

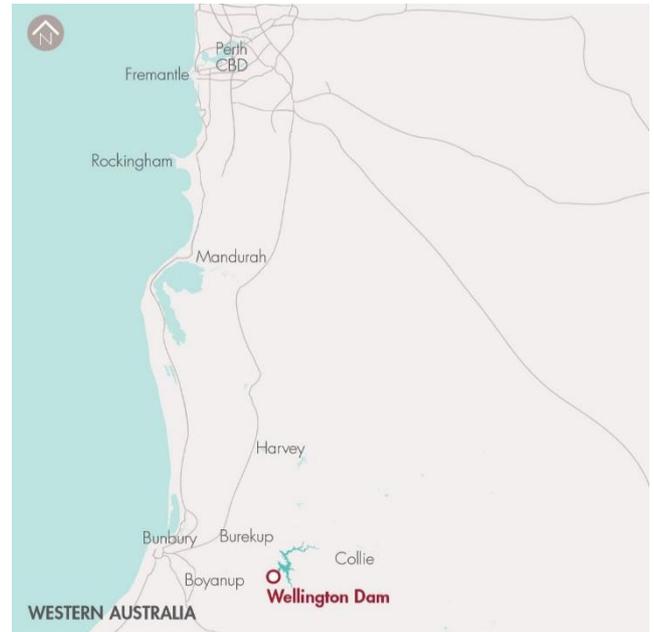
Project Evaluation Summary

Myalup-Wellington Water Project

Proponent: Western Australian Government / Collie Water
Evaluation date: 6 November 2017

Contents

1. Summary	1
2. Strategic context	2
3. Problem description	2
4. Project overview	3
5. Options identification and assessment	3
6. Economic evaluation	4
7. Deliverability	7



1. Summary

Infrastructure Australia has added the Myalup-Wellington Water Project to the Infrastructure Priority List as a **Priority Project**, on the basis that the project will provide economic benefit. However, the benefits of the project are predominantly private, and it is not clear how Australian Government funding would address a market failure which could not be addressed by the proponent. As such, the case for Australian Government funding is not clear.

The Myalup-Wellington Water Project is a response to increased salinity in the Wellington Dam catchment and in the dam itself, and inefficiency in the water distribution network below the dam. Increased salinity and reduced reliability of groundwater has resulted in a reduction of high yield fruit and vegetable agricultural activity in the Myalup Irrigated Agricultural Precinct (MIAP); and a progressive abandonment of agricultural activity in the Collie River Irrigation District (CRID), as growers return water entitlements.

The proposed project is currently included on the Infrastructure Priority List as a Priority Initiative, because of its potential to develop industry and agriculture in south-west Western Australia.

The project proposes to divert high saline inflows upstream from Wellington Dam for desalination. This would improve the quality of water stored in and released from Wellington Dam for agriculture. It would also allow for the sale of potable water to the WA Water Corporation, and treated water to local industries. The project also proposes below-dam initiatives to improve agricultural productivity, including relocation of the existing Borekup Weir, piping of the water distribution network through the CRID, managed aquifer recharge, and distribution to the MIAP. These measures could be delivered in stages. However, because they are interconnected, the overall effectiveness and

benefit of the project would be reduced if these separate components were delivered as stand-alone works. The business case is stronger as an integrated solution.

The proponent's stated benefit-cost ratio (BCR) for the project is 1.6, with a net present value (NPV) of \$387.5 million (7% real discount rate).

The major risk to the project is a reduction in the longer-term availability of water due to climate change. This could reduce the volume of water available for desalination and for agricultural production, although this risk could be mitigated to an extent if the value of the water increases as its availability decreases. A broader risk is that some of the assumptions used in the analysis may overstate the project's net benefits. The most important of these is the estimated increase in agricultural value, which reflects water values higher than most estimates of traded water prices across Australia.

In light of these risks, Infrastructure Australia has undertaken further sensitivity analysis to determine the robustness of the project under different scenarios. In all scenarios tested, the project BCR remains greater than 1. As a result, Infrastructure Australia is confident that the project would have net benefits to the Australian economy.

However, given that the benefits of the project are predominantly private, accruing to Collie Water and agricultural producers, it is not clear how Australian Government funding would address a market failure which could not be addressed by the proponent. As such, the case for Australian Government funding is not clear.

2. Strategic context

The Western Australian Government's, *Water for Food* program has a central objective to improve the capacity of the Western Australian agriculture industry by increasing the availability of water. The Australian Government has also committed to facilitating the building or augmentation of existing water infrastructure, including dams, pipelines or managed aquifer recharge to secure the nation's water supplies and deliver regional economic development benefits for Australia.

The project has recently been included in this program and been awarded feasibility funding under the Australian Government's National Water Infrastructure Development Fund. The project aims to increase the productivity of an existing asset and provide associated flow-on economic benefits to the region.

The project has been identified as a major opportunity to help diversify Western Australia's regional economy through irrigated agriculture. Currently, just 6,557 hectares of the available 34,600 hectares of the Collie River, Harvey and Waroona districts are irrigated.

3. Problem description

Wellington Dam is owned and operated by Water Corporation, which is the major public water service provider in Western Australia, with Harvey Water controlling the releases of water to meet seasonal demand from irrigators. Wellington Dam is the second largest dam in the state and the largest surface water storage in the South West, with a storage capacity of 185 GL. However, unlike other dams in the region, its allocation is not fully utilised due to the salinity of the water and its impact on crop growth.

Wellington Dam is becoming increasingly saline, with current average salinity levels twice the recommended level for drinking water and increasingly above accepted levels for flood irrigation. This salinity is a result of historical native forest clearing which has led to higher saline stream inflows. This has significantly limited the value of the dam's water for irrigation purposes.

In the South West, 18 million hectares of the 25 million originally covered by native vegetation have been cleared, mostly for agricultural purposes. As a result, 1.8 million hectares are now salt-affected, leading to severely reduced crop yields.

Wellington Dam originally captured the waters of the east and south branches of the Collie River, the Bingham River and the Harris River. With increasing salinisation of Wellington Dam, the Harris Dam was constructed on the Harris River and in 1990 commissioned as the source of potable water (allocation limit of 15 GL per annum). This left the Wellington Dam as a 'fit for purpose' source for agriculture and industrial uses. However, the increased salinity of the water in the dam has severely limited the suitability of this source for these purposes.

Wellington Dam's salinity level of more than 1,100 mg/L is well above the 500 mg/L total dissolved salts acceptable for potable water. It is also considered too high for sustaining the current flood irrigation method used in the irrigation districts. This is due to the cumulative salinity effects on the plant root zone, which in turn limits crop yields and higher value enterprise choices.

Wellington Dam has a capacity of 185 GL and a calculated reliable annual yield of 85.1 GL per annum which can be licensed for consumption. The 85.1 GL allocation limit sets the maximum amount of water that can be released or taken from the dam for use each year. Of this, 68 GL is currently licensed to Harvey Water to supply the CRID, and the remaining 17.1 GL per year¹ is the subject of current applications.

As a consequence of the salinity effects from using Wellington Dam water, irrigator members of the Harvey Water cooperative do not currently fully utilise their water allocation. Irrigators draw approximately 40-44 GL from the 68 GL pa allocation per year, or less than 65%. Of the total dam allocation limit (85.1 GL), only 50% is currently utilised.

The MIAP is a key part of Western Australia's agriculture industry, responsible for over 60% of the South West's horticultural production. It is considered integral to domestic supply, and potential increased Australian exports. Many growers have expressed concerns about high salinity levels on their properties, and difficulty in achieving crop germination. They are also experiencing a shortage of water supply which limits capacity for increased productivity, and expansion. Increasing salinity is expected to reduce Western Australia's vegetable production if left unaddressed. The impacts of salinity and/or reduction in water allocations restrict production in the region and constrain potential export growth opportunities.

4. Project overview

The proposed project is located in the south-west of Western Australia, approximately 200 km south of Perth, east of Bunbury. The project is made up of a number of integrated above- and below- dam components, targeted at reducing salinity in Wellington Dam and the surrounding area, and increasing the efficiency of water distribution infrastructure. These are:

- Diversion of approximately 14 GL per year of the high salinity, low volume inflows in the Collie River East Branch into a disused mine void for storage. This is estimated to prevent between 60,000 to 110,000 tonnes of salt entering Wellington Dam per year
- Pumping the stored water to a newly-constructed 20 GL per year desalination plant near Collie, with brine pumped to an ocean outfall using an existing pipeline. The proponent has agreement to sell 10 GL per year (or more) of potable water from the desalination plant to Water Corporation, via pipeline to Harris Dam
- Construction of a new weir at Burekup, upstream of its current location, to provide increased head pressure, enabling water from Wellington Dam to be gravity-fed to the majority of the CRID and MIAP without the need for staging pumps
- Building a closed pipeline system from the new Burekup Weir to replace existing open channels to maintain pressure, prevent seepage, leakage and evaporation and enable monitoring of water usage
- Approximately 2,000 to 4,000 hectares of plantation in the catchment if the project goes ahead. This is additional to the 10,000 hectares proposed to be planted in the catchment independent of the project.

5. Options identification and assessment

A number of past studies have assessed options to decrease salinity in Wellington Dam. These options were generally found to be costly and lacking an integrated approach, but the studies claim that:

1. The most productive use of water from the Collie-Wellington Basin will not be achieved without reducing the salinity of the Collie River
2. A combination of water source options, treatments and delivery methods will best provide water at required volumes and standards; also it is possible that these can be staged. Of the assessed options:

¹ Collie Water has an application for 17.1 GL and Synergy has an application for 5 GL (Pers Comms, 2017)

- a. the quickest means to reduce salinity is by diverting early winter saline stream flows into mine voids, then removing the diverted water from the catchment, either by piping it to the ocean, or by treating it by reverse osmosis to produce potable water
 - b. the most cost-effective medium to long term solution is a combination of reforestation and a moratorium on land clearing in the water catchment
3. The price of 'fit for purpose' water is largely determined by the costs associated with the level of treatment required and the costs of piping it to the point of use, with low unit costs associated with high delivered volumes
 4. The most productive uses of the treated water are urban consumption followed by industrial use (particularly if this includes the needs of the region's power stations)
 5. Opportunities exist for private as well as public sector involvement.

The options analysis for the business case draws on these past works by assessing both capital and non-capital solutions:

- **non-capital solutions** – including the diversion of high salt flows to unused mining voids and reforestation within the catchment. A river diversion trial occurred over three seasons between 2005 and 2007 (diverting a total of 6 GL), which coincided with a reduction in salinity over the period. The river diversion project was stopped in 2008 due to the lack of a water treatment facility, and average salinity has increased since
- **capital solutions** – including the construction and operation of a desalination plant and an associated saline channel diversion network.

The capital and non-capital options were individually assessed using cost-effectiveness analysis. The diversion and reforestation option was determined to be the most cost-effective. However, it was identified that the options are not mutually exclusive.

The proposed solution was chosen following a 2015 tender and evaluation process conducted by an advisory group of government and private sector representatives. Of the 15 expressions of interest submitted, the proponent's proposal was chosen as it offered an integrated, whole-of-system solution that incorporated proven non-capital and capital components. It also identified a market use for diverted and then treated water, which the proponent expects will make the construction and operation of a desalination plant commercially sustainable. This was missing in previous desalination proposals.

6. Economic evaluation

The proponent's economic evaluation states the project has a benefit-cost ratio (BCR) of 1.6, with a net present value of \$387.5 million (7% real discount rate). Some 44% of the project's benefits accrue to irrigators, who would benefit through increased production value due to:

1. An increase in the number of hectares farmed in the MIAP and CRID
2. A shift away from low value beef towards more valuable products including horticulture in the CRID, enabled by reduced salinity and a more efficient water delivery system.

In comparison to the price of rural water in other Australian jurisdictions, the economic evaluation implies a much higher benefit per additional ML of water made available to the CRID and MIAP. While it can be difficult to compare the markets for varying products and regions, it is likely that the benefit estimated for the increased agricultural production is overstated.

Over 50% of the project benefits accrue to the producer, Collie Water, with the vast majority of this resulting from the sale of potable water to Water Corporation. Collie Water has an agreement to sell at least 10GL of potable water per year to Water Corporation, but the proponent has reported that recent discussions indicate that the volume of water sold to Water Corporation each year is likely to exceed this, given reduced rainfall in the Harris Dam catchment (where the potable water will be stored by Water Corporation). Following the ramp-up of sales in the early years of operation, the economic appraisal assumes average annual sales of 18 GL. While there is a risk

that this volume of sales will not be achieved, sensitivity testing using the minimum volume of 10 GL shows that the project is still economically viable.

Furthermore, the long run marginal cost of water to estimate the benefit of additional desalination water may be overstated. Sensitivity testing using a lower long run marginal cost of potable water sourced from the WA water regulator reduces the BCR slightly.

The impact of climate change on water availability is a risk for the project, given that the region’s climate is expected to dry in the future. While there may be a reduction of inflows to the dam, this risk could be partially mitigated if the value of the water increases with less supply. The proponent has assumed that, on average, rainfall would be approximately 90% of the volumes seen over the last 50 years. Furthermore, only 50% of the existing dam allocation is currently used, which could provide a ‘buffer’ against future reductions in rainfall/dam allocation.

A number of social and environmental benefits have also been identified by the proponent, but not quantified. For example, the project would provide environmental benefits to drying wetland systems and reduce agricultural pollutants in the environment through the recharge of groundwater aquifers in the Myalup region, with benefits to the irrigated agricultural sector

From an economic perspective, Infrastructure Australia is confident that the project would deliver a net benefit to the Australian economy. However, the benefits to users are predominantly private, accruing to Collie Water, Water Corporation and agricultural producers. It is not clear how Australian Government funding would address a market failure which could not be addressed by the proponent, private sector or WA Government. The case for Australian Government funding is not clear.

The use of a government grant to fund the project would likely be inconsistent with the National Water Initiative, which requires jurisdictions to implement water pricing and institutional arrangements based on user pays principles and full cost recovery of services for water storage and delivery in rural and urban systems. Infrastructure Australia considers that pricing and funding arrangements should be consistent with the National Water Initiative and the National Water Initiative Pricing Principles.

As currently set out in the business case, cost recovery is lowest for the below-dam irrigation-related infrastructure. The funding from the agricultural sector is estimated at less than one quarter of the benefits that accrue to it, and substantially below the costs of the below-dam works. This suggests opportunities exist to increase funding from agricultural users. This could include transparent and market based mechanisms for irrigators to access water, such as auctions.

The total project costs are estimated to be \$644.6 million (present value, 7% discount rate). This consists of:

- \$354.2 million capital costs (55% of total costs)
- \$290.5 million operating / maintenance costs (45% of total costs).

Capital costs and funding

Total capital cost (nominal, undiscounted)	\$394.1 million
Proponent’s proposed Australian Government funding contribution	\$140 million
Other funding (source / amount / cash flow) (nominal, undiscounted)	\$50 million (National Water Infrastructure Development Fund loan) \$35 million (Western Australian Government) \$169.1 million (Collie Water)

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value (\$m, 2017) @ 7% real discount rate	% of total
Consumer benefits		
Benefits to CRID Irrigators (increased volume of agricultural production and change to higher value commodity mix) less the cost of water	133.7	13%
Benefits to MIAP irrigators (increased volume of agricultural production) less the cost of water	103.2	10%
Additional water security	7.9	1%
Water Corporation (avoided maintenance costs)	5.5	1%
Avoided costs for Water Corporation relative to price paid for water to Collie Water	148.6	14%
Synergy water treatment avoided costs (recovered from water charges)	59.8	6%
Producer benefits		
Revenue from the sale of agricultural water	44.4	4%
Revenue from the sale of water for residential and commercial use in the SW urban fringe	16.8	2%
Revenue from water supply to rural customers for stock and domestic use	1.9	<1%
Revenue from potable water sales to Water Corporation	423.0	41%
Avoided costs of building water supply infrastructure for industry (recovered from water charges)	85.2	8%
Public benefits		
Environmental benefits	1.9	<1%
Reduced public liability by removing open channels	0.1	<1%
Firefighting benefits	0.1	<1%
Total benefits	1,032.2 (A)	100%
Capital costs		
Above-dam capital costs	118.4	18%
Below-dam capital costs	173.1	27%
Indirect costs and contingency	62.7	10%
Maintenance and operating costs	290.5	45%
Total costs¹	644.6 (B)	100%
Net benefits - Net Present Value (NPV)²	387.5 (C)	n/a
Benefit–Cost Ratio (BCR)³	1.60 (D)	n/a

Sources: Proponent's Cost Benefit Analysis and Business Case and Infrastructure Australia analysis.

(1) Totals may not sum due to rounding.

(2) The net present value (C) is calculated as the present value of total benefits less the present value of total costs (A – B).

(3) The benefit–cost ratio (D) is calculated as the present value of total benefits divided by the present value of total costs (A ÷ B).

7. Deliverability

The proponent has developed a staged delivery approach which utilises specific project expertise for each component. For example, Harvey Water will deliver the Burekup Weir upgrade and were chosen based on their success delivering similar previous projects, and local knowledge. Reforestation will be undertaken by Forest Products Commission Western Australia, a statutory corporation which has a core mandate to promote sustainable and commercially viable forestry activity. However, a staged approach presents the risk that a component of the project could be cancelled, which would impact on the integrated solution this project delivers.

The preferred delivery model is a public-private partnership which would facilitate commercial decision making.

Project cost estimates and timings are based on engineering feasibility studies conducted in April 2017. The cost estimates include project contingencies of approximately \$62.7 million (10% of total project costs) and appear adequate for the overall size of the project.

The proponent has identified key project risks including:

- solution does not stimulate long term agricultural development in the CRID and MIAP – including failure to deliver a new water source, only part of the integrated solution is delivered and solution does not achieve salinity reduction target levels
- asset stranding of the desalination plant – including failure to source the necessary supply and appropriate mine void storage to feed into the desalination plant, and lack of demand for the treated water
- environmental approvals are not achieved – including to relocate assets
- not meeting community expectations, or encountering community opposition, resulting in changes to project design, or other delays.

The proponent has implemented risk mitigation strategies including:

- Negotiating an extraction license to divert water to the desalination plant
- Executing a Heads of Agreement with the Water Corporation for the sale and subsequent pricing of treated water, as well as discussions with other potential water customers.

The proponent is currently in negotiation for the storage of the diverted saline water into disused mine voids, as well as use of piping infrastructure to dispose of brine water from the desalination plant.

Further, the Western Australian Government has established a Ministerial steering committee to oversee overall project direction. A government agency project team and technical advisory committee has also been established. A joint project team with the joint venture partners will also be established, which in the first instance will be responsible for day-to-day risk management.

If the project proceeds, Infrastructure Australia encourages the proponent to undertake a Post Completion Review to assess the extent to which expected project benefits and costs have been realised, in order to inform future project development. In particular, such a review should assess the extent to which the reforestation and salinity targets set out in the business case have been achieved.