The plans identify reserves that have different characteristics and locations that lend themselves to opportunities for different scale developments. However, not all water reserves identified in a plan would be suitable to support the development of bulk water supply systems. Table 2 (see page 23) provides a summary of the unallocated water reserves held in each of the eight bulk water supply regions and at a state level, which may support the development of new and/or expanded bulk water supply systems. The reserve volumes provided are for surface water only.

Water reserves are specified in water plans with location, volume and conditions. These plans are developed and administered by DNRME. Information on water planning frameworks and links to water planning documents at a catchment level are available on the DNRME website at www.dnrme.qld.gov.au/land-water.
Accessing latent capacity

While investigations indicate there is substantial water available in Queensland’s existing water infrastructure that could be made available for economic development, there are barriers to customers taking up this water. For example, water may be associated with infrastructure in remote locations that requires additional investment to access, or it may be in a location that will not easily support agricultural development due to soil quality, topography or other reasons.

The QBWOS is the first step in reducing these barriers to support the objective of better using existing water infrastructure and supporting new infrastructure development, where appropriate and particularly where water is a major constraint to economic growth.

The initiatives outlined in Section 6 include the provision of proactive assistance to help customers navigate water information and provide solutions, make water markets and trading more efficient, and make water products better suit business needs. These initiatives are being developed in consultation with stakeholders and subsequent versions of the QBWOS will contain updates on the progress of their implementation.
4 Key infrastructure initiatives and opportunities

There are a range of drivers for building, upgrading and improving bulk water infrastructure across the state, which include:

- continuing to meet compliance obligations and regulatory requirements (e.g. for dam safety and water quality)
- meeting the needs of a growing population
- increasing climate variability (including reduced surface water, but with increased intensity and flooding)
- using the state’s existing and extensive bulk water supply infrastructure more efficiently
- promoting regional economic growth.

With regard to the government’s objectives for bulk water supply (see Section 1.1), the priority driver for bulk water supply infrastructure is the safety and reliability of existing dams and urban water supplies (Sections 4.1 and 4.2), followed by efficiency opportunities (Section 4.3) and the need for further investment (Section 4.4).

Meeting demand will not always require new infrastructure and there are a number of initiatives in development to support better using existing infrastructure and the use of new technologies and approaches including:

- initiatives to make information more available (see Section 6.2) and support water market development (see Section 6.3)
- SunWater’s initiatives relating to better utilisation of latent capacity (including pricing to support the use of latent capacity and water products that better suit business needs) (see Section 6.7)
- initiatives to support new technologies and approaches to meeting demands (see Section 6.6).

DNRME is also developing enhanced project assessment requirements to be considered when assessing new water infrastructure proposals (see Section 6.5).

4.1 Initiatives to keep our dams safe

Over the past decade, the Bureau of Meteorology has revised its forecast of the size of rare but major rainfall events. This has meant that many of Queensland’s dams need to be upgraded to deal with an updated ‘probable maximum flood’ (see Section 5.3 for further details). To reduce public safety risks, it is estimated that the Queensland Government bulk water entities will need to invest significant capital. Any project with an estimated cost over $100 million will have its business case development lead by Building Queensland (see also Appendix 2). Table 3 outlines key dam safety projects that are recently complete, currently underway or in planning. The regulations allow for a staged approach to dam safety upgrades based on risk profiles, with all dam safety upgrades required to be complete by 2035.18

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status</th>
</tr>
</thead>
</table>
| **RECENTLY COMPLETED PROJECTS**                  |            |                                                                \
| Burdekin Falls Dam Foundation Drainage Improvement Project | SunWater   | To improve the efficiency of the dam’s foundation drainage systems to ensure it continues to operate as designed.                                                                                     | Project completed in 2017.                                                                      |
| Cooloolabin Dam—Safety Upgrade Project            | Seqwater   | Upgrade to main embankment abutments and saddle dam ‘A’ for piping, earthquake and embankment stability.                                                                                          | Project completed in March 2018.                                                                |
| **BEING DEVELOPED**                               |            |                                                                \
| Fairbairn Dam Spillway Improvement Project – Stage 1 and Stage 2 | SunWater   | Involves work on drain outlets, anchors, voids and construction of a concrete overlay to return the spillway to its designed functionality and be able to safely pass flows during extreme rainfall periods. Stages 1 & 2 have the same work program in different sections of the spillway. | Stage 1 works are complete. Stage 2 works have commenced and are currently scheduled for completion in late 2020, dependent on weather and environmental factors. |
| Fairbairn Dam Spillway Improvement Project – Stage 3 | SunWater   | Involves work on new gravity sidewalls to alleviate potential risks associated with pressure fluctuations that may occur under the spillway side walls during extreme flood events. | Stage 3 works have commenced and will be delivered in parallel with Stage 2.                     |
| Leslie Harrison Dam—Safety Upgrade Project        | Seqwater   | Upgrade to main embankment and spillway for piping, stability and earthquake.                                                                                                                        | Construction currently underway with completion scheduled for June 2019.                         |
| Paradise Dam Improvement Project - Strengthening of Monoliths and Primary and Secondary Spillways Improvement | SunWater   | Stage 1 involves strengthening the base of the primary spillway, downstream protection of the left-hand side dam wall and construction of an access and drainage culvert. Stage 2 involves more significant improvements to the primary and secondary spillways. | Stage 1 works are complete. Stage 2 business case is progressing. Works will be completed in stages over several dry seasons, until 2025. |
| Sideling Creek Dam (Lake Kurwongbah)—Safety Upgrade Project | Seqwater   | Upgrade to main embankment and spillway for piping, earthquake loading and flood capacity.                                                                                                          | Construction currently underway with completion scheduled for June 2019.                         |
| **ONGOING PROJECT INVESTIGATIONS AND PLANNING**   |            |                                                                \
| Ewen Maddock Dam—Safety Upgrade Project           | Seqwater   | Upgrade to main embankment and spillway for earthquake, piping and flood capacity.                                                                                                                  | Detailed design is underway scheduled to be completed by March 2019. Construction completion scheduled for 2020. |
| Lake MacDonald (Six Mile Creek Dam)—Safety Upgrade Project | Seqwater   | Upgrade to main embankment and spillway for stability, earthquake and flood capacity.                                                                                                              | Detailed design is underway scheduled to be completed by May 2019. Construction completion scheduled for 2021. |
| Leslie Dam Spillway Improvement Project           | SunWater   | Involves strengthening of spillway abutment monoliths and reduction of scour potential downstream of abutments.                                                                                       | Business case currently in development, due for completion late 2019.                            |
Table 3 continued

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somerset Dam—Safety Upgrade Project</td>
<td>Seqwater</td>
<td>Upgrade to main dam and spillway for stability and flood capacity.</td>
<td>Option development and selection underway to allow preliminary design to be completed by mid-2019.</td>
</tr>
<tr>
<td>Teemburra Dam Safety Improvement Project</td>
<td>SunWater</td>
<td>Involves raising of the main embankment and saddle dams to increase spillway capacity and filter installation to protect against piping.</td>
<td>Business case currently in development, due for completion late 2019.</td>
</tr>
<tr>
<td>Wivenhoe Dam—Safety Upgrade Project</td>
<td>Seqwater</td>
<td>Upgrade to increase flood capacity and investigate additional flood mitigation.</td>
<td>Feasibility options study underway to be completed by the end of 2019.</td>
</tr>
</tbody>
</table>

NEW PROJECTS

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burdekin Falls Dam Saddle Dam and Monolith Improvement Project</td>
<td>SunWater</td>
<td>To improve the risk profile of the dam for the impact of severe weather events.</td>
<td>A detailed review of the dam’s catchment hydrology, a risk assessment and review of engineering options is progressing to inform project design requirements. A revised detailed business case is expected to be progressed in 2019.</td>
</tr>
</tbody>
</table>

4.2 Initiatives to support reliable urban supplies

The Queensland Government supports water service providers and local governments to plan for secure urban water supplies through the RWSSAs program (see Section 2.4). The Queensland Government also provides direct financial support to local governments to investigate and undertake works aimed at delivering and maintaining secure and reliable urban water supplies. Current funding programs include:

- Maturing the Infrastructure Pipeline Program (MIPP)—an infrastructure planning program aligned to the State Infrastructure Plan.
- Works for Queensland (W4Q)—supporting a number of maintenance and minor infrastructure projects related to water assets that are managed by Queensland local governments.
- Indigenous Councils Critical Infrastructure Program—provides financial support to deliver critical water, wastewater and solid waste infrastructure to Queensland’s Indigenous councils.

Table 4 provides examples of urban water supply projects recently completed and underway that have received state government funding assistance. Further details of state subsidy programs are provided in Section 6.8.
### Table 4: Urban water supply projects

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status and Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RECENTLY COMPLETED PROJECTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charleville West Water Supply project</td>
<td>Murweh Shire Council</td>
<td>The new deep bore will improve the security of supply to the Charleville community. It will save some homes and businesses from losing water supply during floods, and provide capacity for more development.</td>
<td>Project works were completed in mid 2017. Funding: Queensland Remote and Aboriginal and Torres Strait Islander Communities Fund.</td>
</tr>
<tr>
<td>New Water Reservoir—Georgetown</td>
<td>Etheridge Shire Council</td>
<td>The project will improve the security of supply to the Georgetown community by constructing a new 3 ML water reservoir. This will support growth in the community and tourism with associated economic benefits.</td>
<td>Construction was completed in mid 2017. Funding: Queensland Government.</td>
</tr>
<tr>
<td><strong>PROJECTS BEING DEVELOPED</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beaudesert Water Supply Upgrade</td>
<td>Seqwater</td>
<td>The project will improve water security for the Scenic Rim and South Logan regions, supporting population growth and economic development. Involves an upgrade to the Beaudesert water treatment plant (WTP), connecting Beaudesert to the SEQ Water Grid (South West Pipeline) and building a new water treatment plant at Wyaralong.</td>
<td>Work is in progress to upgrade storage at the Beaudesert WTP and improve plant reliability during extreme wet weather. Planning for the South West Pipeline is progressing. Pending completion of design and approvals, construction is expected to start in 2021. Wyaralong WTP is in the early planning phase. Target completion date is 2022-2025 dependent on demand.</td>
</tr>
<tr>
<td>Herberton Water Supply Upgrade</td>
<td>Tablelands Regional Council</td>
<td>The project will deliver a more economically and environmentally sustainable bulk water supply, with enhanced storage capacity and sufficient pressure to meet firefighting guidelines.</td>
<td>Construction is in progress and due for completion mid 2019. Funding: Queensland Regional Capital Fund.</td>
</tr>
<tr>
<td>Storm King Dam pipeline</td>
<td>Southern Downs Regional Council</td>
<td>The project will support water quality and long-term supply for the Stanthorpe region by constructing an 8,940 m pipeline between Storm King Dam and the Mount Marlay Water Treatment Plant</td>
<td>Construction is in progress and due for completion mid 2019. Funding: Co-funded by Queensland Local Government Grants and Subsidies Program and Southern Downs Regional Council.</td>
</tr>
<tr>
<td>Townsville Haughton Pipeline Duplication</td>
<td>Townsville City Council</td>
<td>The project will improve Townsville’s short-, medium- and long-term water security through the construction of a new 36.5 km raw water pipeline from the Haughton Pump Station to Ross River Dam (Stage 1 pipeline).</td>
<td>Construction has commenced and is due for completion in late 2019. Funding: Queensland Government.</td>
</tr>
<tr>
<td>Burdekin Haughton Main Channel Augmentation Project</td>
<td>SunWater</td>
<td>To support the Townsville Haughton Pipeline Duplication project, this project will increase the capacity of the Burdekin Haughton Main Channel.</td>
<td>Project is scheduled for delivery at the end of 2019, to complement completion of the Townsville Haughton Pipeline Duplication. Funding: SunWater.</td>
</tr>
<tr>
<td><strong>ONGOING PROJECT INVESTIGATIONS AND PLANNING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biggenden Urban Water</td>
<td>North Burnett Regional Council</td>
<td>To ensure water security and improved water quality for Biggenden using an alternative raw water source and enhanced water treatment process.</td>
<td>A business case is in preparation based on preliminary investigations. Funding—MIPP</td>
</tr>
</tbody>
</table>
### Table 4 continued

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status and Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clermont: Sustainable Water Framework</td>
<td>Isaac Regional Council</td>
<td>Secure reliable long-term water supply for Clermont and developments in the Galilee Basin. Focus is on augmentation and remediation works on the Theresa Creek Dam.</td>
<td>Feasibility study completed January 2018.* Identified growth scenarios, development options and information gaps. Council is proceeding to address key data gaps utilising State Government funding under MIPP.</td>
</tr>
<tr>
<td>Great Keppel Island Revitalisation</td>
<td>Livingstone Shire Council</td>
<td>Maintain supply to existing users and support growth of tourism by upgrading the water and power systems.</td>
<td>Detailed design assessment in progress. Funding—MIPP</td>
</tr>
<tr>
<td>Mareeba Water Supply</td>
<td>Mareeba Shire Council</td>
<td>Improve the sustainability of critical infrastructure to secure water supply.</td>
<td>Technical design and cost assessment in progress. Funding—MIPP</td>
</tr>
<tr>
<td>South Burnett Water Strategy</td>
<td>South Burnett Regional Council</td>
<td>Plan for the sustainable upgrade and renewal of Council’s water and wastewater assets.</td>
<td>A Regional Water and Wastewater Strategy is in development. Funding—MIPP</td>
</tr>
<tr>
<td>Tablelands Water Strategy and Plan</td>
<td>Tablelands Regional Council</td>
<td>Inform decision making and identify options to improve efficiency of Council’s water infrastructure system.</td>
<td>A Water Business Strategy is in development. Funding—MIPP</td>
</tr>
<tr>
<td>Torres Shire Water Infrastructure Upgrade</td>
<td>Torres Strait Regional Council</td>
<td>New and upgraded infrastructure works to maintain quality of drinking water supplies on Horn, Thursday and Hammond Islands.</td>
<td>Project works scheduled for 2018/19 and 2019/20. Funding: Queensland Government</td>
</tr>
</tbody>
</table>

* This study was supported by funding from the National Water Infrastructure Development Fund, an initiative of the Northern Australia and Agricultural Competitiveness white papers.

### 4.3 Initiatives to improve efficiency

The second objective for bulk water supply infrastructure (see Section 1.1) is using existing water resources more efficiently. Section 6 outlines several opportunities to make more efficient use of water available in existing infrastructure, including reviewing latent capacity pricing, water markets and trading. Table 5 provides details of efficiency projects recently completed, currently underway or in planning that have received funding under the NWIDF (see also Section 4.5). Table 5 does not include the broad portfolio of continuous improvement and maintenance measures that are routinely undertaken by bulk water providers.
### Table 5: Bulk water supply efficiency projects

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status and Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsella Dimbulah WSS Improvement Project</td>
<td>SunWater</td>
<td>The project comprises six sub-projects to improve operating efficiency and reduce water losses in the Marsella Dimbulah WSS Scheme, by up to 8,000 ML per year. It includes construction of new pressurised pipeline, three additional balancing storages and installation of automated gates in key reaches of the channel system.</td>
<td>A detailed business case is in development in conjunction with Nullinga Dam (see also Table 6), due June 2019. A NWIF (capital) grant has been secured to co-fund the works.</td>
</tr>
<tr>
<td>Bundaberg Channel Capacity Upgrade</td>
<td>SunWater</td>
<td>The project aims to facilitate the use of available water from Paradise Dam by assessing regional demand, water prices and infrastructure options to deliver water to potential future irrigation areas.</td>
<td>Bundaberg Channel Capacity Upgrade Feasibility Study is complete. Water pricing strategy is in development to reduce the price of water from Paradise Dam and Kirar Weir (see also Section 6.7)</td>
</tr>
<tr>
<td>Burdekin Haughton Water Supply Scheme Upgrade</td>
<td>SunWater</td>
<td>The project aims to facilitate the use of available water from the Burdekin Haughton Water Supply Scheme. Options being assessed include channel upgrades, targeted channel lining, additional pipelines and balancing storages, and groundwater dewatering and re-use.</td>
<td>Burdekin Haughton Channel Capacity Upgrade Feasibility study is complete. Further assessment of a range of options is being progressed by SunWater.</td>
</tr>
<tr>
<td>Lockyer Valley–Water for agricultural productivity and sustainability</td>
<td>Lockyer Valley Regional Council</td>
<td>The project aims to provide alternative water supplies and innovative water delivery mechanisms to agricultural users in the Lockyer Valley.</td>
<td>Lockyer Valley Aquifer Recharge Pre-feasibility study is complete. DNRME is amending the Moreton Water Plan to establish volumetric entitlements and transparent sharing and accounting processes. Building Queensland is investigating cost-effective, viable water supply solutions for Lockyer Valley, funded by DNRME. Lockyer Valley Regional Council have secured funding under the Maturing the Infrastructure Pipeline Program to advance the findings of the Building Queensland work in 2019.</td>
</tr>
</tbody>
</table>
### Table 5 continued

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status and Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nogoa Mackenzie WSS Efficiency Improvement Project</td>
<td>SunWater</td>
<td>The project comprises relining works in the Selma Channel system to significantly reduce seepage losses making up to 6,000 ML per annum of more water available each year.</td>
<td>An NWIDF (capital) grant has been secured to co-fund the works. Construction scheduling will align with planned shutdown periods in the scheme to ensure continuity of supply to customers.</td>
</tr>
<tr>
<td>South East Queensland Treated Effluent for Agriculture—NUWater</td>
<td>Queensland Farmers’ Federation</td>
<td>The project considers how to make recycled water available to the Lockyer Valley and Darlings Downs agricultural areas, including consideration of water from the Western Corridor Recycled Water Scheme.</td>
<td>Preliminary business case is complete. The costs currently outweigh the benefits. Building Queensland is investigating cost-effective, viable water supply solutions for Lockyer Valley, funded by DNRME.</td>
</tr>
</tbody>
</table>

* This study was supported by funding from the National Water Infrastructure Development Fund, an initiative of the Northern Australia and Agricultural Competitiveness white papers.

### 4.4 Initiatives to support new infrastructure

While there is water currently available from bulk water supply infrastructure across the state, it may not be available in the right place or with the required reliability of supply to meet demand. The initiatives outlined in Section 4.3 are aligned to the objective of using our current water schemes better, which is critical to ensuring we unlock the potential of past investments. As part of the multi-faceted approach of QBWOS, it is equally important that we ensure the right new water supply projects are being considered to match credible needs and opportunities.

Two of the State’s objectives for bulk water (see Section 1.1) support infrastructure development that provides a commercial return and consider projects that will provide regional economic benefits. Across Queensland, new bulk water supply infrastructure projects (including significant new dams, dam upgrades and irrigation schemes) are actively being considered or developed to support a range of needs.

Through its state owned bulk water providers, the Queensland Government is playing an active role in ensuring we are well-positioned to meet future water needs and that the continued development of our economy is supported. Specifically, the Queensland Government has committed to fund Rookwood Weir, in Central Queensland near Rockhampton, to meet a combination of urban and industrial needs and agricultural opportunities. In northern Queensland, SunWater is advancing consideration of Nullinga Dam in collaboration with Building Queensland. A detailed business case is in development for Nullinga Dam and Mareeba Dimbulah Water Supply Scheme improvements. To ensure the right long-term strategy is in place for the Burdekin Basin, SunWater is also advancing a Preliminary Business Case considering future needs for water in the Burdekin Basin and surrounding areas, and assessing the raising of Burdekin Falls Dam.

The Queensland Government is also funding investigations of selected infrastructure proposals through the MIPP. The MIPP is a $30 million fund that supports the development of a robust infrastructure project pipeline. More information is available on the Department of State Development, Manufacturing, Infrastructure and Planning website at www.dsdmip.qld.gov.au. As well as these projects currently being actively assessed by the Queensland Government, there are a number of assessments being undertaken by other proponents, for example, feasibility studies supported by funding under the Australian Government’s NWIDF. To ensure the most appropriate long term strategy is in place, DNRME is working to identify the next set of priority projects that may have potential merits in terms of contributing to regional economic development.

DNRME is coordinating the prioritisation of bulk water supply infrastructure proposals that may have economic benefits to the state and for which...
state government funding may be requested. This is discussed more in Section 6.1.

The QBWOS includes relevant findings from all assessments completed to date. Table 6 provides a summary of the bulk water supply infrastructure projects currently being developed and potential bulk water supply infrastructure projects currently being considered or investigated to support infrastructure.

This information will be updated in future versions of the QBWOS to reflect the outcomes of current and ongoing assessments. Details and reports for completed feasibility assessments under the NWIDF are available at www.business.qld.gov.au. See also Section 6.1 for more information on the DNRME role in relation to project prioritisation.

Table 6: Potential bulk water supply infrastructure projects

<table>
<thead>
<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROJECTS BEING DEVELOPED</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rookwood Weir</td>
<td>SunWater</td>
<td>Weir located on the Fitzroy River above the existing Eden Bann Weir to nominally provide 76,000 ML of water to service agriculture, industry and urban customers in the Rockhampton, Gladstone and Capricorn Coast areas. Queensland and Australian Governments have committed to jointly funding the project’s $352 million capital costs. SunWater is proceeding with pre-construction activities. Target project completion is in 2022/23.</td>
<td></td>
</tr>
<tr>
<td><strong>RECENTLY COMPLETED INVESTIGATIONS – PROJECT PROGRESSING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Fitzroy River Infrastructure Project</td>
<td>SunWater</td>
<td>Augment water storage to supplement urban and industrial supplies for Rockhampton, Capricorn Coast and Gladstone, and enhance agricultural and industrial development in the Fitzroy Basin and Gladstone region. Detailed business case completed in late 2017, with a focus on Rookwood Weir.* See Rookwood Weir above, and Rookwood Weir Project text box on page 41.</td>
<td></td>
</tr>
<tr>
<td>Hells Gates Dam</td>
<td>Townsville Enterprise Ltd</td>
<td>Supply to large-scale irrigated agriculture within the upper Burdekin River Potentially augment local urban water supplies for Townsville to improve security</td>
<td>Feasibility assessment completed 2018.* The Water Plan does not currently allow for the dam. The proposal costs exceed the benefits – there are high capital costs and there is a lack of demand in the short to medium term, which makes this a challenging investment proposition. The Australian Government have announced additional funding to progress the investigations to a detailed business case, including consideration of constructing Big Rocks Weir.</td>
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## Table 6 continued

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<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
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<tbody>
<tr>
<td><strong>INVESTIGATIONS COMPLETE – PROJECT AWAITING TRIGGERS</strong></td>
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</tr>
<tr>
<td>Cloncurry River Dam</td>
<td>Mount Isa to Townsville Economic Development Zone Inc.</td>
<td>New water supply storage for irrigation development in the Cloncurry region with potential to also augment Cloncurry urban water supply and water available for surrounding mines. Focus is on Cave Hill Dam.</td>
<td>Preliminary Business Case was completed in May 2018*. Identified Cave Hill Dam as the most promising dam option. Indications are that costs outweigh benefits at this time. Detailed Business Case advancing including detailed functional design, costings and social, economic and environmental impact statements.</td>
</tr>
<tr>
<td>Connors River Dam and pipeline</td>
<td>SunWater</td>
<td>Primarily to supply coalmines near Moranbah (Bowen and Galilee basins) with some urban supply to associated communities</td>
<td>State and federal environmental approvals obtained and land acquired. Currently insufficient demand to be viable.</td>
</tr>
<tr>
<td>Fitzroy to Gladstone Pipeline</td>
<td>Gladstone Area Water Board</td>
<td>Provide contingency supply to Gladstone from Fitzroy River when required as a drought response or to meet increased demand</td>
<td>Environmental impact statement completed and conditionally approved. Project will proceed in accordance with agreed water security triggers.</td>
</tr>
<tr>
<td>Nathan Dam and pipeline</td>
<td>SunWater</td>
<td>Mining, industrial, agricultural and urban supply to Dawson Valley and Surat Basin</td>
<td>Environmental impact statement complete. Currently insufficient demand to be viable.</td>
</tr>
<tr>
<td>Tablelands Irrigation Project</td>
<td>Tablelands Regional Council</td>
<td>Multipurpose water use in the Upper Herbert River catchment to support expansion of the region’s agricultural base and generate renewable power, and considering flood mitigation benefits for the Lower Herbert River catchment</td>
<td>Preliminary business case was completed in December 2018.* Requires further demand to proceed.</td>
</tr>
<tr>
<td><strong>ONGOING PROJECT INVESTIGATIONS AND PLANNING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emu Swamp Dam</td>
<td>Stanthorpe and Granite Belt Chamber of Commerce</td>
<td>Investigate the feasibility and economic viability of the proposed Emu Swamp Dam and associated distribution network to provide secure and affordable water to support urban and rural regional growth in the Granite Belt area.</td>
<td>Feasibility investigations are progressing and due for completion by June 2019.*</td>
</tr>
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## Table 6 continued

<table>
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<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status</th>
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<tbody>
<tr>
<td>Gayndah Regional Irrigation Development Project</td>
<td>Isis Central Sugar Mill Company Limited</td>
<td>Water storage and supply options and irrigation development of up to 6800 hectares in the Gayndah region of the Burnett River catchment</td>
<td>Feasibility investigation due for completion late 2018.* The project has a high capital element that would require a significant contribution from the Australian and/or Queensland Governments and/or third parties.</td>
</tr>
<tr>
<td>Lakeland Irrigation Area</td>
<td>Regional Development Australia Far North Queensland and Torres Strait Incorporated</td>
<td>New water supply and storage options to support the expansion of irrigated agriculture in the Lakeland Irrigation Area</td>
<td>Feasibility investigation progressing Target completion—June 2019.*</td>
</tr>
<tr>
<td>Nullinga Dam</td>
<td>SunWater</td>
<td>Expansion of irrigated production in the Mareeba-Dimbulah Irrigation Area—in the longer term, potential to augment Cairns urban supplies</td>
<td>Preliminary Business Case was completed in 2018.* A detailed business case is in development in conjunction with Mareeba Dimbulah Water Supply Scheme Improvements (see also Table 5), due June 2019.</td>
</tr>
<tr>
<td>Urannah Dam</td>
<td>Bowen Collinsville Enterprise Inc.</td>
<td>New water supply to support mines, agriculture and tourism development and could also increase local urban supplies</td>
<td>Feasibility investigation progressing with target completion June 2019.*</td>
</tr>
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### NEW PROJECTS

<table>
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<tr>
<th>Project name</th>
<th>Proponent</th>
<th>Purpose</th>
<th>Status</th>
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<tbody>
<tr>
<td>Gilbert River Irrigation Project</td>
<td>Etheridge Shire Council</td>
<td>Construct a dam, weir and channels on the Gilbert River to support expansion of irrigated agriculture.</td>
<td>A detailed business case is progressing with funds secured from the State Government MIPP.</td>
</tr>
<tr>
<td>Richmond Irrigation Project</td>
<td>Richmond Shire Council</td>
<td>Undertake a study to determine the technical feasibility of constructing a weir, channels and associated infrastructure to support sustainable agricultural development.</td>
<td>A feasibility study is progressing with funds secured from the State Government MIPP.</td>
</tr>
</tbody>
</table>

* This study was supported by funding from the National Water Infrastructure Development Fund, an initiative of the Northern Australia and Agricultural Competitiveness white papers.
4.5 National Water Infrastructure Development Fund feasibility studies

The NWIDF is an initiative of the Australian Government delivered through the states and territories. It aims to accelerate the assessment of water infrastructure proposals which could stimulate regional economic activity and development. There are 15 feasibility studies being administered by DNRME that have been funded under the NWIDF. These studies are being undertaken by a range of proponents, including SunWater, local governments and other organisations that support regional development. Some of these studies are detailed feasibility studies and others are high-level assessments.

As at late 2018, 11 of the NWIDF studies were complete and the remaining four are due for completion before June 2019. The information generated by the assessments will help proponents and governments understand the viability of the proposals, the potential contribution the proposals could make to the economy of Queensland, the potential challenges associated with the proposals, and inform decisions about the future of the proposals. The projects receiving funding under the NWIDF are listed in tables 4, 5 and 6 (Sections 4.2, 4.3 and 4.4).

The majority of the NWIDF water infrastructure proposals are not construction ready, and most will require further detailed assessment and activities (e.g. environmental impact assessments) to advance. There is no specific Queensland Government funding allocated for further development of any of these proposals. Project proponents may choose to further develop their infrastructure proposals on their own, or by seeking funding support from existing State and Commonwealth programs for eligible projects that align with program objectives for public infrastructure.

The NWIDF funded proposals represent only a portion of the water projects under review by the state and other proponents. Completed NWIDF feasibility studies will feed into the Queensland Government’s broader strategic bulk water prioritisation process for new bulk water supply infrastructure, together with other project proposals that are shown to have commercial or economic potential.

Refer to Section 6.1 for further details of the prioritisation initiative and Section 6.5 for details on the requirements of project assessments.
Rookwood Weir Project

The Rookwood Weir Project (previously known as Lower Fitzroy River Infrastructure Project) is focused on the construction of a new weir at Rookwood on the Lower Fitzroy River, with associated fauna passage, roadworks, bridges and culverts. Water is currently supplied to urban, commercial, industrial and agricultural customers across Central Queensland primarily through the Lower Fitzroy Water Supply Scheme (WSS), Fitzroy Barrage WSS and the Awoonga Dam WSS. Rookwood Weir will operate in conjunction with existing infrastructure in these schemes including Eden Bann Weir and the Fitzroy Barrage, as well as proposed infrastructure such as the Gladstone–Fitzroy Pipeline. The weir is expected to provide an additional 76,000 ML per year of high priority water to support the expansion of irrigated agriculture and manage urban water security risks in the Rockhampton, Gladstone and Capricorn Coast regions.

In late 2017 a detailed business case found that the project should proceed when there is greater certainty in potential demand and funding arrangements, and also recommended a final proponent be decided. The Queensland Government has now confirmed SunWater as the sole proponent; and both the Queensland and Australian Governments have committed to co-funding the project’s $352 million capital costs.

Both state and federal environmental approvals were secured in 2017. SunWater is now proceeding with detailed design, planning and procurement activities. The target date to commence construction is in late 2019, with the first water expected to be available about two years later (dependent on rainfall and inflows). SunWater is now soliciting interest in demand for the water entitlements that will be associated with the project.

Once completed, Rookwood Weir will provide both broad water security benefits to urban communities as well as extensive economic development opportunities for irrigated agriculture and industrial development in the central Queensland region.
Nullinga Dam and Mareeba Dimbulah Water Supply Scheme Improvements Project

The Nullinga Dam and Mareeba Dimbulah Water Supply Scheme Improvements Project has been proposed as a future water supply to serve growing urban demand in Cairns and stimulate irrigated agriculture in the region by supplementing existing supplies. The proposed Nullinga Dam site is on the Walsh River in the Atherton Tableland, approximately 55 kilometres south-west of Cairns. The dam has potential to provide up to 90,000 ML per year of additional water for the region.

The Nullinga Dam and Other Options Preliminary Business Case was completed in mid-2017, with a focus on the potential need for augmented water supplies in the region and possible water supply options. It found that if a satisfactory level of demand was identified, further investigation of the Nullinga Dam would be warranted. It also recommended that further evaluation of changes to operating rules in the Mareeba Dimbulah Water Supply Scheme (MDWSS) and modernisation of the MDWSS distribution infrastructure should progress.

Since completing the preliminary business case, potential customers have provided information that satisfies the demand triggers to progress to the next stage of development—a detailed business case. Building Queensland and SunWater (the proponent) are now working together with potential customers and other key stakeholders on the detailed assessment of economic benefits and costs, technical feasibility and environmental implications for the proposed water supply options. The detailed business case is expected to be complete in mid-2019 and will enable all levels of government and investors to make informed decisions on the project.

If the Nullinga Dam proposal is to be advanced past the detailed business case stage, there are a range of activities and approvals that would need to occur such as: consideration of water availability under the water planning framework, securing environmental and cultural heritage approvals and completing further detailed design.

During the 2018–19 financial year, SunWater commenced the implementation of six channel and scheme modernisation projects in the MDWSS. These projects will improve operating efficiency and reduce water losses by up to 8,000 ML per annum, enabling certain loss allocations to be converted into new water allocations for sale. SunWater will construct a new pressurised pipeline, balancing storages and automated gates in key reaches of the channel system. The total estimated project cost for the six MDWSS efficiency improvement projects is $28 million, with $16.4 million being funded by SunWater and the remaining $11.6 million by the Australian Government.

The Nullinga Dam and Other Options Preliminary Business Case was supported by funding from the NWIDF.
4.6 Key agency roles

Several Queensland Government agencies have key roles in planning and administration of water resources, regulating the provision of water supply, management and operation of existing bulk water supply infrastructure and consideration of new infrastructure. The roles of these agencies are summarised below to provide clarity to customers, potential customers and those seeking more information on Queensland’s water arrangements.

The roles of the agencies should be read in conjunction with the roles of the state bulk entities (described earlier in Section 3.2).

Considering the range of issues associated with better use of existing infrastructure and developing new infrastructure where appropriate, it is acknowledged there can be improvements in the way relevant state government agencies work to better achieve beneficial economic outcomes for the state. Improvement is an ongoing process; however, specific opportunities have been identified and are outlined in Section 6.

Department of Natural Resources, Mines and Energy

The Department of Natural Resources, Mines and Energy (DNRME) helps the community and the government to make the best use of our renewable and non-renewable land, water, mineral and energy resources; and deliver safe, secure, affordable and sustainable energy and water. DNRME provides a regulatory framework to manage security of rights (entitlements, allocations, licences etc.) to these natural resources, which involves both legal ownership and security to exercise those rights.

The management of water resources within Queensland is undertaken on a catchment basis using water plans and management areas developed under the Water Act 2000 and implemented through subordinate instruments such as Water Management Protocols (previously resource operations plans), ROLs, distribution operations licences, water supply scheme operations manuals and water entitlement notices. These instruments are developed through technical and scientific assessments, as well as extensive community consultation, to determine the appropriate balance between the economic, social and environmental demands on the state’s water resources. This balance is achieved by establishing rules for operating water supply schemes and sharing water within schemes and management areas.

In addition, DNRME provides advice on water-related economic and pricing policy, institutional arrangements, bulk water supply infrastructure, and urban water security—including partnering with local governments to develop RWSSAs. DNRME regulates water service provision, drinking water, recycled water and dam safety; provides oversight of the Gladstone Area Water Board and Mount Isa Water Board, and is responsible for administration and oversight of Category 2 water authorities and together with Queensland Treasury, provides oversight of water-related government-owned corporations and statutory authorities (SunWater and Seqwater). On behalf of the state government, DNRME manages the non-commercial asset portfolio of 21 dams and weirs, and associated land, plant and equipment. DNRME also administers the NWIDF projects for Queensland.

Department of State Development, Manufacturing, Infrastructure and Planning

The Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) brings together the functions of infrastructure planning and policy, planning, local government, regional services and economic and regional development to create better cities, towns and communities. DSDMIP leads the development of infrastructure policy, including the State infrastructure plan, regional plans and investment prioritisation for Queensland.

The DSDMIP is responsible for leading the delivery of economic development outcomes for Queensland. With a focus on industry, regions and projects, DSDMIP supports economic development by influencing the policy and the investment environment, supporting projects with funding and coordination, and supporting new and emerging industries and job creation.

The Queensland Government assists local governments to plan and provide infrastructure for their communities. Local government infrastructure includes water supply and reticulation, sewage treatment, local roads, stormwater management and parks and land for community facilities.

Through the Office of the Coordinator-General, DSDMIP also progresses assessment of coordinated projects, investigation of potential coordinated projects and facilitation of all approvals for construction-ready projects.
Department of Local Government, Racing and Multicultural Affairs

Department of Local Government, Racing and Multicultural Affairs (DLGRMA) administers the legislation that regulates the roles and responsibilities of local governments. The DLGRMA assists local governments with infrastructure funding proposals, such as those for water infrastructure, and provides some targeted funding and grants.

Their WaQ program supports local governments outside of South East Queensland to undertake job-creating maintenance and minor infrastructure projects and the Local Government Grants and Subsidies Program (LGGSP) aims to support local governments to meet the needs of their community by providing funding for the delivery of priority capital infrastructure projects. See Section 6.8 for more on government grant and subsidy programs.

Department of Agriculture and Fisheries

The Department of Agriculture and Fisheries (DAF) facilitates the growth and sustainable development of the agriculture, fishing and forestry sectors, and seeks to optimise their contribution to economic, environmental and social outcomes for Queensland (including developing export markets).

With respect to bulk water infrastructure, DAF is an advocate for agriculturally important land, energy and water, and the sector’s key role in regional economies and employment. It also actively advocates for leveraging changes in water and land use to develop new agricultural and aquaculture opportunities. DAF also has a role to protect fish habitat; activities that disturb fish habitats (such as the construction or raising of waterway barriers, including weirs and dams) may require fisheries development approval under the Planning Act 2016.

Department of Environment and Science

The Department of Environment and Science (DES) is Queensland’s environmental regulator. DES has a number of roles relating to environmental impact assessment of development (including bulk water supply projects) depending on the type of development proposed, including:

- assessment manager or referral agency for development applications to undertake environmentally relevant activities that are listed and defined in the Environmental Protection Regulation 1998
- assessment manager or referral agency for assessable development regulated under the Coastal Protection and Management Act 1995
- advice agency as part of assessment processes managed by the Coordinator-General under the State Development and Public Works Organisation Act 1971
- Coordination of advice and statutory notices to the federal environment department related to assessments (including accredited environmental impact statement processes) under the federal Environment Protection and Biodiversity Conservation Act 1999.

Within DES, the Office of the Great Barrier Reef implements and coordinates reef management strategies and programs, including the Queensland Government’s actions under the Reef 2050 long-term sustainability plan and the Reef water quality protection plan 2013 (see Section 5.4).

DES also provides expert hydrological modelling services that underpin development of water plans and support the preparation of RWSSAs.

Queensland Treasury

Queensland Treasury (QT) is responsible for managing Queensland’s revenue and expenditure in a way that drives economic growth, creates jobs, and improves prosperity now and into the future. QT’s remit includes providing economic and commercial advice to government, procuring infrastructure (including through optimised public infrastructure investment), and monitoring the performance of the state’s commercial businesses (including providing oversight of SunWater and Seqwater jointly with DNRME).
The Bradfield Scheme—a project facing challenges

Over many decades, there have been numerous investigations into water supply infrastructure proposals across Queensland. Many of these investigations have found that the proposed infrastructure is not technically possible from an engineering perspective, or it is not economically viable—either due to prohibitive costs and/or insufficient demand.

The most notable of these proposals is the Bradfield Scheme. In 1938, Dr John Bradfield proposed a scheme where water would be extracted from one or more of the Tully, Herbert or Burdekin rivers, pumped over the Great Dividing Range and then distributed through a system of rivers, channels, pipelines and storages to water users across western areas of Queensland and other states. Although there were slight variations to the proposal, the general premise was to enable irrigation of vast areas of land, in the order of 15.5 million hectares, and support communities and other industries.

As early as the mid 1940s, the federal government was highlighting the technical issues, lack of knowledge and costs that would prohibit development of such a scheme. By 1945, the Australian Government had a ‘standard reply’ for enquires on the proposal. The Queensland Government regularly receives suggestions, proposals and general correspondence advocating the Bradfield Scheme or a similar arrangement to enhance water security.

Since investigations commenced in the 1940s, there have been occasional reviews of Bradfield Scheme—style proposals, as well as a number of reports prepared in the early 1980s. More recently in 2007, during the Millennium Drought, the state government commissioned consultants to investigate the option of piping water from Burdekin Falls Dam, inland of Townsville, to South East Queensland to provide a drought supply option.

The investigation found that construction costs ranged from $7 billion to $14 billion, with lower range water costs of more than $5000 per megalitre (if the scheme was in use permanently). This is well in excess of alternative supply options such as desalination (estimated at around $2500 to $3500 per megalitre for ‘ready to supply’ water). Consequently, the scheme was found not to be viable, which confirmed the findings of previous investigations.

Common findings from a range of investigations suggest Bradfield Scheme—type proposals are constrained by:

- availability of water according to water plans
- ability and willingness of potential users to pay for water
- availability of alternative water sources that have lower costs, in particular groundwater
- environmental impacts on flora and fauna due to changing flow regimes of watercourses
- impacts on groundwater recharge if water is redirected away from aquifer recharge areas
- variability of water availability across North Queensland year to year
- variability in the demand for water, especially during wet years
- losses of water due to seepage and evaporation in what is an arid area much of the time
- large storage requirements to maintain water availability during dry years
- access to energy to meet pumping requirements
- technical issues and costs for using onsite renewable energy generation to power pumps
- construction issues for channels, pipelines and storages, including locating suitable sites
- remoteness of much of the area presenting challenges during construction and operation.
Burdekin Falls Dam—complexity, risks and opportunities

Burdekin Falls Dam is currently Queensland’s largest water supply dam. The dam forms Lake Dalrymple with a storage capacity of 1,860,000 ML (more than three times the capacity of Sydney Harbour). The dam operates in conjunction with other storage weirs and a series of channels and pipelines to form the Burdekin Haughton Water Supply Scheme (BHWSS), which is owned and managed by SunWater. The BHWSS has 1,080,000 ML of water entitlements associated with it, of which 990,000 ML are committed to customers, supporting a diverse mix of irrigated agriculture, grazing, mining, industry and urban population centers, including Townsville and Thuringowa.

A portion of the water released from the BHWSS is directed to the Lower Burdekin Water Authority area to supplement groundwater supplies by recharging the Burdekin delta aquifer, which has an estimated storage capacity of 1,230,000 ML. With the potential for double-cropping of many field crops, and the highest yields and sugar content for cane in Australia, there has been growing demand for water allocations in this region. The Burdekin Basin Water Plan identifies a strategic reserve of 150,000 megalitres of water is available from the catchment, but additional infrastructure would be required to access it. However, there are issues such as rising groundwater, soil salinity and additional run-off to sensitive downstream environments (such as the Great Barrier Reef) that must be considered before further allocations are made available. DNRME has been progressing development of the Lower Burdekin Groundwater Strategy, to manage water-related risks to the economic productivity of the region.

SunWater and the DSDMIP have completed a study to forecast future potential demand and SunWater is now developing a preliminary business case to further investigate long-term water supply requirements and options for raising Burdekin Falls Dam. At the same time, there are feasibility assessments underway for new dams at Hells Gate (upstream on the Burdekin River) and Urannah being undertaken by local organisations with an interest in water supply issues in the region.
5 Addressing unique risks and uncertainty

5.1 Planning for an uncertain climate future

Queensland is a vast state with great variations in climate—from the temperate south to the tropical north and the arid west. Queensland also experiences high-impact extreme weather events, such as heatwaves, droughts, floods, tropical cyclones, bushfires and severe storms.

Increased climate variability will have an increasing influence on water security and availability from existing and potential bulk water supply sources. The majority of modelling results for Queensland, including Bureau of Meteorology and CSIRO studies, indicate that Queensland’s future climate is expected to have higher temperatures, hotter and more frequent hot days, less frequent but more intense cyclones in the north, more intense downpours across the state, fewer frosts, reduced rainfall in the south-east and more time in drought in the south. This suggests that climate change may lead to a potential increase in water demand and changing demand patterns, less surface water is likely to be available for both the environment and water supply infrastructure, but with increased rainfall intensity there may also be more flooding events.

With these changes expected to occur over the medium to long term, it is imperative that water security planners consider and manage the risks of climate variability and climate change. There will need to be sufficient flexibility in planning to accommodate and adapt to changing climate trends as they are established by ever-improving science.

Climate Change Adaptation Strategy

In 2017, the Queensland Government released the Queensland Climate Adaptation Strategy (Q-CAS), a framework to support an innovative and resilient Queensland that manages the risks and harnesses the opportunities of a changing climate. The Q-CAS is centered on a partnership approach that recognises that climate change is everyone’s responsibility, and that a collaborative approach is needed to ensure resilience is embedded in Queensland’s diverse economies, landscapes and communities.

Supporting Q-CAS are Sector Adaptation Plans that help to prioritise climate change adaptation activities across key sectors of the community. The plans are being developed in consultation with stakeholders to reflect the needs and priorities of each sector. They identify emerging opportunities, share knowledge and encourage collaboration. Sector plans have been developed for: human health and wellbeing, emergency management, agriculture, built environment and infrastructure, and tourism. Plans are in development for: biodiversity and ecosystems, small and medium enterprise, and the industry and resources sector.

Planning for climate change

Following changes to the Water Act 2000 in 2018, there are now clear requirements to take account of the effects of climate change on water availability at all phases of the water planning process. Consideration must also be given to the effect of climate change on water use practices and the risk to land and water resources arising from water use.

The water planning framework under the Water Act 2000 is a key adaptation tool to manage the effects of climate change on water resources. Climate variability and climate change forms part of the...
technical assessment process that supports water planning—but how this science informs water planning policy has not always been transparent in the past. The new requirements will inform the development of future water plans and influence the design of implementation instruments, so that strategies are adaptive to the prevailing climate conditions.

DNRME works with local governments across the state to develop RWSSAs and RWSSEs, previously discussed in Section 2.4. The RWSSAs and RWSSEs provide an overview of the capability of the existing water sources to meet projected population growth and water demands in discrete urban centres. The assessments and evaluations use a range of techniques to assess the performance of the bulk water supply in meeting forecast demands, with consideration of a broad range of climate scenarios.

There is a drive to understand how climate change may affect rainfall and weather patterns. As the science around climate impacts becomes more certain, new information will be factored into RWSSAs and RWSSEs. This will improve the quality of water security assessments and the accompanying planning and investment decision-making.

DAF plays an important role in helping primary producers manage their business through a range of drought services, including financial assistance, livestock nutrition and animal welfare information, and business-management strategies. More discussion on drought management is provided in Section 2.5.

Designing and adapting infrastructure for a changing climate

Climate-adapted and disaster-resilient infrastructure can be more cost-effective in the long term, as it reduces the need for repairs or relocation due to environmental impacts. Accordingly, it is important to consider the effects of climate change when designing new infrastructure and adapting existing infrastructure.

New infrastructure

The Queensland Government recognises climate change as a challenge in its State infrastructure plan. This plan highlights the need for adaptation, in particular to build resilience within infrastructure networks and ensure the safety, reliability and connectivity of these networks are maximised during extreme events.

One State infrastructure plan implementation action is that, through the Building Queensland project assessment process, government projects greater than $100 million in value will include a sustainability assessment across the design, construction and operation of infrastructure. Assessments are also recommended for projects worth less than $100 million.

Existing infrastructure

Existing bulk water infrastructure is susceptible to the impacts of climate change. As discussed, climate change may reduce the performance of bulk water supply infrastructure, including reduced water supply yields and water quality. In addition, infrastructure can be affected directly by extreme weather events such as droughts, floods, storms and cyclones. The risk of damage to infrastructure escalates as it is exposed to increasingly extreme climate-related events (natural disasters).

Adaptation strategies for infrastructure can include:
- adjusting the capacity of infrastructure elements
- undertaking modifications including retrofitting or replacing infrastructure components
- delaying action until new information is available
- relying on insurance to cover damage.

Each of these strategies depends on responsive management to achieve the best possible outcome.

5.2 Flood mitigation

A recent history of flooding of urban areas across Queensland, in particular in 2011 and 2013, has put a focus on flood mitigation and operational strategies for managing dams (whether or not they have dedicated flood mitigation capacity). The 2011 flood events forced thousands of people to be evacuated from towns and cities across the state, much of the state was declared a disaster zone and a significant damage bill was incurred.

Reducing or mitigating the social, environmental and economic impacts of floods is likely to be an increasing driver for investment in bulk water storage infrastructure. All dams provide a limited mitigating effect on floods. However, only a small number of Queensland dams (such as Wivenhoe and Somerset dams in South East Queensland and Peter Faust Dam in the Whitsunday region) have been specifically
designed to provide flood mitigation in addition to providing water supplies.

Following the flooding events of 2011, a number of recommendations were made (including reviewing operating strategies) to support increasing flood mitigation capacity, particularly in the heavily populated south-east corner. These included increasing flood mitigation capacities of existing storages, reviewing operating strategies and building new storages.

Flood mitigation solutions for a community might include development of specific infrastructure, such as dedicated flood mitigation compartments in dams, ‘dry’ dams or stormwater detention basins, or levees. Solutions could also include a combination of infrastructure development, changes to operational practices and investment in community resilience to flooding events.

Increasing the flood mitigation capacity of existing storages to better protect downstream properties, communities and major population centres is often not possible without affecting water supply security, unless major works are considered. It is often necessary to strike a balance between acceptable levels of flood mitigation and the provision of appropriate water supply security.

There have been recent reviews of this balance in a number of Queensland communities. For example, following a significant flooding event in the Callide Valley in 2015, DNRME, Callide dam owner (SunWater) and Banana Shire Council engaged with the community to assess whether the existing dam could be operated in alternative ways to deliver more effective flood mitigation while maintaining water supply security. In addition, the Wivenhoe and Somerset dams optimisation study investigated alternative strategies for operating those dams during floods to achieve a more appropriate balance between flood mitigation and water supply security. Seqwater has implemented relevant changes to achieve an optimal outcome.

It should be noted that traditional project assessment techniques are difficult to apply to flood mitigation proposals. This type of infrastructure can have a significant gap between commercial and economic viability due to the broad economic benefits to multiple residents and businesses, with a limited ability to recover specific costs related to flood mitigation from these beneficiaries.

5.3 Dam safety upgrades

In Queensland, the responsibility for the safety of a dam rests with the dam owner. This includes dams owned by state and local governments, and other entities such as mining companies and farmers.

One of the critical drivers for capital spending by state-owned bulk water providers over the next few decades is the need to upgrade dams and spillways to meet state regulatory requirements for safety, which is linked to guidelines prepared by the Australian National Committee on Large Dams. These guidelines and standards are designed to ensure that dams and weirs are designed to appropriate standards.

The guidelines seek to ensure that, from a risk management perspective, the failure of a large dam is an exceedingly rare event. The assessments are very complex but, as an example, they set the target for each existing dam so the risk to any one person is lower than 1 in 10,000 annual exceedance probability— in other words, there is less than a 1 in 10,000 chance of loss of life associated with dam failure in any given year. The standards get more stringent when more people downstream are at risk. By contrast, land use planning on a flood plain is generally based on a 1 in 100 annual exceedance probability. The overall risk levels in the dam safety standards are consistent with similar standards around the world.

In 2003, the Bureau of Meteorology issued updated ‘probable maximum precipitation’ estimates, which had an impact on the calculation of the ‘probable maximum flood’. The changes to the probable maximum flood calculation mean that many of the large dams built before 2003 may no longer be compliant with current guidelines and will require upgrading. This is reflected in the program of projects described in Section 4.1.

The combination of updated rainfall information, downstream population growth and changes to state regulatory guidelines and Australian National Committee on Large Dams industry standard guidelines means that some dam owners (including SunWater and Seqwater) are required to upgrade applicable dams.

The Queensland Government Guidelines on acceptable flood capacity for water dams: July 2017 provide a schedule for dam upgrades to reduce life safety risks and meet the minimum required standards by 2035. While a number of dams have already been upgraded, more work still needs to be done. Seqwater
and SunWater have assessed the risks associated with their dam portfolios and are working to design and implement improvements in a staged manner consistent with the regulations and guidelines. Both organisations have made substantial capital allocations in their forward budgets to accommodate the costs, and these are refined and updated regularly as new information becomes available.

5.4 Protecting the environment and the Great Barrier Reef

Bulk water supply infrastructure can provide many economic benefits to the community; however, there can be environmental impacts associated with their development and operation that must be appropriately managed. Activities that make use of the water (such as agriculture, mining, industry and urban development) can also have material and ongoing impacts on the environment that need to be assessed and managed through the relevant environmental assessment processes.

Challenges

There are many challenges associated with the supply of bulk water. Dams and weirs can have major impacts on aquatic ecosystems if not planned and managed well. They create physical barriers to the passage of fish and other fauna, as well as manipulating in-stream flow velocities—both of which have impacts on breeding and population health.

Bulk water supply for irrigation is also associated with potential environmental risks such as irrigation salinity or nutrient run-off into waterways or other sensitive coastal environments.

The Great Barrier Reef is facing a number of challenges. Concern about the health of the Reef has heightened following multiple mass bleaching events in the last 20 years. The back to back events in 2016 and 2017 were unprecedented and collectively affected two thirds of the Great Barrier Reef.

The Great Barrier Reef outlook report 2014 stated that the highest risks to the health and resilience of the Reef are:

- climate change (i.e. stronger storms, flooding, thermal stress)
- land-based soil run-off (with the greatest impact on the inshore areas)
- coastal land-use change
- aspects of direct use (e.g. fishing, shipping, port activities).

The impact that results from any one individual risk might be minor if considered alone, but collectively these risks are likely to (and have already) lead to a major impact on the Reef. In addition, risks considered low at the scale of the whole Reef, which extends 2300 kilometres along the Queensland coast, can still have local impacts.

The development of new water storages is usually associated with agricultural expansion or intensification that, by their nature, can also lead to land-use changes. Bulk water infrastructure, such as large dams, can have a direct impact on water quality downstream as they can alter the natural volumes of water flowing into a watercourse and change the chemical composition of its flow. However, it is the activities that benefit from bulk water supply, such as irrigation, that are a direct cause of land-based run-off of nutrients and sediment. Indeed, the main source of excess nutrients, fine sediments and pesticides from Reef catchments is diffuse source pollution from agriculture and grazing. As such, the Queensland Government’s focus has been on working with farmers to improve the quality of water in the Reef by improving land management in Reef catchments.

21 www.aims.gov.au (Australian Institute of Marine Science)
Commitments

The Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan) is the overarching framework for protecting and managing the Reef until 2050. The plan, updated in July 2018, sets clear actions, targets, objectives and outcomes to drive and guide the short, medium and long-term management of the Reef.

Improving water quality in the Reef is a major theme under the Reef 2050 Plan, supported by the Reef 2050 Water Quality Improvement Plan 2017–22 (Reef 2050 WQIP) which addresses all land-based sources of water pollution including run-off from urban, industrial, agricultural and public lands adjacent to the Reef. The Reef 2050 WQIP responds to the findings of the 2017 Scientific Consensus Statement and recommendations made by the Great Barrier Reef Water Science Taskforce.

As part of the Reef 2050 WQIP, the Queensland and Australian governments have committed to new water quality targets at the catchment, region and whole-of-Reef scale. The end-of-catchment water quality targets take into account local situations for areas of the Reef affected by each river. This will support better targeting and prioritisation of on-ground management and investment. The targets for sediments, particulate nutrients and dissolved inorganic nitrogen are based on the quality of water that corals and seagrass need to be healthy. They are calculated as reductions in anthropogenic loads—the pollutant load from human activities. The whole-of-Reef targets include reducing anthropogenic end-of-catchment dissolved inorganic nitrogen loads by 60% by 2025, and reducing anthropogenic end-of-catchment fine sediment loads by 25% by 2025.

The Queensland Reef Water Quality Program and bulk water infrastructure

The Queensland Reef Water Quality Program (QRWQP) is the Queensland Government’s five year program of actions (until 2022) to implement the recommendations of the Great Barrier Reef Water Science Taskforce (delivered in May 2016). The QRWQP aims to improve the quality of waters flowing to the reef. The QRWQP is supported by a five year investment plan of more than $261 million to accelerate progress towards water targets, achieve minimum standards of practice across all land uses, encourage a culture of innovation and stewardship, and restore catchments. These actions are supported by programs to fill science and knowledge gaps, develop decision support tools, and monitor, evaluate and report on progress towards water quality targets.

Minimum practice standards will be applied across all relevant industries and land uses in reef catchments to improve the quality of water in waterways flowing to the Reef. Achieving this will remove the highest risk practices to deliver a step-change in progress towards the water quality targets across all reef catchments. The Queensland Government, in collaboration with its partners, will leverage off existing regulations for urban and industrial land uses and, where necessary, expand regulation for all agricultural land uses. Adoption of minimum standards of agricultural practice will be achieved by a combination of voluntary, industry-led best management practice programs and regulation.

Implications

Over and above obtaining the standard environmental approvals required for new bulk water infrastructure, proponents seeking to expand existing infrastructure or develop new bulk water infrastructure will need to take into account policies and regulations to meet the Great Barrier Reef water quality targets. This will include 9 of the 15 Queensland proposals being assessed under the NWIDF, as they are based in catchments with inflows into the Reef.

5.5 Diversifying supply

In Australia, water for urban, agricultural and industrial use has traditionally been sourced from surface and groundwater resources using infrastructure, including dams, weirs and bores. Developing and accessing alternative water supplies will increase diversity, increase resilience and improve the overall security of supply for both non-drinking and drinking purposes. These alternative supplies include municipal and industrial waste water recycling, desalination, coal seam gas water, rain water and storm water.

As our population grows and our climate future becomes more uncertain, a push towards diversification of water supplies, with an increased proportion of climate resilient water may become necessary. The role of demand management initiatives will also become more significant. Best practice water supply planning must take into account the technical,
environmental, social and economic impacts and benefits of potential water supply sources. The focus will always be on sustainably providing safe, reliable and affordable water supplies that are fit for purpose and support long-term economic benefits for our state.

**Groundwater**

The *Water Act 2000* provides the framework for the sustainable management of Queensland’s groundwater resources, including managing the impacts of the resource sector on underground water. A number of management areas have been established in Queensland to protect underground water resources. These include groundwater management areas and sub-artesian management areas. Within these areas, a water licence is generally required to take underground water, and an authorisation to construct works may also be required. Groundwater allocations can be traded in the same manner as surface water allocations, in accordance with the specific rules (water dealing rules and seasonal water assignment rules) provided in the relevant water management protocol or operations manual. The current Queensland regulatory framework for water management also includes a role for the Office of Groundwater Impact Assessment (OGIA), to assess and manage the cumulative impacts from groundwater extraction by the resource sector.

**Recycled Water**

Recycled water is generated from sewage, greywater or storm water systems and treated to a standard that is appropriate for its intended use. In Queensland, recycled water that is produced from sewage, effluent or wastewater from municipal, industrial, commercial, manufacturing or animal husbandry activities is regulated under the *Water Supply (Safety and Reliability) Act 2008*. Indirect reuse of recycled water to augment raw water supplies upstream of a water treatment plant is permitted in Queensland. However, direct reuse by injection of recycled water into the drinking water system is not permissible. An approved Recycled water management plan is required for all high exposure uses (such as indirect reuse, supply to premises and the irrigation of minimally processed food crops) and some prescribed low exposure uses of recycled water. In 2018 there were 169 registered recycled water schemes in Queensland. The majority of these are owned and managed by local governments using treated wastewater effluent for irrigation of parks and gardens. In 2016–17, 77% of service providers that reported recycled water programs also reported they did not impose restrictions, while 79% of service providers that reported imposing restrictions did not have an active recycled water program.

**Coal Seam Gas Water**

Coal seam gas (CSG) is natural gas (predominately methane) trapped in underground coal seams by water and ground pressure. CSG accounts for about 90% of Queensland’s natural gas supply and fuels about 17% of the state’s electricity generation. To produce CSG, wells are drilled into underground coal seams, releasing the gas which brings water (CSG water) from the seams to the surface. The management of CSG water is heavily regulated through the *Petroleum and Gas (Production and Safety) Act 2004*, the *Water Act 2000* and the *Environmental Protection Act 1994*. Beneficial reuse of CSG water in a way that protects the environment and maximises its productive use is strongly encouraged. The quality of CSG water varies greatly, however it is generally rich in salts and other minerals, requiring some degree of desalination or treatment to make it usable. The amount of CSG water produced varies over the life of a project depending on a range of factors; however, the largest volumes are generally recovered in the early stages of CSG production, decreasing exponentially over time.

Over the proposed life of all current CSG projects in Queensland, an estimated 1,700,000 ML of water will be produced. Recent studies collating data from each of the major Queensland CSG producers have found water production from the Surat Basin CSG operations average 55,000 ML per annum. By comparison, Queensland agricultural producers have averaged about 2,500,000 ML of water use, each year for the last three years. In 2014, about 97% of associated water from Queensland CSG activity was treated and the majority supplied for irrigation or reinjected into aquifers for future use. Treated CSG water is also used for some industrial purposes such as mining and construction, and to supplement raw water supplies to some urban communities.

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Desalination

Desalination is a process for removing salt and other minerals from seawater or brackish water (surface or groundwater), to produce high quality water for drinking and other uses. There are two main desalination methods—distillation and reverse osmosis. All desalination processes require energy input, with energy recovery techniques used to improve the efficiency of the process. The waste brine stream containing the salt may be discharged back into the environment (e.g. by ocean outfall or blending with freshwater) or the salt may be recovered as a by-product of the process (e.g. using evaporation ponds).

In Queensland, desalination plants are used to provide water in a range of scenarios including at remote locations such as island resorts and indigenous communities, in rural communities with saline groundwater such as Dalby, and at large scale at Tugun near the Gold Coast (133 ML per day). Further discussion on portable desalination is provided in Section 6.6.

5.6 Getting the balance right

Water infrastructure projects are typically long-life assets with demands developing over a long period of time. It is sometimes many decades before the full supply potential is taken up. These projects are often not commercially viable on construction and the private sector is often reluctant to assume the investment risk.

The Queensland Government has a role in driving sustainable regional economic development, and bulk water supply can be a key enabler. There are many demands on the state’s limited funds and the key issue is how the state government (with the involvement of its various stakeholders) prioritises expenditure for bulk water supply and invests in opportunities for the future of the community.

There is an imperative that governments spend ever more wisely on ideas and projects that provide quality economic and community outcomes, and this means planning for the best use of the existing water resources and bulk water infrastructure, and consider the benefits of new infrastructure to grow Queensland’s economy.
Planning to maximise economic benefit: Is new bulk water supply infrastructure the solution?

Before a proposal for new bulk water supply infrastructure is developed, a range of factors need to be considered. These include identification of a need or water supply issue, the potential benefits, consideration of what water resources may be available, evaluation of options to service the need, and assessment of capacity to pay for development and ongoing operation and maintenance of new infrastructure.

**Identifying the need and benefits**

Identifying and clarifying the water supply need or issue is an important step prior to considering new bulk water supply development. Undertaking and completing this step will allow an understanding of factors such as the scale of demand, level of commitment from potential customers, type of water products required and areas where further work is required. This will inform subsequent actions and guide which water supply options, including non-infrastructure options, should be further investigated. Equally important is understanding what benefits could be realised by addressing the need or issue. Ultimately, a significant net commercial or economic benefit must be clearly demonstrated before a project has any chance of proceeding.

**Availability of water in the relevant water plan**

Not all areas of Queensland have water reserves identified in the water plans that could be accessed through development of new bulk water supply infrastructure. In some circumstances, the water reserves may be put aside for other uses or may not provide water products that will meet the identified need—for example, there may not be the right reliability of supply.

**Water supply options**

All potential water supply options should be assessed, including both infrastructure and non-infrastructure (such as market options). There may also be merit in considering demand management and efficiency initiatives such as improved irrigation practices or lining of irrigation channels.

When considering water supply options, it is important to understand the current use and products, as well as the additional requirements. Infrastructure and non-infrastructure options need to be considered in the long list of options, and only through evaluation against agreed criteria can options be shortlisted. In many circumstances, an approach centered around efficient and appropriate use of existing developed water resources can delay the need for expensive new infrastructure. See Section 6.6 on new technologies and approaches.

**State government consideration**

The state government will consider investing in proposals for new bulk water infrastructure that are well supported with evidence and analysis that proves the need and the benefits, demonstrates alignment with water planning arrangements and justifies the preferred option. If a local government is the project proponent seeking state investment, they should also demonstrate that they have worked with the Queensland Treasury Corporation and considered all other funding avenues.

If it is determined that new bulk water infrastructure is required, a proposal will need to be assessed against Queensland Treasury’s Project Assessment Framework (or Building Queensland’s Business Case Development Framework as appropriate) and guided by principles of best practice assessment (see Section 6.5). Relevant state agencies, bulk water entities and the project proponent will work together to progress the project through the various decision gates and processes put in place to ensure state funds continue to be spent prudently and efficiently.
6 Key policy initiatives and opportunities

6.1 Prioritisation of bulk water supply infrastructure for government consideration (DNRME)

The opportunity
In 2017, DNRME assumed an oversight role to coordinate the prioritisation of bulk water supply infrastructure proposals that have significant economic benefits to the state and for which state government funding may be requested. DNRME will be supported in this oversight role by bulk water entities and the DSDMIP, with input from DAF, DLGRMA and other agencies to ensure projects support regional economic development.

The DNRME role includes a high-level evaluation of historic and new water bulk infrastructure proposals, including those being assessed under the NWIDF. The prioritisation project will explore all bulk water infrastructure proposals, including those that are either unlikely to be commercial in nature or that are commercial but the net economic benefits to the state are uncertain. This evaluation will focus particularly on locations where water availability is the major constraint to economic growth. Assessments will include consideration of non-infrastructure options, environmental and social issues, and economic costs and benefits.

Progress and next steps
An outline of the key components, timing and resource requirements for the project have been developed and components of work that are currently progressing include:

• Establishing a prioritisation framework—a conceptual framework for considering and prioritising bulk water proposals is being developed. The framework will utilise a high-level screening process to identify proposals that are suitable for advancing to comparative evaluation. Preliminary data collection and management tools, filtering criteria (fatal flaws analysis) and analyses techniques will be used to evaluate technical, economic, environmental and social impacts associated with proposals.

• Regional needs and opportunity assessment—work has commenced to identify information sources that will inform identification of regions that may need additional water supplies or that have opportunities to utilise additional water to support the expansion of regional economies. The information gathered will be a critical input into the assessment of potential project benefits and guide the prioritisation of project proposals.

• Historical benefits review—work has commenced to review and assess the historical, financial, economic and social costs and benefits of selected bulk water supply infrastructure assets. The findings of two case studies will be used to refine the assessment methodology applied as part of the prioritisation framework.

• Information and data collection—to support the project prioritisation program, work has commenced on gathering, reviewing and, where necessary, updating previous proposal studies and investigations.

The next tranche of works in the project program will focus on developing the detailed assessment methodology and utilising case study areas for testing. This process will direct refinements before the first phase of screening commences. Project prioritisation will be an ongoing process, resulting in a list of priority projects for input to the state regional and infrastructure planning processes.
6.2 Making information available (DNRME)

The opportunity

Making accurate information easily accessible has the potential to significantly contribute to increased use of our available water resources and better use of existing infrastructure. To support commercial decision-making, water resource information needs to be relevant, from a trusted source, current, accurate, timely and internally consistent.

The Queensland Government is committed to better servicing the water information needs of all stakeholders, including existing and potential water customers, bulk water entities and industry professionals. This will require relevant agencies to coordinate efforts to provide the necessary information, in terms of both data and processes, for accessing water.

Progress and next steps

The Government’s new RWMP aims to deliver improved water information systems that will link with online tools and platforms, providing real time and accurate information about entitlements, water availability and access rules. The systems will facilitate self-service for many enquiries, and improve client experience and advice for more complex issues. Service models and/or business arrangements that provide proactive assistance to existing users and investors will be considered as the program develops and as water market and trading tools and information offerings develop.

In the interim, DNRME have developed the Water Information Viewer. This tool shows users where existing entitlements are located, and the development and testing work is progressing with plans to enhance the tool to include information on actual water availability. Other water information availability developments include:

- DNRME has committed to a quarterly update of key data sets supporting the Water Information Viewer - work is progressing on this.
- Water information products available through the Queensland Globe and Open Data portal have been updated.

- The water entitlement portal under the Business Queensland website has been augmented to include meter reading and water use data.
- All current water plan spatial information layers (plan boundaries, scheme areas, water management areas, trading zones) are now available on the Queensland Globe.
- New Business Queensland website content has been developed, including water summary information, links and search functionality.

6.3 Markets, trading and product review (DNRME)

The management of surface water resources within Queensland is undertaken on a catchment basis via a water plan (previously water resource plan), a water management protocol (previously a resource operations plan) and, if required, ROLs, distribution operations licences and supporting operations manuals. A water plan sets the boundaries within which the water resources of that catchment must be managed and defines the specific way in which water management is to be achieved, including water trading zones and rules for the catchment.

The water plan may enable three water markets to operate within selected Queensland catchments:

- a water allocation market that deals in the permanent trade of registered water allocation titles
- a seasonal water assignment market in which seasonal assignment of water available under allocations and other entitlements are temporarily traded for up to 12 months
- a relocatable water licence market in which water licences may be relocated from one parcel of land to another on a permanent or seasonal basis.

More than 75% of the water in Queensland is held by entitlement holders as water allocations—the majority of which are surface water allocations. Permanent trading of surface water allocations involves the transfer of a water allocation title, similar to the sale of a land title. These dealings must be registered in the Water Allocations Register, and may need to be approved by DNRME.

Seasonal water assignments are temporary trades of water to meet short-term water needs—some or all of the water that may be taken under a water entitlement
in a water year can be assigned to another person or place. Both supplemented and unsupplemented water can be seasonally assigned but different processes and rules apply. Temporary trades are approved by the ROL holder for supplemented schemes and by DNRME for unsupplemented water. However, temporary trade prices are not currently required to be reported.

The opportunity

There are lower levels of permanent and seasonal trades in Queensland water markets compared with the levels of trade in southern Australian water markets. Queensland’s hydrology and climate are significantly different from other states and the market arrangements are tailored to these differences, which translates into less market liquidity. For example, Queensland has disconnected catchments with smaller numbers of market participants and less regulated water infrastructure.

As identified in Section 3.3, there is significant latent capacity in existing bulk water supply systems. Facilitating an increase in water market activity, including by removing any unnecessary constraints, could potentially increase the uptake of supplemented water, unsupplemented water and groundwater resources that are under-utilised, not used, uncommitted or unallocated across Queensland.

Even in highly utilised schemes there is an opportunity for water trading to continue, driving efficient water use and delivering economic benefits (including if users are holding more allocation than they need as a risk mitigation measure). Furthermore, a water market that is perceived as well functioning may result in risk-averse entitlement holders being more confident/comfortable with trading. This may increase water use or offer surplus water for sale, facilitating the movement of water to customers that need it most or are willing to pay a premium.

Trading activity could be supported through actions that improve price declaration and market formation; however, improvements are likely to need both process and regulatory changes. In 2019, DNRME will work with stakeholders to review trading arrangements and the function of water markets in Queensland.

Progress and next steps

The RWMP includes a new trading and markets component, pursuing opportunities to maximise the value of Queensland’s water resources by enhancing our water markets and trading regime. This will enable the optimal use of Queensland’s water entitlements and introduce mechanisms to mobilise water that is being underutilised not only in the supplemented schemes, but expanding on the QBWOS initiative, to include unsupplemented catchment areas for both surface and groundwater resources of Queensland.

As part of changes made to the Water Act 2000 in 2018, a ROL and distribution licence now has the ability to require the holder to collect and publish customers’ supplemented seasonal water assignment sale price information. This information will complement existing available price information for permanent water trades.

DNRME initiated a partnership with key industry stakeholders in June 2018 to better understand water usage practices and to develop recommendations to achieve better utilisation of latent capacity to support economic development objectives. The findings will be reviewed and implemented as soon as practical.

SunWater Online Water Trading Platform Program: SunWater has a program to adopt an online open water trading platform available to all market participants, which will provide free live trading data to anyone viewing the site. Including SunWater’s allocations in this platform will increase public transparency on SunWater’s water trading practices. Additionally, as the largest holder of available allocations for trade in Queensland, the use of this platform has the potential to encourage other users adoption and attract a large amount of market information to become freely available for public use. SunWater has invited open water trading platforms providers to submit an Expression of Interest and is currently assessing the responses.
6.4 Improving access to unallocated water (DNRME)

The opportunity

As part of using existing bulk water supply infrastructure better, DNRME has a role in reducing constraints to the access of water. One of the constraints to increased supply of available water from existing bulk water supply infrastructure is the process of unallocated water releases.

Progress and next steps

Progress on improving access to unallocated water includes:

• A review and update of priority projects relating to unallocated water has been completed and an operational policy for releasing unallocated water has been developed.

• Three options for releasing unallocated water have been trialed, these include:
  – tender in the Gulf, Whitsundays, Baffle Creek catchments
  – fixed price in the Gulf, Whitsundays and GABORA
  – auction in the Wet Tropics.

• The Government’s new RWMP expands on the QBWOS initiative, to include further releases in unsupplemented catchment areas for both surface and groundwater resources of Queensland to maximize the utility of Queensland’s water resources.

• As part of changes made to the Water Act 2000 in 2018, there is now the capacity to release water reserves to support short-term economic development opportunities for a period of up to three years such as in areas without an active water market. A pilot is in development to trial temporary products where the conditions are favorable and where infrastructure is not proposed in the short to medium term.

SunWater is also progressing an initiative targeted specifically at increasing the utilisation of uncommitted water in Paradise Dam. Progress on a review of water pricing arrangements is discussed in Section 6.7.
6.5 Best practice project assessment (DNRME and Queensland Treasury)

Investment decision-making should be a logical, phased process that takes account of all relevant information and clearly addresses the identified and inherent uncertainties of long-lived assets such as large water supply infrastructure. The process must also be flexible enough to incorporate new information as it becomes available. Queensland has a well-established project assessment framework in place, including guidance on investment decision-making provided by Queensland Treasury, Building Queensland and other state entities. Figure 8 presents the alignment of some of these key processes (source: Building Queensland, Business case development framework: strategic business case—template and guide: April 2016).

Figure 8: Alignment of key project assessment processes (Source: Building Queensland 2016)
The opportunity

To complement the current process for assessing proposed bulk water supply infrastructure proposals, the government has committed to considering some additional requirements for bulk water providers. This is critical to ensure that scarce government funds are focused on the investigation of water infrastructure projects that have the best chance of delivering a net public benefit to Queensland.

The requirements under consideration will be based on the following principles:

1. Analysis of water demand is informed by direct engagement with potential customers, who have been provided with estimates of the availability and security of water to be supplied and the potential charges likely to be associated with water delivery.

2. Estimates for water charges that are presented to potential customers as part of demand analysis are underpinned by preliminary strategic and technical assessment of infrastructure options.

3. There should be secure customer commitment (through formal arrangements between the proponent and the customers) prior to any state government funding of bulk water supply infrastructure projects.

4. If a government contribution is necessary to enable a project to proceed, the government should be presented with a business case that addresses the above matters prior to the commencement of more detailed and costly assessments (including environmental impact assessments and any potential environmental impact statement).

Appendix 2 provides a summary of current arrangements for project assessment.

Progress and next steps

DNRME has worked with QT, BQ and DPC, to develop draft guidelines to ensure assessment of bulk water proposals is consistent with the objectives and principles described in this Queensland Bulk Water Opportunities Statement. The guidelines are intended to supplement existing assessment frameworks, with a focus on factors relating to demand risks, optimism bias and financial risk. The guidelines will apply to all bulk water infrastructure proposals that are seeking government funding, regardless of size.

Prior to finalisation of the guidelines into a policy, DNRME will consult with key stakeholders. The most appropriate mechanism for implementation will also be determined, with a target completion date for the project of early 2019.

6.6 New technologies and approaches for the future (DNRME)

The construction of traditional new bulk water supply infrastructure, such as dams and weirs, is one of a number of options for delivering water security solutions to a community or region. This option can require significant capital and ongoing expenditure, and there may often be a more cost-effective solution to meet demand. Across the state there is ageing bulk water infrastructure that needs ongoing maintenance and much of it requires costly upgrades (e.g. dam safety spillway upgrades to meet acceptable flood capacity guidelines). Any new infrastructure will come with the same liability.

The opportunity

As new opportunities for high-performing traditional infrastructure are exhausted, and climate change impacts such as evaporation and rainfall intensity increase, development of water security solutions will need to consider all available options, including new technologies and approaches. Queensland may benefit from increased uptake of new technologies, new approaches to improved use of existing bulk water supply infrastructure and potential alternatives to new infrastructure.

Water supply infrastructure of any kind should be part of a holistic solution with multiple benefits and, as with any development, new technologies and approaches need to satisfy all requirements for environmental and other approvals. Preliminary screening of potential options (technological or efficiency) identified the following technologies that may warrant further investigation and consideration:

- Aquifer recharge—introduce additional water by pumping into an aquifer for withdrawal later (less evaporation than surface storage and can be employed for either storing seasonal peaks from run-off-river flows or reclaimed wastewater).
• Evaporation covers—solid or fluid materials can be placed over the water surfaces to minimise evaporation.
• Irrigation mosaics—smaller discrete patches of irrigated land are dispersed across the landscape, offering a potentially more water-efficient alternative to traditional large-scale contiguous irrigation systems.
• Irrigation scheduling—tensiometers give estimates of soil moisture content and indicate when irrigation is required, reducing the volume of irrigation.
• Leakage prevention—same-day repairs, early detection and pipe material developments can reduce possible resulting damage, including subsidence of roads and muddying of water.
• Sand dams—Simple, low-cost and low-maintenance impermeable weir constructed across a seasonal sandy river that captures rain and suspended sand (the sand matrix significantly reduces evaporation).
• Smart technology—instantaneous feedback is provided to residents on daily water and energy use through an in-home device or smart phone/tablet app (can include incentive program and gamification).
• Solar desalination—direct or indirect type plants where the solar array is either coupled with or separate from the distillation mechanism (these plants are typically provided as a package installation of varying scales).
• Solar pumping—solar-powered bulk water pumping used in conjunction with balancing storage and more power-efficient, soft-start pumps.
• Subsurface irrigation—subsurface drip or textile system for direct application of water or reclaimed wastewater to plant roots, minimising evaporation.
• Underground weirs—impermeable barrier down to the clay lens, creating water storage.

Progress and next steps

Considering the list of potential technologies listed above, and the following criteria, two new technologies have been short-listed for further investigation—underground technologies and portable desalination plants. These technologies were selected for investigation based on their potential to augment supply in a broad range of situations compared to the majority of technologies identified through the preliminary screening that are directed towards water use efficiency improvements.

The underground technologies project considers three opportunities for increasing the yield and long-term reliability of a water systems: sand dams, underground weirs and managed aquifer recharge. The portable desalination plants project has potential applications as an emergency source of supply using brackish water or groundwater high in total solids and/or fluorides. Investigating portable desalination plants was considered a valuable opportunity to capture and pass on experiences with portable desalination units. The following works are progressing as part of the technology investigations.

Underground technologies

Underground technologies is a group of related water supply options including sand dams, underground weirs and managed aquifer recharge. An underground weir is a ‘below stream bed’ storage created by a barrier constructed within the bed sands of a watercourse. It is also a form of managed aquifer recharge. The barrier obstructs the flow of water through the bed sands, allowing for continued access to water that would otherwise drain downstream.

A desktop pre-feasibility assessment has commenced, investigating the potential applicability of underground technologies in Queensland. The assessments will develop and prioritise key suitability parameters and identify areas where there may be a potential for the use of underground technologies. Key performance indicators and survey data provided by Queensland water service providers will be used to identify water-critical locations (where there is 12 months or less water supply) and these will be cross-referenced against areas where underground technologies may have potential.

Regional deployment of portable desalination plants

Portable desalination plants can provide temporary and permanent water supply solutions using seawater or brackish water as a feed. This concept evaluation project involves a review of existing portable desalination plants in Australia that could be made available for deployment to Queensland regional centres to provide temporary drinking water supplies in times of drought or other emergencies. A request for information enquiry was sent to federal (including Queensland bulk water opportunities statement

61
military), state and local government, and 18 private plant owners of portable desalination plants. The study also includes assessments and costings for six sample sites (inland, coastal and island communities) to develop an understanding of the issues related to the emergency deployment of desalination plants in these areas. A scan of other portable desalination plant use, both nationally and internationally is also being conducted.

Dependent on the findings of these preliminary studies, it is expected that further local based investigations will then be required to prove the potential of the technologies at specific sites. Investigation of more new technologies will be prioritised based on the results of a review (yet to be completed) of the technologies and measures utilised in Queensland, Australia and overseas. However, it is also recognised that sustainable bulk water supply requires consideration of efficient water use along-side that of new and existing technologies. Growing interest in planning for water sensitive cities suggests there are opportunities to improve resilience through supply diversification, community education and demand management strategies.

### 6.7 SunWater initiatives

#### The opportunity

SunWater holds the ROLs for 23 of the state’s 42 regulated water supply schemes. As such, they have a substantial ability to influence how water is managed and utilised across the state, including unsold and underutilised water allocations. If a proposed bulk water supply infrastructure project to support economic development requires state government funding and is to be owned and operated by SunWater, there is currently provision for SunWater to assess whether the proposal is in its commercial interests. The government has recognised the important role that SunWater plays in supporting projects that may not provide a full commercial return to SunWater but may be economically beneficial to the state.23

The state is further investigating options relating to its shareholder’s mandate for SunWater, and SunWater is undertaking a number of projects to support the Queensland Government’s objectives for bulk water supply.

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**Progress and next steps**

#### Shareholders mandate

The Queensland Government has been working with SunWater on how it can contribute to the Government’s regional economic development objectives. The Queensland Government articulates its guidance to the SunWater board through its shareholder mandate. The shareholder mandate is currently under review and will articulate how SunWater will contribute to the Queensland Government’s economic development objectives. The shareholder mandate is expected to be issued in early 2019.

#### SunWater regional blueprint

SunWater is developing the SunWater Regional Blueprint (the Blueprint) - a strategy for achieving increased availability of water from the regulated water supply schemes managed by SunWater. The Blueprint analyses risks and opportunities on a regional basis, including supply constraints and demand drivers such as electricity costs and outlooks for commodity prices. It explores a number of scenarios for how water demand might look in the future, and identifies products and services that will be required to address future customer needs arising from the potential scenarios. The Blueprint considers the need for large-scale projects that provide a step-change in water supply volumes, but also new water products, modified charging regimes to encourage demand up-take, efficiency initiatives and infrastructure enhancements that maximise the usage and benefits of SunWater existing assets.

The first stage of the Blueprint development consolidates water supply initiatives that SunWater has previously identified, focusing on the Burdekin region as a case study. As part of this stage, SunWater identified key risks and opportunities and developed a set of actions to meet these challenges. The next stage of development will introduce an economic assessment framework that allows SunWater to identify and prioritise opportunities for regional growth associated with its supply schemes.

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23 This initiative relates predominantly to regional Queensland; however, the same principles could apply to Seqwater in relation to new, non-urban infrastructure in South East Queensland.
The outputs will inform SunWater’s strategy for utilising and managing its existing asset portfolio and will form an input to the prioritisation of infrastructure to support the Queensland Government’s regional economic development objectives. Details of the Blueprint are available in SunWater’s Annual Report 2017–18 and online at www.sunwater.com.au.

Paradise Dam water pricing

Paradise Dam has significant water allocations available for sale. Only 11 per cent of the total available water capacity has been sold since 2005, leaving more than 100,000 megalitres of water available for purchase. Historically, the low water allocation volumes have resulted from low demand in the Bundaberg Water Supply Scheme area and current allocation prices for water from Paradise Dam. SunWater completed a water pricing review to develop a strategy to increase sales of uncommitted water allocations. An Expression of Interest was released to the market in September 2018 seeking interest in purchases of medium priority water allocations from Paradise Dam at a price of $550 per megalitre, reduced from $971 per megalitre. SunWater will assess the expressions of interest and proceed with water sales, consistent with the pricing strategy and within the physical capacity constraints of the network infrastructure.

6.8 Improved state subsidy programs for local government (DSDMIP and DLGRMA)

In Queensland, local governments are established by the Local Government Act 2009 and the City of Brisbane Act 2010, which drive the councils to be accountable, effective, efficient and sustainable. Local governments are responsible for the sustainable development and management of assets and infrastructure, and the delivery of effective services (including some water supply services).

It is the Queensland Government’s expectation that all councils will move toward fiscal sustainability. To support this progression, the government supports councils in the delivery of community, economic and social infrastructure projects. It provides support in many ways, including planning assistance (such as the RWSSAs discussed in Section 2.4) and direct financial subsidies and grants.

Current arrangements

Outside South East Queensland, water and sewerage services are predominantly delivered by local councils or council-owned water businesses in Queensland. There are a number of programs administered by the state government aimed at funding local government infrastructure (including water infrastructure such as water treatment plants, sewage treatment plants, pipelines and water reservoirs), which include the following:

- The Natural Disaster Resilience Program seeks to reduce communities’ vulnerability to natural hazards.
- The Building our Regions fund provides funding for critical infrastructure in regional areas that meet the specific needs of regional communities and supports economic development, including generating jobs.
- The 2017–19 Works for Queensland program supports local governments to undertake job-creating maintenance and minor infrastructure projects, including those for sewer, water and stormwater networks and systems.
- The Local Government Grants and Subsidies Program provides grants and subsidies for the purposes of providing essential public infrastructure. This includes, but is not limited to, capital infrastructure projects that are new constructions or expansions, renovations or replacements of existing facilities, water and sewerage infrastructure, and community safety infrastructure.
- The Indigenous Councils Critical Infrastructure Program supports Indigenous councils to deliver critical water, wastewater and solid waste infrastructure projects and provide a basis for the long-term strategic management of these essential assets.
- The State Government Financial Aid program is an allocation based program provided to Indigenous Councils (in lieu of rates) to assist in the delivery of essential local government services including water treatment and supply, waste water systems, gas, drainage, and flood mitigation.
To date, many of the grants and subsidy programs have provided funding for permanent, traditional infrastructure solutions—such as upgrades to water treatment plants, reservoirs and pipe networks. However, there has been an absence of financial support for initiatives that are:

- non-infrastructure solutions, such as demand management or efficiency programs
- non-permanent solutions, such as modular water and sewerage treatment programs
- alternative solutions, such as vegetation swales or floating wetlands.

The current framework tends to inhibit opportunities to implement innovative, low cost, non-infrastructure solutions that may effectively and efficiently address water supply and security issues. There is an opportunity to allow, or even require applicants seeking funding under state government grant and subsidy programs to consider alternative solutions as part of any options analysis. Funding should also be extended to include such alternative options where they are found to be feasible and preferred.

### The opportunity

Given the costs and long lifespan of water supply infrastructure, it is important to look at all types of solutions along the water supply chain (i.e. beyond the dam) that may help with water security. This may include non-infrastructure solutions such as water-use efficiency programs, management of leakage and pressure, and market mechanisms. These types of options can help defer bulk water supply infrastructure investment, with accompanying long-term cost savings.

The Queensland Government has recognised that only hard infrastructure solutions are considered under existing state funding programs.

The Government has commenced a review of the grant funding programs, aiming to:

- implement an outcome focused grants model where grant programs with common objectives are managed consistently
- align grant programs with Queensland Government priorities, council strategies and budget cycles
- reduce red tape through streamlining the administration, monitoring and reporting of grant programs
- support councils across all stages of the grant program process, including necessary long-term planning.

### Progress and next steps

The Queensland Government released its Grants to Local Government Policy Position in September 2018 to guide a model for grants funding that is simple, adaptable, coordinated, and provides value for the State, while being responsive to local government and community priorities. In 2018, the State committed $3.2 million over four years to improve and simplify the administration of grants to local government. DLGRMA has responsibility to plan and implement these improvements.

DLGRMA will work with DSDMIP, local councils and key industry stakeholders (such as the Local Government Association of Queensland) and relevant state agencies to progress the improvement of state government funding programs.
QBWOS next steps

The Queensland Government has invested heavily in bulk water supply infrastructure over many years. Much of this infrastructure is part of water supply systems that are supporting prosperous Queensland regions. New water infrastructure can bring growth opportunities and attract investment into communities; however, it can also require significant capital and ongoing expenditure. The development of new greenfield irrigation areas will also require major expenditure to establish the essential supporting and enabling infrastructure and services to support agricultural development.

The QBWOS reinforces the importance of prioritising development of new infrastructure along with options to maximise the benefits of existing infrastructure and managing the costs of continuing to keep dams safe for the future.

In addition to the bulk water infrastructure prioritisation project, key initiatives for 2019 and beyond include a focus on the further enhancement of our information provision and systems, water markets and trading regimes, as well as releasing more unsupplemented water. This will enable optimal use of Queensland’s water entitlements by introducing mechanisms to mobilise water that is being underutilised not only in the supplemented schemes, but expanding on the original QBWOS initiative, to include unsupplemented catchment areas for both surface and groundwater resources of Queensland.
Appendix 1: Details of supplemented, surface water in Queensland’s bulk water supply systems

Table A1 and A2 describe the details associated with surface water entitlements that are supplemented by bulk water infrastructure and used to meet the needs of Queensland’s urban, rural, agricultural and industrial water users.

**Table A1: Details of supplemented, surface water entitlements in all regulated water supply schemes**

<table>
<thead>
<tr>
<th>QBWOS region</th>
<th>Water supply scheme</th>
<th>Total water storage capacity (ML)</th>
<th>Total Allocations</th>
<th>Allocations for operational losses (ML)</th>
<th>Allocations available to customers (ML)</th>
<th>Allocations committed to customers (ML)</th>
<th>Uncommitted allocations available for contract, sale or lease (ML)</th>
<th>Reported 2017-2018 water delivered (ML)</th>
<th>Associated infrastructure</th>
<th>Primary water users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>Awoonga</td>
<td>777 000</td>
<td>78 000</td>
<td>78 000</td>
<td>64 000</td>
<td>14 000</td>
<td>54 191</td>
<td>14 907</td>
<td>Awoonga Dam, pipelines, pump stations, reservoirs</td>
<td>Large industry and urban water supply for Gladstone</td>
</tr>
<tr>
<td>Central</td>
<td>Callide Valley</td>
<td>151 406</td>
<td>19 449</td>
<td>19 449</td>
<td>19 449</td>
<td>14 907</td>
<td>14 907</td>
<td>Callide Dam, Kroombit Dam, Callide Creek Weir and pipelines</td>
<td>Agricultural, industry and community water supply, including for Biloela</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>Dawson Valley</td>
<td>66 266</td>
<td>61 737</td>
<td>4 005</td>
<td>57 732</td>
<td>57 595</td>
<td>137</td>
<td>55 204</td>
<td>Glebe Weir, Gyandra Weir, Orange Creek Weir, Theodore Weir, Moura Weir, Moura Offstream Storage, Neville Hewitt Weir, Selma Weir and channels</td>
<td>Agricultural, industrial and community water supply, including Theodore, Moura and Baralaba</td>
</tr>
<tr>
<td>Central</td>
<td>Eton</td>
<td>62 800</td>
<td>62 563</td>
<td>9 384</td>
<td>53 179</td>
<td>53 179</td>
<td>24 420</td>
<td>24 420</td>
<td>Kinchant Dam, channels and pipelines</td>
<td>Agricultural, industrial and community water supply</td>
</tr>
<tr>
<td>Central</td>
<td>Fitzroy Barrage</td>
<td>81 300</td>
<td>62 093</td>
<td>62 093</td>
<td>62 093</td>
<td>24 634</td>
<td>Fitzroy Barrage</td>
<td>24 634</td>
<td>Fitzroy Barrage</td>
<td>Urban potable water supply for Rockhampton, Gracemere and parts of Livingstone Shire Council, and agriculture</td>
</tr>
</tbody>
</table>

24 Total functional water storage capacity can be less than the authorised water storage capacity due to operational constraints, changes in policy or for other reasons. Storage capacity of a dam or weir can be much greater than the water captured and stored on an annual basis (due to the weather and catchment characteristics) for this reason storage capacity may be significantly larger than the total water allocations.

25 All water priority types have been added together for each scheme.

26 Authorised storage capacity for Fitzroy Barrage is listed. A bathymetric survey undertaken by Rockhampton Regional Council in 2014 indicates the full storage volume to be 74 400 ML.
<table>
<thead>
<tr>
<th>QBWOS region</th>
<th>Water supply scheme</th>
<th>Total water storage capacity (ML)</th>
<th>Total Allocations (^{25}) (ML)</th>
<th>Allocations available to operational losses (ML)</th>
<th>Allocations available to customers (ML)</th>
<th>Allocations committed to customers (ML)</th>
<th>Uncommitted allocations available for contract, sale or lease (ML)</th>
<th>Reported 2017–2018 water delivered (ML)</th>
<th>Associated infrastructure</th>
<th>Primary water users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>Lower Fitzroy</td>
<td>35 900</td>
<td>28 621</td>
<td>1 275</td>
<td>27 346</td>
<td>27 559</td>
<td>187</td>
<td>19 740</td>
<td>Eden Bann Weir</td>
<td>Industrial water supply for Stanwell Power Station and agriculture</td>
</tr>
<tr>
<td>Central</td>
<td>Nogoa Mackenzie</td>
<td>1 345 140</td>
<td>231 859</td>
<td>29 010</td>
<td>202 849</td>
<td>199 778</td>
<td>3 071</td>
<td>178 911</td>
<td>Fairbairn Dam, Selma Weir, Bedford Weir, Bingegang Weir, Tartus Weir, pipelines and channels</td>
<td>Agricultural, industrial and community water supply, including Emerald</td>
</tr>
<tr>
<td>Far North</td>
<td>Mareeba Dimbulah</td>
<td>441 610</td>
<td>204 424</td>
<td>45 000</td>
<td>159 424</td>
<td>159 424</td>
<td>117 912</td>
<td>117 912</td>
<td>Tinaroo Falls Dam, Granite Creek Weir, Bruce Weir, Leafgold Weir, Solanum Weir, Collins Weir, Dubil Weir, channels and pipelines</td>
<td>Agricultural, industrial and community water supply</td>
</tr>
<tr>
<td>North</td>
<td>Bowen Broken</td>
<td>118 573</td>
<td>38 930</td>
<td>494</td>
<td>38 436</td>
<td>38 041</td>
<td>395</td>
<td>14 099</td>
<td>Bowen River Weir (Collinsville Weir), Gattonvale offstream Storage, Eungella Dam, channels</td>
<td>Mining industry in the Bowen Coal Basin, agricultural and community water supply</td>
</tr>
<tr>
<td>North</td>
<td>Burdekin Haughton</td>
<td>1 890 455</td>
<td>1 079 593</td>
<td>206 737</td>
<td>872 856</td>
<td>791 542</td>
<td>81 313</td>
<td>636 047</td>
<td>Burdekin Falls Dam, Gorge Weir, Blue Valley Weir, Val Bird Weir, Giru Weir, Clare Weir, Haughton, Elliot and Barratta main channels, pipelines and pump stations</td>
<td>Large agricultural and mining industry in the Bowen Coal Basin and urban water supplies, including for Townsville</td>
</tr>
<tr>
<td>North</td>
<td>Paluma-Crystal</td>
<td>11 800</td>
<td>21 571</td>
<td>21 571</td>
<td>21 571</td>
<td>9 954</td>
<td>Paluma Dam, Crystal Creek Weir, pipelines</td>
<td>Urban water supply for Townsville and local communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>Pioneer River</td>
<td>160 318</td>
<td>78 130</td>
<td>78 130</td>
<td>65 830</td>
<td>12 280</td>
<td>24 984</td>
<td>Agricultural, industrial and community water supply, including for Mackay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QBWOS region</td>
<td>Water supply scheme</td>
<td>Total water storage capacity 26 (ML)</td>
<td>Total Allocations 25 (ML)</td>
<td>Allocations for operational losses (ML)</td>
<td>Allocations available to customers (ML)</td>
<td>Allocations committed to customers (ML)</td>
<td>Uncommitted allocations available for contract, sale or lease (ML)</td>
<td>Reported 2017-2018 water delivered (ML)</td>
<td>Associated infrastructure</td>
<td>Primary water users</td>
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</tr>
<tr>
<td>North</td>
<td>Proserpine River</td>
<td>491 400</td>
<td>62 876</td>
<td>62 876</td>
<td>52 359</td>
<td>30 517</td>
<td>24 380</td>
<td>Peter Faust Dam</td>
<td>Agricultural, industrial and community water supply, including for Bowen</td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>Ross River</td>
<td>233 187</td>
<td>75 000</td>
<td>75 000</td>
<td>75 000</td>
<td>9 896 27</td>
<td>Ross River Dam, Black School Weir, Pipeline connection to the Burdekin Haughton Water Supply Scheme</td>
<td>Urban water supply for Townsville</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North West</td>
<td>Julius Dam</td>
<td>107 500</td>
<td>48 850</td>
<td>1 250</td>
<td>47 600</td>
<td>36 750</td>
<td>10 850</td>
<td>Julius Dam, pipelines</td>
<td>Mining industry and urban water supply for Mount Isa and Cloncurry</td>
<td></td>
</tr>
<tr>
<td>North West</td>
<td>Moondarra Dam</td>
<td>106 833</td>
<td>26 300</td>
<td>1 250</td>
<td>25 050</td>
<td>25 050</td>
<td>13 208</td>
<td>Moondarra Dam, pipeline</td>
<td>Mining industry and urban water supply for Mount Isa</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>Central Brisbane and Stanley River</td>
<td>154 750</td>
<td>286 061</td>
<td>286 061</td>
<td>286 061</td>
<td>177 861</td>
<td></td>
<td>Wivenhoe Dam, Somerset Dam, Mount Crosby Weir</td>
<td>Urban water supply for South East Queensland</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>Central Lockyer Valley</td>
<td>32 125</td>
<td>7 201</td>
<td>184</td>
<td>7 017</td>
<td>7 017</td>
<td>1202</td>
<td>Bill Gunn Dam, Lake Clarendon, Kentville Weir, Jordan I and II Weirs, Wilson Weir, Clarendon Weir, Glenore Grove Weir, Lidley Creek Diversion Weir, Showgrounds Weir, Crowley Vale Weir, pipeline and channels</td>
<td>Agricultural, industrial and community water supply</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>Logan River</td>
<td>148 890</td>
<td>23 411</td>
<td>23 411</td>
<td>23 411</td>
<td>6 718</td>
<td></td>
<td>Maroon Dam, Wyaralong Dam, Cedar Grove Weir, Bromelton Weir, South Maclean Weir, Bromelton Offstream Storage</td>
<td>Agricultural, industrial and community water supply, including Beaudesert</td>
<td></td>
</tr>
</tbody>
</table>

27 Water for Townsville was also sourced from the Burdekin Haughton Water Supply Scheme into Ross River Dam. The delivery of 12,913 ML from the Burdekin Haughton Water Supply Scheme for the period is accounted for in the Burdekin Haughton Water Supply Scheme Statistics.
<table>
<thead>
<tr>
<th>QBWOS region</th>
<th>Water supply scheme</th>
<th>Total water storage capacity</th>
<th>Total Allocations</th>
<th>Allocations for operational losses</th>
<th>Allocations available to customers</th>
<th>Allocations committed to customers</th>
<th>Uncommitted allocations available for contract, sale or lease</th>
<th>Reported 2017–2018 water delivered</th>
<th>Associated infrastructure</th>
<th>Primary water users</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>Lower Lockyer Valley</td>
<td>31 534</td>
<td>12 620</td>
<td>1 530</td>
<td>11 110</td>
<td>11 110</td>
<td>638</td>
<td>Atkinson Dam, Buaraba Creek Diversion Weir, Brightview Weir, Sippels Weir, Potter's Weir, O'Reilly's Weir, pipeline and channels</td>
<td>Agricultural, industrial and community water supply</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>Nerang</td>
<td>317 435</td>
<td>84 000</td>
<td>84 000</td>
<td>84 000</td>
<td>53 420</td>
<td>33 504</td>
<td>Hinze Dam, Little Nerang Dam</td>
<td>Urban water supply for South East Queensland</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>Pine Valleys</td>
<td>25 000</td>
<td>59 000</td>
<td>59 000</td>
<td>59 000</td>
<td>33 504</td>
<td>53 420</td>
<td>North Pine Dam</td>
<td>Urban water supply for South East Queensland</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>Warrill Valley</td>
<td>84 152</td>
<td>29 833</td>
<td>3 714</td>
<td>26 119</td>
<td>26 119</td>
<td>7 975</td>
<td>Moogerah Dam, Upper Warrill Diversion Weir, Kents Lagoon Diversion Weir, Aratula Weir, Warrill Creek Diversion Weir, Warroolaba Creek Diversion Weir, Churchbank Weir, West Branch Warrill Diversion Weir, Railway Weir, channels</td>
<td>Agricultural, industrial and community water supply</td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>Border Rivers</td>
<td>264 043</td>
<td>84 666</td>
<td>28 900</td>
<td>55 766</td>
<td>55 766</td>
<td>42 336</td>
<td>Glenlyon Dam, Goondiwindi Weir, Glenarbon Weir, Mungindi Weir, Boggabilla Weir, Bonshaw Weir, Boomi Weir, Cunningham Weir</td>
<td>Agricultural, industry and community water supply</td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>Chinchilla Weir</td>
<td>9 780</td>
<td>4 049</td>
<td>4 049</td>
<td>4 049</td>
<td>2 207</td>
<td>2 207</td>
<td>Chinchilla Weir, pipeline</td>
<td>Agricultural, industrial and community water supply</td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>Cressbrook Creek</td>
<td>111 982</td>
<td>10 000</td>
<td>10 000</td>
<td>10 000</td>
<td>9 631</td>
<td>10 000</td>
<td>Cressbrook Creek Dam, Perseverance Creek Dam, pipeline connection to Wivenhoe Dam</td>
<td>Town water supply to Toowoomba and agriculture</td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>MacIntyre Brook</td>
<td>70 576</td>
<td>25 127</td>
<td>25 127</td>
<td>24 337</td>
<td>790</td>
<td>18 337</td>
<td>Coolmunda Dam, Greenup Weir, Whetstone Weir, Ben Dor Weir</td>
<td>Agricultural, industrial and community water supply</td>
<td></td>
</tr>
<tr>
<td>QBWOS region</td>
<td>Water supply scheme</td>
<td>Total water storage capacity</td>
<td>Total  Allocations</td>
<td>Allocations for operational losses</td>
<td>Allocations available to customers</td>
<td>Allocations committed to customers</td>
<td>Uncommitted allocations available for contract, sale or lease</td>
<td>Reported 2017–2018 water delivered</td>
<td>Associated infrastructure</td>
<td>Primary water users</td>
</tr>
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</tr>
<tr>
<td>South West</td>
<td>Maranoa River</td>
<td>1470</td>
<td>805</td>
<td>805</td>
<td>805</td>
<td>14</td>
<td>E J Beadmore Dam, Moolabah Weir, Jack Taylor Weir, Buckinbah Weir, Channels</td>
<td>82 154</td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>St George</td>
<td>99 670</td>
<td>84 575</td>
<td>9701</td>
<td>74 874</td>
<td>74 874</td>
<td>82 154</td>
<td>82 154</td>
<td>Agricultural, industrial and community water supply, including for St George</td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>Upper Condamine</td>
<td>108 780</td>
<td>33 960</td>
<td>25</td>
<td>33 935</td>
<td>33 725</td>
<td>4 291</td>
<td>4 291</td>
<td>Agricultural, industrial and community water supply, including for Warwick</td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>Cunnamulla</td>
<td>4 770</td>
<td>2 612</td>
<td>2 612</td>
<td>2 492</td>
<td>120</td>
<td>1746</td>
<td>1746</td>
<td>Agricultural and community water supply</td>
<td></td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Barker Barambah</td>
<td>136 190</td>
<td>34 315</td>
<td>34 315</td>
<td>33 512</td>
<td>803</td>
<td>10 641</td>
<td>10 641</td>
<td>Agricultural, community and industrial water supply</td>
<td></td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Baroon Pocket</td>
<td>61 000</td>
<td>36 500</td>
<td>36 500</td>
<td>36 500</td>
<td>19 949</td>
<td>Baroon Pocket Dam, tunnel and pipeline</td>
<td>19 949</td>
<td>Urban water supply for Caloundra and Maroochy areas</td>
<td></td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Boyne River and Tarong</td>
<td>204 200</td>
<td>43 405</td>
<td>1620</td>
<td>41 785</td>
<td>41 785</td>
<td>Boondooma Dam, pipeline</td>
<td>34 129</td>
<td>Industry, agricultural and community water supply</td>
<td></td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Bundaberg</td>
<td>937 420</td>
<td>380 329</td>
<td>41 520</td>
<td>338 809</td>
<td>209 978</td>
<td>128 831</td>
<td>128 831</td>
<td>Large agricultural, industry and urban water supplies, including for Bundaberg</td>
<td></td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Cedar Pocket</td>
<td>730</td>
<td>495</td>
<td>495</td>
<td>495</td>
<td>307</td>
<td>Cedar Pocket Dam</td>
<td>307</td>
<td>Agricultural</td>
<td></td>
</tr>
</tbody>
</table>

Table A1 continued
<table>
<thead>
<tr>
<th>QBWOS region</th>
<th>Water supply scheme</th>
<th>Total water storage capacity</th>
<th>Total Allocations</th>
<th>Allocations for operational losses</th>
<th>Allocations available to customers</th>
<th>Allocations committed to customers</th>
<th>Uncommitted allocations available for contract, sale or lease</th>
<th>Reported 2017–2018 water delivered</th>
<th>Associated infrastructure</th>
<th>Primary water users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Bay Burnett</td>
<td>Lower Mary River</td>
<td>26 750</td>
<td>30 409</td>
<td>4 912</td>
<td>25 497</td>
<td>19 517</td>
<td>5 980</td>
<td>7 464</td>
<td>Mary River Barrage, Tinana Barrage, pipeline, channel</td>
<td>Agricultural, industrial and community water supply, including Maryborough</td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Mary Valley</td>
<td>46 046</td>
<td>32 033</td>
<td>4 86</td>
<td>31 547</td>
<td>28 547</td>
<td>3 000</td>
<td>8 074</td>
<td>Borumba Dam, Imbil Weir, pipeline, channels</td>
<td>Agricultural, industrial and community water supply</td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Teddington Weir</td>
<td>4 095</td>
<td>10 869</td>
<td>10 869</td>
<td>10 869</td>
<td></td>
<td>3 648</td>
<td></td>
<td>Teddington Weir, Tallegalla Weir, Teddington Diversion pipeline (pipeline owned and operated by SunWater for the purpose of diverting water from the Mary River to the Teddington Weir)</td>
<td>Urban water supply for Maryborough and agriculture</td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Three Moon Creek</td>
<td>89 328</td>
<td>14 734</td>
<td>14 734</td>
<td>14 734</td>
<td></td>
<td>4 833</td>
<td></td>
<td>Cania Dam, Youlambie Weir, Monto Weir, Bazley Weir, Avis Weir, Mulgildie Weir, pipeline</td>
<td>Agricultural and community water supply</td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Upper Burnett</td>
<td>188 439</td>
<td>48 550</td>
<td>48 550</td>
<td>40 985</td>
<td>7 565</td>
<td>16 158</td>
<td></td>
<td>Wuruma Dam, John Goleby Weir, Kiral Weir, Jones Weir, Claude Wharton Weir</td>
<td>Agricultural, industrial and community water supply</td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Wide Bay</td>
<td>32 357</td>
<td>14 473</td>
<td>14 473</td>
<td>14 473</td>
<td></td>
<td>4 723</td>
<td></td>
<td>Lenthalls Dam, Burrum Weir No 1, Burrum Weir No 2</td>
<td>Urban water supply for Hervey Bay and agriculture</td>
</tr>
</tbody>
</table>
Table A2: Details of supplemented surface water entitlements supporting town water systems

<table>
<thead>
<tr>
<th>QBWOS region</th>
<th>Town water supply system</th>
<th>Total water storage capacity (ML)</th>
<th>Total water entitlements (ML)</th>
<th>Reported 2017-2018 water delivered (ML)</th>
<th>Associated infrastructure</th>
<th>Primary water users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>Clermont</td>
<td>9 200</td>
<td>1 850</td>
<td>956</td>
<td>Theresa Creek Dam²⁹</td>
<td>Urban water supply for Clermont</td>
</tr>
<tr>
<td>Central</td>
<td>Comet</td>
<td>50</td>
<td>40</td>
<td>38</td>
<td>Comet Weir</td>
<td>Urban water supply to Comet</td>
</tr>
<tr>
<td>Central</td>
<td>Mount Morgan</td>
<td>3 950</td>
<td>584</td>
<td>441</td>
<td>Mount Morgan No 7 Dam</td>
<td>Urban water supply for Mount Morgan</td>
</tr>
<tr>
<td>Central</td>
<td>St. Lawrence</td>
<td>152</td>
<td>70</td>
<td>28</td>
<td>St Lawrence Creek Weir</td>
<td>Urban water supply for St Lawrence</td>
</tr>
<tr>
<td>Far North</td>
<td>Cairns</td>
<td>37 100</td>
<td>46 685</td>
<td>24 837</td>
<td>Copperlode Falls Dam, Behana Creek</td>
<td>Urban water supply for Cairns</td>
</tr>
<tr>
<td>Far North</td>
<td>Cooktown</td>
<td>400</td>
<td>1 000</td>
<td>776</td>
<td>Annan River Weir</td>
<td>Urban water supply to Cooktown</td>
</tr>
<tr>
<td>Far North</td>
<td>Forsayth</td>
<td>363</td>
<td>140</td>
<td>41</td>
<td>Big Reef Dam</td>
<td>Urban water supply for Forsayth</td>
</tr>
<tr>
<td>Far North</td>
<td>Normanton-Karumba Drinking</td>
<td>1 850</td>
<td>3 100</td>
<td>871</td>
<td>Glenore Weir, Pipeline</td>
<td>Urban water supply for Normanton and Karumba</td>
</tr>
<tr>
<td>North</td>
<td>Charters Towers</td>
<td>5 227</td>
<td>7 500</td>
<td>3640</td>
<td>Charters Towers Weir</td>
<td>Urban water supply to Charters Towers</td>
</tr>
<tr>
<td>North West</td>
<td>Cloncurry</td>
<td>2 750</td>
<td>2 700</td>
<td>1 728</td>
<td>Chinaman Creek Dam, River Wells, Weir</td>
<td>Urban water supply for Cloncurry</td>
</tr>
<tr>
<td>North West</td>
<td>Croydon</td>
<td>5 200</td>
<td>4 360</td>
<td>114</td>
<td>Belmore Creek Dam, Butterfly North Pit</td>
<td>Urban water supply for Croydon</td>
</tr>
<tr>
<td>South West</td>
<td>Stanthorpe</td>
<td>2 180</td>
<td>1 150</td>
<td>755</td>
<td>Storm King Dam</td>
<td>Urban water supply for Stanthorpe</td>
</tr>
<tr>
<td>South West</td>
<td>Surat</td>
<td>430</td>
<td>350</td>
<td>409</td>
<td>Surat Weir</td>
<td>Urban water supply for Surat</td>
</tr>
</tbody>
</table>

28 Total water storage capacity of a dam or weir can be much less than the water captured and stored on an annual basis, due to the weather and catchment characteristics. The total storage capacity may be significantly larger than the total water allocations for this reason.

29 Authorised storage capacity for Teresa Creek Dam is listed. Investigations undertaken by Isaac Regional Council in 2017 indicates the current full storage volume of Teresa Creek Dam to be 5,920 ML.
<table>
<thead>
<tr>
<th>QBWOS region</th>
<th>Town water supply system</th>
<th>Total water storage capacity (ML)</th>
<th>Total water entitlements (ML)</th>
<th>Reported 2017–2018 water delivered (ML)</th>
<th>Associated infrastructure</th>
<th>Primary water users</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West</td>
<td>Yarraman</td>
<td>290</td>
<td>200</td>
<td>27 31</td>
<td>Ted Pukallus Weir, pipeline connection to Boondooma Dam</td>
<td>Urban water supply for Yarraman and Tarong Power Station</td>
</tr>
<tr>
<td>West</td>
<td>Longreach</td>
<td>8 400</td>
<td>2 200</td>
<td>1 821</td>
<td>Longreach Town Weir, Bimbah Weir, Fairmont Weir, Goodberry Weir</td>
<td>Urban water supply for Longreach</td>
</tr>
<tr>
<td>Wide Bay Burnett</td>
<td>Kingaroy Potable 32</td>
<td>6 500</td>
<td>1 809</td>
<td>467</td>
<td>Gordonbrook Dam, pipeline connection to Boondooma Dam</td>
<td>Urban water supply to Kingaroy and Nanango</td>
</tr>
</tbody>
</table>

31 Water for the community of Yarraman was also sourced from Boondooma Dam in the Boyne River and Tarong Water Supply Scheme. The delivery of 69 ML from Boondooma Dam for the period is accounted for in the Boyne River and Tarong Water Supply Scheme Statistics.
32 Information is for supply from Gordonbrook Dam. Kingaroy also has access to water from Boondooma Dam, this take is accounted for in the Boyne River and Tarong Water Supply Scheme Statistics.
Appendix 2: Project assessment arrangements

<table>
<thead>
<tr>
<th>Table A3: Project assessment arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td><strong>Administration</strong></td>
</tr>
<tr>
<td><strong>Relationship between frameworks</strong></td>
</tr>
<tr>
<td><strong>Who does it apply to?</strong></td>
</tr>
<tr>
<td><strong>What does it apply to?</strong></td>
</tr>
</tbody>
</table>
When does it apply? PAF uses the following thresholds for application:

1. Agencies are to apply the PAF to projects with an estimated capital cost of $100 million or more.

2. For projects with estimated capital costs of $50 million or more (but less than $100 million), all agencies are to apply the PAF or obtain written approval from their DG or equivalent, should they seek to use an assessment methodology other than the PAF.

3. For projects with estimated capital costs below $50 million, agencies should use the PAF if their agency lacks an established project assessment methodology.

For all other projects identified by an agency as concerning a significant asset, where not captured by points 1–3 above, agencies must have regard for the PAF as required by the Financial Performance Management Standard.

For proposals with an estimated capital cost of $50 million to $100 million, Building Queensland assists in the preparation of business cases and use of the templates and guidance provided under the BCDF is encouraged.

For proposals with an estimated capital cost of $100 million or more, the assessment must be led by Building Queensland and the BCDF must be used.

Note: For any proposal being assessed for commonwealth funding, proponents would be required to address Infrastructure Australia’s Assessment Framework. For an overview visit www.infrastructureaustralia.gov.au

### Table A3 continued

<table>
<thead>
<tr>
<th>Core elements</th>
<th>Project Assessment Framework</th>
<th>Business Case Development Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Strategic assessment of service requirement—determine the need</td>
<td>1. Strategic business case—ensures the service need is substantiated and effectively articulated, and the benefits sought are achievable through the proposed initiative/s</td>
</tr>
<tr>
<td>2.</td>
<td>Preliminary evaluation—development and assessment of options</td>
<td>2. Preliminary business case—progresses the concept documented in the SBC through an options generation and assessment process, which culminates in preferred option/s for analysis within the detailed business case</td>
</tr>
<tr>
<td>4.</td>
<td>Supply strategy development</td>
<td>Note: In practice, proponents would also be expected to assess whether completed projects have delivered outcomes.</td>
</tr>
<tr>
<td>5.</td>
<td>Source supplier/s</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Establish service capability</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Deliver service</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Benefits realisation</td>
<td></td>
</tr>
</tbody>
</table>

Note: In practice, proponents would also be expected to assess whether completed projects have delivered outcomes.
### Appendix 3: Regional water supply security assessment summaries

<table>
<thead>
<tr>
<th>Urban centre</th>
<th>RWSSA water security outlook at time of assessment*</th>
<th>Actions identified by partner council</th>
<th>Council’s achievements following RWSSA publication</th>
</tr>
</thead>
</table>
| Bundaberg                            | Council holds sufficient water entitlements to meet projected water demand for Bundaberg beyond the mid-2030s, and the supply has high reliability. Council may need to use more of its existing surface water to meet demand if groundwater availability is restricted. | • Regular review of water security position  
• Consider purchasing additional water allocation                                                            | • 3-year groundwater quality assurance program                                                                   |
| Bundaberg Feb 2016 —Bundaberg Regional Council |                                                    |                                                                                                         |                                                                                                                  |
| Cairns                               | Council holds water entitlements that should be sufficient to meet projected demand for Cairns to the mid-2030s. However, with Council’s current water allocations and treatment capacity, restrictions that constrain demand by at least 10% are expected at least one year in two. With forecast increases in total water demand, the likelihood and duration of these and of more severe restrictions (up to 25% restriction) will also increase. | • Review strategy  
• Determine appropriate level of service objectives  
• Finalise demand management strategy  
• Assessment of future water supply options                                                                        | • Water Security Strategy and Demand Management strategies released in 2015  
• New water treatment plant for water sourced from the existing intake on Behana Creek and future use of Mulgrave River  
• Managed extractions from Mulgrave River to augment supplies from Behana Creek and Copperlode Falls Dam |
| Cairns Oct 2014 —Cairns Regional Council |                                                    |                                                                                                         |                                                                                                                  |
| Charters Towers                      | Council holds sufficient water entitlements to meet projected water demand for Charters Towers beyond the mid-2030s and the supply has a high level of reliability. However, restrictions that constrain supply by 15%–40% are expected every one to two years as part of this security outlook. | • Review demand management measures  
• Review water operations for improvements  
• Investigate increasing effluent reuse  
• Determine appropriate level of service objectives  
• Assess future water supply options                                                                 | • Revised Drought Management Plan, community engagement and water restriction regime to improve system performance  
• Worked with DNRME to revise water licence conditions for improved efficiency and security  
• Upgraded effluent reuse  
• Pursuing options for additional upstream infrastructure, such as the Big Rocks Weir (~23 km upstream), which is being considered as part of the NWIDF Hells Gate investigations |
<p>| Charters Towers Feb 2016 —Charters Towers Regional Council |                                                    |                                                                                                         |                                                                                                                  |</p>
<table>
<thead>
<tr>
<th>Urban centre</th>
<th>RWSSA water security outlook at time of assessment*</th>
<th>Actions identified by partner council</th>
<th>Council’s achievements following RWSSA publication</th>
</tr>
</thead>
</table>
| Emerald                      | Emerald’s demand is likely to exceed the volume of  water the council has allocated for the town around the mid-2020s, and the supply is relatively reliable. The Nogoa-Mackenzie Water Supply Scheme that supplies Emerald is fully committed—there are no additional entitlements or reserves set aside for Emerald. | • Plan and budget to purchase additional high priority water entitlements  
• Improve residential water use efficiency  
• Continue loss detection and reduction activities from the town’s supply network.  
• Expand recycled water use | • Engaged with SunWater and have obtained additional flexibility with the ability to transfer allocation between Blackwater and Emerald |
| Jul 2017 — Central Highlands Regional Council |                                                                 |                                                                                                          |                                                                                                                    |
| Gladstone                    | Through its relationship with the Gladstone Area Water Board, Council has access to sufficient water entitlements to meet projected water demand for Gladstone beyond the mid-2030s, and the supply has a high level of reliability. However, the board may impose restrictions on Council (and others) as demand grows across its entire customer base. | • Strategic modelling and planning  
• Assess potential demand management measures  
• Increase supply efficiency (e.g. minimise leaks/losses in network) | • Network leak detection and remediation program  
• Construction of two clear water reservoirs to improve supply efficiency  
• Smart metering and zone metering strategies to assist demand management  
• Working with GAWB to improve knowledge sharing |
| Feb 2017 — Gladstone Regional Council |                                                                 |                                                                                                          |                                                                                                                    |
| Gympie                       | Council holds water entitlements that should be sufficient to meet projected water demand for Gympie to at least the mid 2020s. In the medium term, the council will also need additional measures to improve supply reliability. | • Purchase additional water allocation  
• Look at options for increasing security of supply (e.g. investigate possibility of increased regional urban supply storage)  
• Assess potential demand management measures | • Pursuing increased storage options, such as raising of Borumba Dam  
• Continued to provide educational material about being water-wise, reducing water consumption, use of rainwater tanks, and related links on its website |
| Dec 2016 — Gympie Regional Council |                                                                 |                                                                                                          |                                                                                                                    |
| Hervey Bay                   | Council holds sufficient water entitlements to meet projected water demand for Hervey Bay beyond the mid-2030s, and the supply has a high level of reliability to the mid 2020s. Water restrictions that constrain supply by up to 40% form part of this security outlook. | • Continue regular review of water strategy  
• Review demand management  
• Assessment of future supply options | • The Fraser Coast Water Supply Strategy identified interconnection between the Hervey Bay and Maryborough networks improves regional water security and treatment and delays infrastructure investment.  
• Hervey Bay’s urban water demand is not expected to exceed the Burrum River licence limit over the 30 year economic study period. |
<p>| Apr 2015 — Fraser Coast Regional Council |                                                                 |                                                                                                          |                                                                                                                    |</p>
<table>
<thead>
<tr>
<th>Urban centre</th>
<th>RWSSA water security outlook at time of assessment*</th>
<th>Actions identified by partner council</th>
<th>Council’s achievements following RWSSA publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mackay</td>
<td>Dependent on supply arrangements to Sarina, Council’s water allocations for Mackay could be fully utilised between 2028 and 2036. However, there are substantial entitlements of high priority water available in the Pioneer River Water Supply Scheme. The current low water use for agriculture and the non-use of uncommitted water temporarily contributes to relatively secure water supply.</td>
<td>• Monitor levels in Teemburra Dam as an indicator of increased risk&lt;br&gt;• Manage and monitor water demands&lt;br&gt;• Maintain understanding of status of unallocated water-entitlements in the Pioneer River WSS.</td>
<td>• Refurbishment works for Mount Pleasant Reservoir No.1 and water mains&lt;br&gt;• Continued provision of real-time water use data to residents with council’s free myh2o website&lt;br&gt;• Replacing old meters with smart metering and MiWater to improve water efficiency&lt;br&gt;• Planned Mirani Water Recycling Facility Upgrade</td>
</tr>
<tr>
<td>Maryborough</td>
<td>Wide Bay Water Corporation holds sufficient water entitlements to meet projected water demand for Maryborough beyond the mid-2030s, and the supply has a high level of reliability. Water restrictions that constrain supply by 10%–20% form part of this security outlook.</td>
<td>• Continue regular review of water strategy&lt;br&gt;• Review demand management&lt;br&gt;• Assessment of future supply options</td>
<td>• The Fraser Coast Water Supply Strategy identified interconnection between the Hervey Bay and Maryborough networks improves regional water security and treatment and delays infrastructure investment&lt;br&gt;• The Burnett River (Paradise Dam) to Howard Water Supply Pipeline was identified as a future water supply option for the Fraser Coast</td>
</tr>
<tr>
<td>Mossman and Port Douglas</td>
<td>The Mossman–Port Douglas communities typically has lower water reliability during the dry season. It is likely that water demands will exceed Council’s entitlements for Mossman–Port Douglas within the next 10 years. Water supply security for Mossman–Port Douglas could be enhanced by additional entitlement from within the catchment. Whyanbeel communities have good water supply security over the next 25 years, dependent upon the volume transferred to Mossman–Port Douglas via the two-way pipeline.</td>
<td>• Plan for an additional raw water extraction site within the Mossman catchment.&lt;br&gt;• Continue demand management activities (e.g. leak detection program and replace aging reticulation mains)&lt;br&gt;• Continue to supply recycled water to resorts in Port Douglas&lt;br&gt;• Investigate replacing the aging retail meter fleet with smart meters</td>
<td>• Council engaged a consultant for a Sewerage Treatment Plant upgrade strategy and re-use investigation to maximise unrestricted effluent use for irrigation&lt;br&gt;• Council is securing additional raw water extraction within the Mossman catchment and has allocated budget in 2018–2019 to progress the detailed design and secure water licences</td>
</tr>
<tr>
<td>Mount Morgan</td>
<td>Current low water use by community contributes to maintaining a relatively reliable water supply capable of supporting community growth over the next 20 years. Water restrictions that constrain supply form part of this security outlook.</td>
<td>• Continue to encourage waterwise behaviour in the community.&lt;br&gt;• Consider the expansion of recycled water.&lt;br&gt;• Investigate connecting Mt Morgan to the Rockhampton reticulation system.</td>
<td>• Worked with SMEC who were engaged as part of the Maturing the Infrastructure Pipeline Program (MIPP) to develop options for increased water security&lt;br&gt;• Draft report from SMEC currently being reviewed prior to finalisation</td>
</tr>
<tr>
<td>Urban centre</td>
<td>RWSSA water security outlook at time of assessment*</td>
<td>Actions identified by partner council</td>
<td>Council’s achievements following RWSSA publication</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
</tbody>
</table>
| Rockhampton Feb 2016 —Rockhampton Regional Council | Council holds sufficient water entitlements to meet projected water demand for Rockhampton beyond the mid-2030s. However, the supply is vulnerable because of its short storage duration and hence heavy reliance on seasonal inflows. Council is expected to be able to meet water demand in most years over the long term. | • Continue demand management activities  
• Assessment of future infrastructure and non-infrastructure options (including reducing water losses and recycled water substitution) | • Incentivised water efficiencies and adoption of water efficient appliances  
• Reviewed restriction triggers  
• Leak detection program to reduce water wastage  
• Upgraded Glenmore Water Treatment Plant to improve supply resilience  
• Completed feasibility study for increased storage volume in Fitzroy Barrage |
| Stanthorpe Nov 2016 —Southern Downs Regional Council | Council holds sufficient water entitlement to meet projected water demand for Stanthorpe beyond the mid-2030s. While Stanthorpe’s supply was found to be reliable, there is risk of Storm King Dam becoming depleted due to its short storage duration and dependence on seasonal inflows to maintain supply. | • Continue demand management activities  
• Assessment of future infrastructure and non-infrastructure options to improve water supply security | • Introduced a water tank rebate scheme to reduce demand on the town supply  
• Program to replace Storm King Dam to Mt Marley WTP mains to improve security.  
• Working with DNRME to assess augmenting supply from Connolly Dam  
• Council will require businesses with ›10 ML/a water use to submit water efficiency management plans |
| Townsville Oct 2014 —Townsville City Council | The council holds sufficient water entitlements to meet projected water demand for Townsville to around 2030. However, it remains vulnerable to an over-reliance on Ross River Dam and could increase security by drawing earlier on its allocation in Burdekin Falls Dam and improving demand management. Improvements to water security may not be required immediately, but water security will reduce over the next 10–15 years to less-acceptable levels. | • Secure additional high-priority water (expected to be needed by 2020)  
• Determine appropriate level of service objectives  
• Assessment of future supply options, including accessing additional water from the Burdekin River | • Currently implementing a number of infrastructure and non-infrastructure measures recommended in both the Interim and Final Report of the Townsville Water Supply Taskforce for which it has $225 M funding from the State. These include duplication of the Burdekin Haughton pipeline and a demand management transition package for the community |
<table>
<thead>
<tr>
<th>Urban centre</th>
<th>RWSSA water security outlook at time of assessment*</th>
<th>Actions identified by partner council</th>
<th>Council’s achievements following RWSSA publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warwick</td>
<td>The council holds sufficient water entitlement to meet projected water demand for Warwick until at least 2041, and the supply has a high degree of reliability.</td>
<td>• Continue to utilise water restrictions to manage the available water supplies, when necessary.</td>
<td>• Council is expanding its recycled water network to the Warwick industrial area</td>
</tr>
<tr>
<td>June 2018 — Southern Downs Regional Council</td>
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<td>• Council identified alternative water sources to augment the main supply and is using recycled water and bore water for construction and maintenance works</td>
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<td>• Raw water supply extended to the Warwick Sporting precinct at Morgan Park</td>
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<td></td>
<td>• Council has commenced contingency supply planning</td>
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<tr>
<td>Whitsunday</td>
<td>Council holds water allocations that should be sufficient to meet projected water demand for the Whitsunday communities to the mid 2020s. Council will need to consider additional allocations and measures to improve security.</td>
<td>• Purchase additional water allocation • Revise demand management strategy • Undertake groundwater reliability assessment • Determine appropriate level of service objectives</td>
<td>• Reduced non-revenue water by delivering targeted meter replacements, district meters and replacement of unlined cast iron water pipeline</td>
</tr>
<tr>
<td>Aug 2016 — Whitsunday Regional Council</td>
<td></td>
<td></td>
<td>• Completed groundwater risk and reliability assessment</td>
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<td></td>
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<td></td>
<td>• Program to re-use -90% of Bowen wastewater treatment plant effluent for irrigation, industry and construction</td>
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</tbody>
</table>

* For more detailed information on the water security outlook for any of these communities, please refer to the individual RWSSA documents at https://www.business.qld.gov.au.
## Acronyms

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BCDF</td>
<td>Business Case Development Framework</td>
</tr>
<tr>
<td>COAG</td>
<td>Council of Australian Governments</td>
</tr>
<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
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<tr>
<td>DAF</td>
<td>Department of Agriculture and Fisheries</td>
</tr>
<tr>
<td>DES</td>
<td>Department of Environment and Science</td>
</tr>
<tr>
<td>DLGRMA</td>
<td>Department of Local Government, Racing and Multicultural Affairs</td>
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<tr>
<td>DNRME</td>
<td>Department of Natural Resources, Mines and Energy</td>
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<tr>
<td>DPC</td>
<td>Department of Premier and Cabinet</td>
</tr>
<tr>
<td>DSDMIP</td>
<td>Department of State Development, Manufacturing, Infrastructure and Planning</td>
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<tr>
<td>GAWB</td>
<td>Gladstone Area Water Board</td>
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<tr>
<td>MIWB</td>
<td>Mount Isa Water Board</td>
</tr>
<tr>
<td>ML</td>
<td>Megalitre (1 000 000 litres)</td>
</tr>
<tr>
<td>NWIDF</td>
<td>National Water Infrastructure Development Fund</td>
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<tr>
<td>PAF</td>
<td>Project Assessment Framework</td>
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<tr>
<td>QBWOS</td>
<td>Queensland bulk water opportunities statement</td>
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<tr>
<td>QT</td>
<td>Queensland Treasury</td>
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<tr>
<td>RWMP</td>
<td>Rural Water Management Program</td>
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<tr>
<td>RWSSAs</td>
<td>Regional water supply security assessments</td>
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### Water-related terms

<table>
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<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Allocation (water)</td>
<td>A water allocation is an entitlement created under the Water Act 2000. Water allocations are assets that are separate to land and may be owned and traded by non-landholders. All water allocations are registered in the Water Allocation Register. The register records ownership information on water allocations in a similar way to which details of land ownership are recorded in the Freehold Land Registry.</td>
</tr>
<tr>
<td>Bulk water</td>
<td>Raw water that is supplied from a bulk water supply system, in accordance with a water entitlement, either directly to an end-user customer or to a customer that provides treatment services and/or distribution services to end-user customers.</td>
</tr>
</tbody>
</table>
| Bulk water entity                 | Bulk water providers generally provide water to local councils as the source of their drinking water supplies. DNRME oversees four bulk water entities in Queensland:  
• Queensland Bulk Water Supply Authority (trading as Seqwater)  
• SunWater  
• Gladstone Area Water Board  
• Mount Isa Water Board. |
| Bulk water supply system          | Consists, includes or is supported by either a dam, a weir or other infrastructure. In South East Queensland, Seqwater is the bulk water supply authority and owns and operates the bulk water supply system infrastructure. Outside South East Queensland, the infrastructure within the bulk water supply systems is typically owned by the state entities of SunWater, Gladstone Area Water Board and Mount Isa Water Board, or councils or council-owned entities. |
| Committed water                   | Water allocations that have been sold or traded to a customer for the customer’s use.                                                                                                                     |
| Millennium Drought                | From late 1996 to mid 2010, much of southern Australia (except parts of central Western Australia) experienced a prolonged period of dry conditions, known as the Millennium Drought. The drought conditions were particularly severe in the more densely populated south-east and south-west. South East Queensland was affected from 2001 to 2009. |
| Priority group                    | Water allocations in a supply scheme that have the reliability as defined by the relevant water plan. Determined with consideration of the water security objectives and environmental flow objectives. |
| Supplemented water                | Water supplied under an interim ROL or other authority to operate infrastructure. Usually supplied from either a dam or a weir or other manufactured improvements to supplement natural stream flows or groundwater supplies, and generally has higher reliability than unsupplemented water according to the priority group. |
| Unallocated water reserve         | Water allocations that have been set aside in a water plan for future use or to facilitate construction of storage. It can be either supplemented or unsupplemented. Includes general, strategic, town water supply or state reserve, indigenous reserve and strategic infrastructure (water that may be granted to facilitate the development of particular water infrastructure projects). |
| Uncommitted water                 | Water allocations that have not been committed. These allocations are usually available for lease, sale or contract subject to transportation infrastructure constraints. |
| Unsupplemented water              | Water that is not supplemented water. Water that is available for use from a non-regulated source where no instream improvements or transportation assets are present to supplement natural water supplies. Can be surface water or groundwater. |
| Water service                     | Under the Water Supply (Safety and Reliability) Act 2008, a water service includes:  
• water harvesting or collection, such as dams, weirs, bores and direct extraction from watercourses  
• the transmission of water  
• the reticulation of water  
• drainage infrastructure other than for stormwater drainage  
• water treatment and recycling. |
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<th><strong>Water-related terms</strong></th>
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<tr>
<td><strong>Water service provider</strong></td>
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<tr>
<td><strong>Water supply scheme</strong></td>
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<tr>
<td><strong>Water storage capacity (of dam or weir)</strong></td>
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<th><strong>Economic and financial terms</strong></th>
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<td><strong>Commercially viable</strong></td>
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<td><strong>Economically viable</strong></td>
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<td><strong>Financial analysis</strong></td>
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<td><strong>Regional economic development</strong></td>
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<td><strong>Feasibility assessment</strong></td>
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<td><strong>Optimism bias</strong></td>
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<td><strong>Project proponent</strong></td>
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