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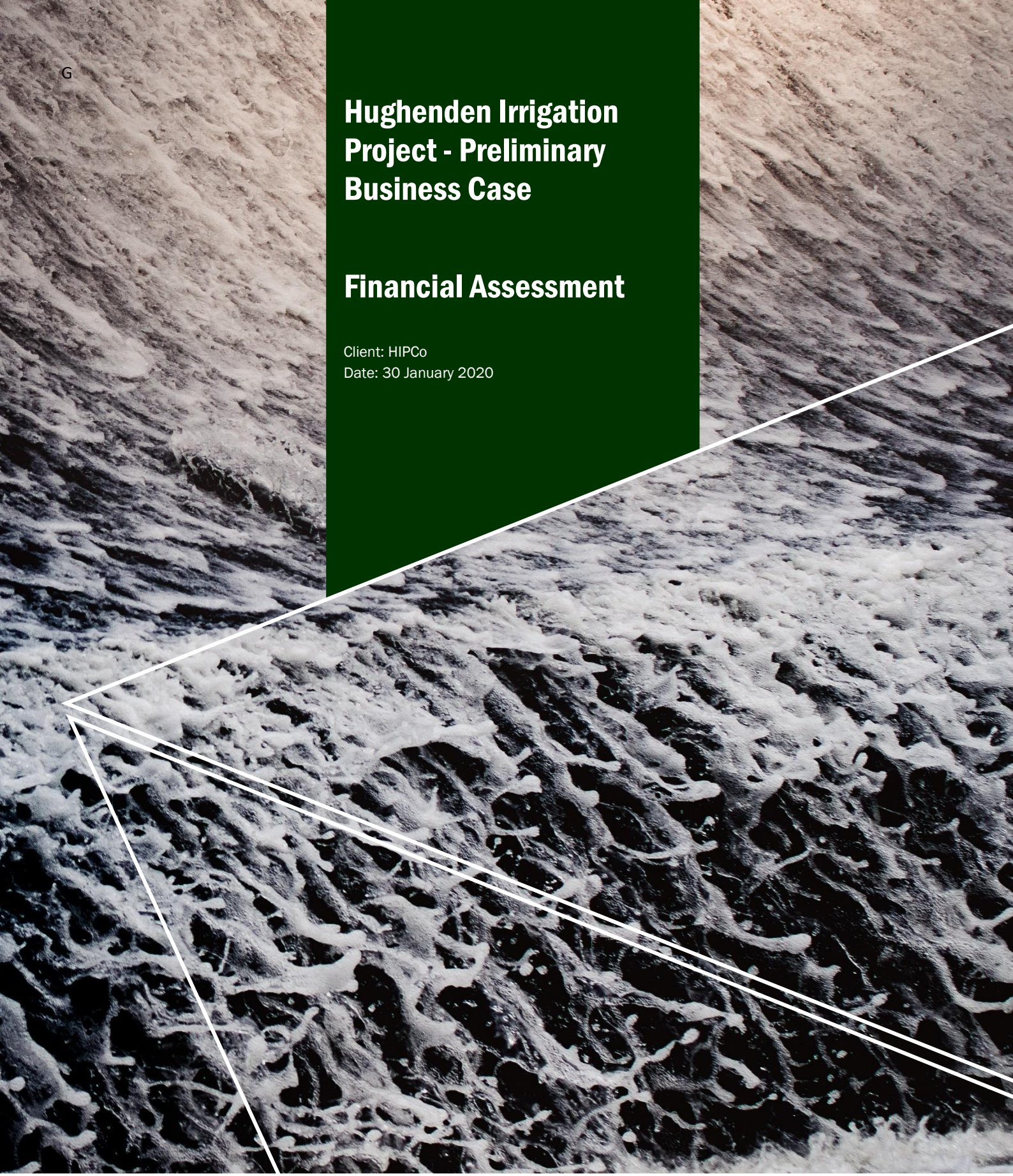
Hughenden Irrigation Project - Preliminary Business Case

Financial Assessment

Client: HIPCo
Date: 30 January 2020



NineSquared

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NineSquared is a specialist economic consulting and commercial advisory firm focused on helping governments and companies make great decisions and achieve your goals and objectives.

Our principals and staff are experienced, senior level practitioners who have worked in and advised government and private sector clients about a range of commercial and economic issues, primarily relating to transportation. Broadly, our expertise lies in the fields of transport and regulatory economics, policy development and analysis and advising on commercial arrangements between government and the private sector as well as arrangements between companies operating within regulated environments.

Our combined public and private sector experience means that we are well placed to provide our clients with deep understanding of both the public and private sectors and the interface between them.

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30 January 2020

Andrew Vitale
Principal Civil Engineer (RPEQ)
Sector Leader - Water Management
Director

Dear Mr. Vitale

RE: Hughenden Irrigation Project – Financial Analysis

Please find enclosed NineSquared's financial report for the Hughenden Irrigation Project. This report provides an overview of the assumptions, approach and results of the financial assessment conducted by NineSquared.

Our work has been undertaken in accordance with our email dated 19 March 2019. The report may be relied upon by HIPCo and Engeny in describing the estimated financial impacts of the project as of 30 January 2020.

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For all enquires on this report please contact me at tfrost@ninesquared.com.au or 0414 316 656.

Yours sincerely,

T. W. Frost

Tom Frost
Director
NineSquared

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Executive Summary

The Hughenden Irrigation Project is a potential game-changer for the Hughenden region. This has been discussed in NineSquared's Economic Analysis Report.

However, to generate the regional benefits described in this separate report, a large capital investment will be required. There will also be ongoing costs associated with operating the bulk infrastructure (dam, in-stream weir and diversion channel) and distribution infrastructure (pumps and channels). This requires assessment via a financial analysis.

This financial analysis has been undertaken to complement the economic assessment. It considers the project as a stand-alone investment, rather than assessing broader costs and benefits that might flow to the community.

This analysis is also important to assess how affordable the project might be to the potential funders of the project, notably the customers (irrigators) and the Government.

The financial analysis was undertaken through a conventional Financial Net Present Value approach, where all capital and ongoing operational costs and revenues are assessed over a 50-year period and then discounted back into present-day dollar terms.

A key challenge for this project – which is common among large regional bulk water infrastructure projects – is the magnitude of the capital costs and the size of the gap between this and the likely revenues, based on the capacity-to-pay of irrigation customers. These factors are assessed in the analysis to follow.

On the cost side, the main findings are:

- The capital costs are high relative to the volume of water stored, irrespective of the project scenario (e.g. medium and low priority water mix, or low priority water only)
- Most of the costs are those incurred during construction, which is assumed to be during the period 2022 to 2024
- The dam is the most expensive component of the project, accounting for around two-thirds of the total capital costs
- The contingencies attached to each of the sub-projects account for around one-quarter of the overall capital cost estimate, which is not unreasonable at this stage of the assessment process, given the amount of geotechnical investigations yet to be completed. It would be expected to reduce as further project design and other risk-mitigation work provides greater confidence in the final capital cost estimates
- The capital costs need to be considered after cost escalations are applied, as this is the best representation of the cost required to deliver the project
- Ongoing operational costs once construction is complete and water sales commence are dominated by the operation of pumps.

On the revenue side, the main findings are:

- There are three key revenue streams: government capital grant funding (timed to match the construction costs incurred); the sale of water allocations (at the commencement of water sales); and ongoing revenues from water sales to customers.
- It is highly improbable that customer (irrigator) willingness-to-pay for water allocations would be anywhere near enough to negate the need for significant government funding of the project's capital costs.

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- Revenues from customers – both upfront water allocation charges and ongoing charges once water sales commence – also need to be escalated, as these revenue payments in future years will be more than the current estimates.

An analysis of the impact of changes in cost and revenue assumptions to the financial results concluded that it makes little difference to the headline conclusions in most cases since the gap between capital costs and indicative water allocation charges is so large.

The assessment concludes – again not unlike other contemporary regional bulk water infrastructure assessments – that the project is only affordable if significant government capital grant funding is committed. Other sources of non-customer funding sources, such as loan funding, are not considered practical, as funding sources such as these require the capital contributions to be repaid along with interest. Likewise, equity injections from government or, for that matter, private sector investors, also seem impractical at this stage, as this would require prices also covering a return to the investors.

It is not considered feasible, based on customer willingness-to-pay for water allocations, that prices could be set which would be sufficient to cover either loan repayments with interest or a return to investors.

Based on the assumptions outlined in this report – including the amount of customer contributions towards the capital costs through the purchase of water allocations - the funding gap for the project is of the order of $398 to $429 million, expressed in 2019 dollars.

The difference in these estimates relates to which of the two modelled cropping scenarios is adopted, as there are differing distribution infrastructure requirements between the two.

When account is taken of cost escalations between now and when construction and operational costs are incurred, this rises to between $435 and $470 million. This is a matter that will require further negotiations between the proponent and the Australian Government.

The financial analysis concludes that both the costs and revenue estimates will require further refinements, specifically in the following areas:

- Construction costs, including contingencies;
- Irrigation customer willingness-to-pay, including taking into account the water reliability estimates;
- Pricing analysis, including the apportionment of capital costs across different classes of water users (i.e. where those with more reliable water allocations pay proportionately more in their ongoing water charges);
- Government funding capacity.

However, such further refinements of this analysis are unlikely to change the current conclusion that the gap between the financial costs and benefits (revenues) of the project are of such a magnitude that significant government capital funding grant will be required. The other studies undertaken for this Business Case, particularly the Economic Analysis Report, provide justification for public investment of this nature.

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1. Purpose and Scope

1.1 Introduction

NineSquared was engaged by Engeny, to provide financial advice to HIPCo on the Hughenden Irrigation Project (the Project).

The financial analysis was undertaken through a conventional Financial Net Present Value approach, where all costs (including upfront capital costs and ongoing operational costs) and revenues (again both upfront funding and ongoing revenues from customer) are assessed over a 50 year period and then discounted back into current-day (2019) dollar terms.

The analysis was done with regard to both the Infrastructure Australia and Building Queensland Business Case Development Frameworks. National Water Pricing Principles were also considered in relation to the preliminary assessment of water prices that would form a component of the project's revenues.

1.2 Background of the Project

The project is a largescale irrigation scheme located near Hughenden in north Queensland, which has been promoted both locally and by the Australian Government as a project with large potential regional economic development opportunities.

As outlined in the separate Economic Analysis Report, the Hughenden region has been characterised by declining population, employment and economic activity over recent decades. An important factor identified as limiting further regional growth is reliable water supplies. Other studies undertaken for this Business Case, particularly by Peritus Ag, have identified that soil types and other environmental conditions in the project area are suitable for agricultural production.

This project is being advanced by the proponents, HIPCo, for further consideration by the Australian Government ("the Government") as the principal funder. The Government has been negotiating with the company since 2018 and has provided funding for early stage feasibility assessments, including this Business Case. The Government has also committed to further funding for the project, which is understood to be subject to ongoing discussions between the two parties.

Engineering studies undertaken by Engeny that underpin NineSquared's financial (and economic) assessments have proposed:

- The yield, reliability and availability of water supplies over the evaluation period, including two potential water supply scenarios based on reliability
- The cropping area available to be irrigated through the increased water availability
- The capital costs of the dam, in-stream weir, diversion channel and irrigation scheme network.

Agronomic studies undertaken by Peritus Ag that underpin NineSquared's financial (and economic) assessments have proposed:

- The cropping scenarios based on two water supply/reliability scenarios, one of which is a diversified mix of high value horticultural and broadacre grain and hay crops, while the other is just grain and hay crops

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- The costs, revenues, gross margins and water requirements for each crop.

1.3 Approach

The definition of the Reference Project – both in terms of size and operations and the mix of customers - has been a significant part of developing the Preliminary Business Case, and especially for the financial modelling. NineSquared, Peritus Ag and Engeny discussed and agreed on relevant modelling assumptions in several iterations before modelling of the agreed Reference Project was finalised.

The approach to the financial assessment has had two key components:

- Agreeing with the project team the central-case assumptions to apply, and those additional scenarios and sensitivities to apply to these;
- Developing a financial model.

As outlined later in this Report, the model was developed as a 50-year discounted cash flow model capable of assessing a large range of modelling scenarios, including testing results over a shorter 30-year period.

Unlike the separate economic analysis which considers the project in terms of its community-wide costs and benefits, the financial analysis considers the costs and benefits of the project to the proponent only. Here the proponent is HIPCo, a private Hughenden-based company established for the purpose of advancing this project for the benefit of the Hughenden region.

The main inputs into the financial analysis (and their sources) are:

- **Costs**
  - Capital Costs (Engeny, see other sections of the Business Case)
    - Assessment, planning, approval and implementation costs
    - Construction costs
    - Capital replacement costs
  - Operational Costs (Engeny)
- Revenues
  - Area available for irrigation (Engeny)
  - Water sales availability and reliability (Engeny)
  - Crop types and areas (Peritus Ag, see other sections of the Business Case)
  - Crop costs and returns (Peritus Ag)
  - Upfront water allocation charges (Peritus Ag)
- Modelling parameters (NineSquared, as described in this report)
  - Cost escalation indices
  - Discount rates
  - Water pricing parameters

In relation to costs, these are estimated in two groups:

- Bulk infrastructure
  - In-stream weir
  - Diversion channel
  - Dam
- Distribution infrastructure
  - Pumps
  - Channels

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- Related earthworks

The financial analysis takes each of these groups of inputs and calculates Financial Net Present Values (FNVP) for the project over a 50-year time period. This is repeated for both cropping scenarios, which assume different water reliability levels.

A positive FNPV indicates that the project is a financially viable project; i.e. the investor(s) would receive a return on their investment. A negative FNP indicates the opposite.

The FNVP results are described in detail in Section 3.3 of this report. Section 4 then considers these results from an affordability perspective. This is done from two perspectives: firstly assessing how much customers (irrigators) would need to pay if there was no government subsidisation, and how this compares to what they might be able to afford; and secondly, what level of government financial support might be required if customers were to only pay what they can afford.

The table below summaries the approach taken in the financial analysis.

Table 1: Summary of Approach

Consideration	Details
Approach	Considers the monetary costs and revenues ***accruing to the proponent*** to determine whether the project is affordable
Key Inputs	• Water prices • Capital costs • Ongoing costs • Demand
Impacts Measured	• Present value of costs to construction and maintain the dam • Present value of revenues from the sale of water
Key Outputs	Financial net present value (FNPV)

Source: NineSquared

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2. Methodology and Key Assumptions

2.1 Definitions of the Reference Project

The table below summarises the relevant details of the proposed project. As discussed, two water allocation scenarios have been included as part of the assessment.

Table 2: Key assumptions

Project	Details
Reference Project	The project involves the construction of a rockfill embankment with clay core adjacent to the Flinders River on Saego station which makes use of the natural topography of surrounding basalt plateau to create a suitable "off-stream" water storage facility.
Scenario 1 *Mixed Cropping*	Scenario 1 assumes a split in production between horticulture and grazier cropping. Horticulture will require medium priority water with 30GL available, and grazier cropping will require low priority water with 40GL available, with a total of 70GL available.
Scenario 2 *Grazier Support*	Scenario 2 assumes all water is allocated to grazier cropping. In this scenario a total of 84GL is available.

Source: NineSquared

2.2 Key Assumptions

This section summarises the key revenue, cost and other financial modelling assumptions used to undertake the Financial and Commercial Analysis. The table below details the assumptions and the respective position adopted.

Table 3: Key assumptions

Key Assumption	Position Adopted
Evaluation period	50 years based on IA guidance, not including the construction period. Scenario results presented using 30 years for to align to BQ's BCDF.
Financial evaluation discount rate	Pre-tax WACC of 7.4% adopted for FNPV. Discount rate based on the most recent publicly available SunWater WACC, noting a 2018 version of this discount rate was adopted in the Nullinga Dam Detailed Business Case undertaken by Building Queensland. In the absence of an established Hughenden Dam construction entity with its own unique WACC, using SunWater's as a proxy is considered appropriate due to its role as Queensland's largest regional bulk water provider.
Base price year	2019/20

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Key Assumption	Position Adopted
Capital costs	Engeny provided capital costs associated with both scenarios. The raw undiscounted and unescalated costs provided are: • Scenario 1 (Mixed Cropping): $498.2m • Scenario 2 (Grazier Support): $512.8m The capital expenditure for Scenario 2 (Grazier Support) is greater than Scenario 1 (Mixed Cropping) as it covers a larger irrigated area. This means additional distribution expenditure is required.
Types of crops supported	Crops supported were provided by Peritus Ag for each scenario. They include: **Scenario 1 (Mixed Cropping):** • Avocado • Mango • Lemon • Mandarin • Sorghum • Corn • Wheat • Rhodes Grass Hay **Scenario 2 (Grazier Support):** • Sorghum • Corn • Wheat • Rhodes Grass Hay
Pricing policy for fixed and variable charges	Fixed and volumetric charges to be based on National Water Initiative (NWI) pricing principles, namely cost-reflective pricing for both capital expenditure and operations and maintenance expenditure.
Fixed tariffs for bulk and distribution schemes (Parts A and C)	Options will be developed assuming government grant funding (which will not be recovered from users) and one-off customer payments for water allocations will off-set some of the capital cost and reduce the ongoing fixed tariffs charged to users.
Volumetric tariffs for bulk and distribution schemes (Parts B and D)	Charges were developed on the assumption that only the ongoing cost component is fully recovered from users, while government funding would be required to support the capital component.
One-off water allocation sales price	Water allocation sales will be based on willingness-to-pay. The agricultural assessment also informed the considerations for the willingness-to-pay of producers for a water allocation. Separately, the one-off water allocation sales price was calculated in the absence of any government funding.
Asset Lifespans (Accounting)	Asset lifespans were not available for each asset type. Without specific information on each asset class, an assumption was made that the project will have a useful life of 80 years based on advice from Engeny. It is recommended that further analysis be undertaken on this in the next stage of analysis.
Design Yield for Reference Projects	Central case assumptions for design yields have been advised by Engeny as follows: • Scenario 1 (Mixed Cropping): 30GL of medium priority allocation and 40GL of low priority allocation • Scenario 2 (Grazier Support): 84 GL of low priority allocation

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<table>
<tr><th>Key Assumption</th><th>Position Adopted</th></tr>
<tr><td>Proportion of allocations assumed for calculating volumetric charges</td><td>Engeny provided inputs regarding the expected availability of water annually. This was used to determine the proportion of allocations able to be sold for the purposes of volumetric charges.
The values used for each scenario are as follows:
Scenario 1 (Mixed Cropping): Medium Priority – 90%
Scenario 1 (Mixed Cropping): Low Priority – 70%
Scenario 2 (Grazier Support): Low Priority – 80%</td></tr>
<tr><td>Expected distribution losses</td><td>Engeny have included the expected distribution losses in their reliability estimates.</td></tr>
<tr><td>Cost - Risk Adjustments (Planned and Unplanned Risk)</td><td>Provided by Engeny. A formal risk adjustment process was not undertaken as part of this analysis. In place of a probabilistic risk assessment, a deterministic contingency was applied of 35% to capital items. In terms of total capital cost, contingency is approximately 26% of total capital.</td></tr>
<tr><td>Operating and Maintenance Costs for Reference Projects</td><td>Provided by Engeny, including both dam and distribution costs.</td></tr>
<tr><td>Implementation costs</td><td>Implementation costs were not provided directly by Engeny; however, it is assumed that this is included in the 15% principals' costs included in the capital estimate.</td></tr>
<tr><td>Escalation</td><td>Using project phases was considered the best approach for inflation estimates to reflect the long implementation lead times before the construction and operational phases. The following escalation rates have been used, based on relevant cost indices. 2.50% has been adopted in line with long-term forecasts of inflation. Capital costs have been based on the Queensland Non-Residential Construction Producer Price Index from the ABS.
<table>
<tr><th>Project Phase</th><th>Nominal (p.a.)</th><th>RBA Inflation Estimate[1]</th><th>Real (p.a.)</th></tr>
<tr><td>Implementation costs</td><td>2.50%</td><td>2.00%</td><td>0.50%</td></tr>
<tr><td>Capital costs (during construction period)</td><td>3.07%</td><td>2.50%</td><td>0.57%</td></tr>
<tr><td>Operations & Maintenance costs</td><td>2.50%</td><td>2.50%</td><td>0.00%</td></tr>
</table></td></tr>
</table>

Source: NineSquared

[1] RBA estimates of short term and long-term inflation – Inflation Target, mid-point over time.

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2.3 Water Pricing

The National Water Initiative (NWI) – which Australian, State and Territory governments are signatories to – expresses a preference for rural water prices to target and, if needed, move towards over time to Upper Bound pricing; i.e. full cost recovery of supply costs, including capital costs.

At present most existing Queensland irrigation schemes target what the NWI refers to as "Lower Bound" pricing; i.e. where customers are only charged for the operating costs and any sustaining capital expenditure[2] required. In some Queensland cases, the schemes are already at price levels above Lower Bound, but beneath "Upper Bound" price levels.

The targeting of Upper Bound pricing, particularly for new rural water projects, is a significant water pricing issue because of the large capital costs. This was certainly found to be the case for this project.

Water prices in SunWater irrigation schemes elsewhere in Queensland have two categories of charges, in addition to the customer paying for the water allocation:

- Fixed tariffs — also known as Part A tariffs (in bulk water supply schemes) and Part C tariffs (in distribution systems) — are paid according to the amount of water allocation held by irrigators. These tariffs are 'fixed' in the sense they are set based on the size of the water allocation held by the customer, regardless of the actual water used in the year.
- Volumetric tariffs — also known as Part B tariffs (in bulk water supply schemes) and Part D tariffs (in distribution systems) — are charges paid per megalitre of actual water used by the customer.

Water prices to customers in Queensland irrigation schemes where there is a distribution system (i.e. taking water from the river downstream of the dam through irrigation pumps, channels, pipes, etc to farms) can have up to (and in some cases more than) four tariffs, as summarised below. This is in addition to any one-off price paid to gain the water allocation.

Table 4: Water tariff structure

Tariff	Bulk System (Weir, Diversion Channel, Dam)	Distribution System (Pumping, Channels)
Fixed tariff (per ML of allocation p.a.)	Part A	Part C
Volumetric tariff (per ML of water sales)	Part B	Part D

Source: NineSquared

The financial analysis for this project simplifies this approach to pricing as shown in Figure 1.

[2] Sustaining capital expenditure is defined as the ongoing (yearly) capital investment that the project must make to continue to operate at its planned level of service delivery

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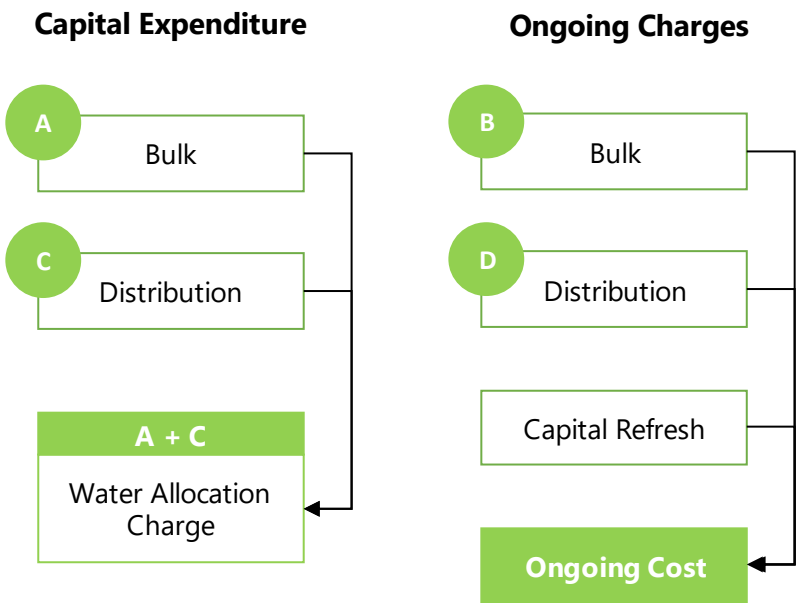
Figure 1: Pricing approach



The other dimension to water pricing relates to the product sold, particularly the reliability attached to the water allocation. For this scheme, the engineering designs are based on two water products, Medium Priority and Low Priority water, with the former subject to greater reliability, particularly in times of lower dam volumes.

This distinction is not currently factored into the revenue calculations in this analysis, as it has no overall impact on the project's FNPV, because it is basically a mechanism for sharing the project's ongoing annual fixed costs between different customer groups. However, further work undertaken into customer willingness-to-pay will inform the refinement of water pricing for this scheme.

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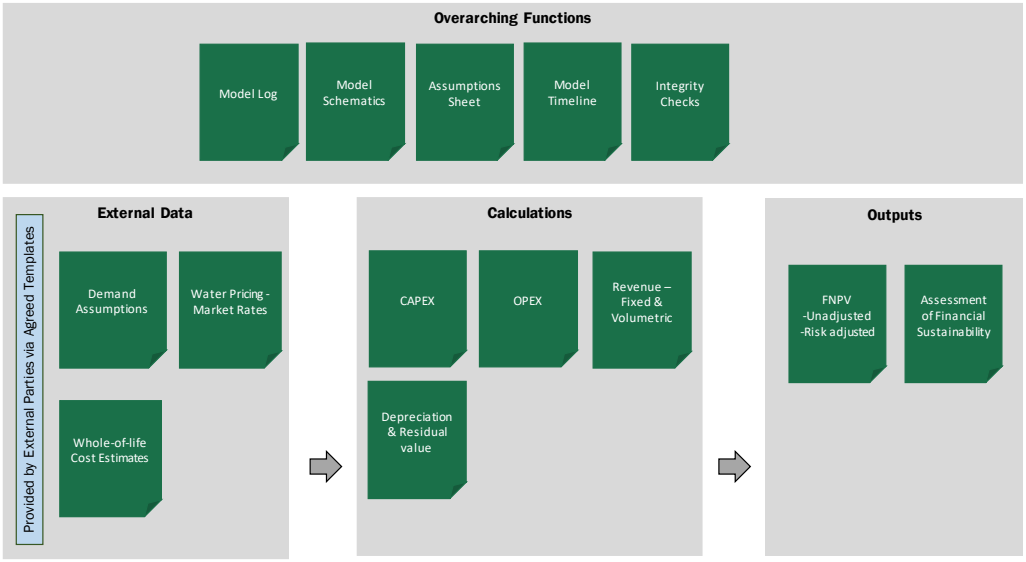
2.4 Structure of the Model

The financial model was developed as summarised in the following Figure. The financial model comprises of several main sections:

- Inputs – the main input sources included: cost estimates provided by Engeny; demand estimates provided by Engeny; timelines for projects provided by Engeny and through discussions with the project team
- Calculations – these included, for each scenario, costs broken down by component (capex and opex), prices and revenues, with the capacity to apply sensitivity analysis to the most important variables
- Outputs – the main modelled outputs are costs, prices and funding gap, including tables summarising the main findings.

Figure 2: Model Structure Schematic



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2.5 Limitations

The financial modelling is based on recognised best-practice financial modelling techniques. The major assumptions determining financial viability of the projects, prices and the potential funding gap (if capital contributions are limited to nominated willingness'-to-pay) are:

- Capital costs
- Escalation rates which are used to estimate the true capital cost that will be incurred in the future, as well as how the customers' willingness-to-pay will change
- The Weighted Average Cost of Capital (WACC) that applies in relation to the proponent's investment decision-making (a corporate finance rate)
- The proportion of water sales that are assumed to be Low and Medium Priority and the appropriate pricing mechanism to apportion bulk water infrastructure costs between the two categories, noting this does not impact overall project viability, rather the prices paid by the two groups
- The estimated willingness to pay of both high and medium priority users.

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3. Financial and Commercial Analysis

3.1 Purpose

The purpose of this section is to present the findings from the financial analysis completed in relation to the Project, including an assessment of:

- Inputs and assumptions for the financial modelling of the project
- Whole of life financial analysis based on the estimated risk-adjusted net financial cost/benefit to the proponent and, thereby, the Hughenden region
- Sensitivity analysis of the estimated net financial cost/benefit.

The purpose of the Financial Analysis is to take a series of costs and revenues to be incurred over time, discount them into present dollars to determine the net financial cost/ benefit, analyse what is driving the results, and compare scenarios. This is done by incorporating each of the assumptions into the financial model and calculating a single financial metric (FNPV) that can be used for scenario testing.

3.2 Assumptions

3.2.1 Project timing assumptions

The design, construction and operations periods adopted for the Reference Project are set out in the table below. An evaluation period of 50 years has been used starting from the first year after construction. A scenario analysis using a 30-year evaluation period has also been completed.

Table 5: Project Timings

Project	Start Date	End Date	Length
Reference Project			
Planning and design period	2019	2021	3
Construction period	2022	2024	3
Operations period	2025	2074	50
Water sales	2029	2074	46

Source: Engeny

3.2.2 Raw capital cost estimate

Raw upfront capital cost estimate (excluding risk contingency and escalation) for the Reference Project is summarised in the table below in undiscounted terms. These cost estimates have been prepared by Engeny.

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Table 6: Project Timings

Project	Capital Cost Estimates (excluding risk contingency & escalation)
Reference Project	$368,200,000

Source: Engeny

Cost items included in the capital cost estimates include:

- Dam costs
- Irrigation costs
- Weir costs
- Diversion channel costs
- Principal's costs
- Land acquisition
- Water allocation.

3.2.3 Contingency

Deterministic contingency was applied evenly to each component of the project. 35% contingency was applied to the construction items, which excludes land purchases, contractor preliminaries and principal's costs. When all cost components are considered, contingency comprises 26% of total capital cost. The contingency allowance is displayed in the table below.

Table 7: Total Contingency

Project	Contingency Allowance
Reference Project	$130,100,000

Source: Engeny

It should be noted that a probabilistic contingency allowance was not calculated by the cost advisor for this engagement. It is recommended that a detailed risk register be developed as part of the Detailed Business Case with the results being incorporated in a Monte Carlo analysis so that P50 and P90 values may be used in the subsequent financial and economic analysis.

3.2.4 Operations and maintenance cost estimates

Estimated annual operations and maintenance (O&M) costs in real terms are summarised in the table below.

Table 8: Annual Average O&M Costs (Real Terms)

Project	Average O&M Cost Estimates (excluding risk contingency & escalation)
Reference Project	$3,910,902

Source: Engeny

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3.2.5 Sustaining Capital - Pump Stations

Estimated sustaining capital for the pump stations, including the replacement of mechanical and electrical components, are summarised in the table below in real terms. This cost is expected to be incurred 25 years after the development of the project.

Table 9: Sustained capital – pump stations

Project	Sustained capital – Pump Stations (excluding risk contingency & escalation)
Reference Project	$3,280,400

Source: Engeny

3.2.6 Price escalation - Costs

Using information from the Australian Bureau of Statistics and the RBA, the following nominal and real escalation rates for the implementation (i.e. preconstruction), construction, and operational phases of the Project were used in the financial modelling.

Table 10: Price Escalation (Costs) – Nominal & Real Rates

Project Phase	Nominal (p.a.)	RBA Inflation Estimate	Real (p.a.)
Implementation costs	2.50%	2.50%	0.00%
Capital costs (during construction)	3.07%	2.50%	0.57%
Operations & Maintenance costs	2.50%	2.50%	0.00%

Source: RBA, ABS

For inflation estimates, the Reserve Bank of Australia (RBA) has indicated in its November 2018 Statement of Monetary Policy that measures of short-term inflation expectations are around 2 percent, while survey-based measures of longer-run inflation expectations measures remain around 2.50 percent. Given the long lead times from the implementation phase to the construction phase, capital costs from the Base Year have been indexed using 2.50 per cent annually until the construction period.

To escalate construction costs during the construction phase, the 20-year compound annual growth rate of the non-residential construction producer price index was adopted in the absence of information from the cost advisor. Post the construction term the escalation rate reverts back to the RBA's 2.50 percent of longer-run inflation expectations.

3.2.7 Water demand estimates

Central case estimates for water demand (with supply capacity) for the Reference Project, provided by Engeny, are summarised in the table below.

Table 11: Average annual water availability

	Scenario 1 – Mixed Cropping (ML)	Scenario 2 – Grazier Support (ML)
Medium Priority	30	-

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	Scenario 1 – Mixed Cropping (ML)	Scenario 2 – Grazier Support (ML)
Low Priority	40	84
Total	**70**	**84**

Source: Engeny

3.2.8 Water pricing

Two water pricing scenarios have been modelled in this analysis:

1. Pricing is set to cover the capital cost of the project
2. Pricing is set based on an estimate of market prices of water allocations.

The water pricing required to cover the capital cost of the project is calculated as part of the financial assessment, with the results presented in Section 3.3.1. It is assumed that this payment is made the first year after construction is finalised. Further, a simplifying assumption has been made that the up-front water price will grow over time in line with inflation (i.e. 2.5% per annum). In practice, the ability or willingness for producers to pay for water allocations will be driven by the market and associated risk factors. As such, it is recommended that this is reviewed in the following stages of work.

Where market prices were used, an assessment of previous financial analyses was undertaken. This was workshopped and agreed with the project agronomist Peritus Ag. The water prices used for the basis of this analysis is displayed in the table below.

Table 12: Water pricing assumptions

	Price ($ / ML)
Medium Priority	$2,000
Low Priority	$1,000

Source: Literature review and discussions with Peritus Ag

It is recommended that the willingness- and ability-to-pay of potential farmers is reviewed and documented as part of the Detailed Business Case. In practice, the price that farmers are willing and able to pay may be higher or lower. Where high value crops can be grown, producers may be more willing and able to pay for highly reliable water. However, since the region does not have a documented track record of production for these crops, producers may seek a discount on market prices to encourage them to produce in Hughenden.

It is assumed that producers will fund the ongoing cost requirements outside of the initial water allocation charge. These costs are calculated as part of this analysis based on the ongoing costs and sustaining capital provided by Engeny, with the results presented in Section 3.3.4.

3.2.9 Project revenues

Project revenues have been calculated using water supply estimates provided by Engeny and the price per megalitre contracted as per Peritus. These demand estimates assume water sales and priorities for the customer groups included in the scope of this Project.

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In addition to water supply estimates, the other three components of revenue calculations are:

- Timing of the commencement of water sales (assumed to be in the fourth year after the end of construction when the dam is full)
- The proportion of water allocations used each year (assumed to align to water availability)
- Water prices (as outlined above).

Importantly, water demand and water prices are interrelated. That is, if prices for water (either allocation charges or tariffs) are too high, there will be less demand. This is a significant issue for the Reference Project, when pricing is assumed to recover the full costs (including capital), as the prices would be well above levels for which customers have indicated a willingness-to-pay.

Changes in revenue assumptions are included in the sensitivity analysis of FNVP results.

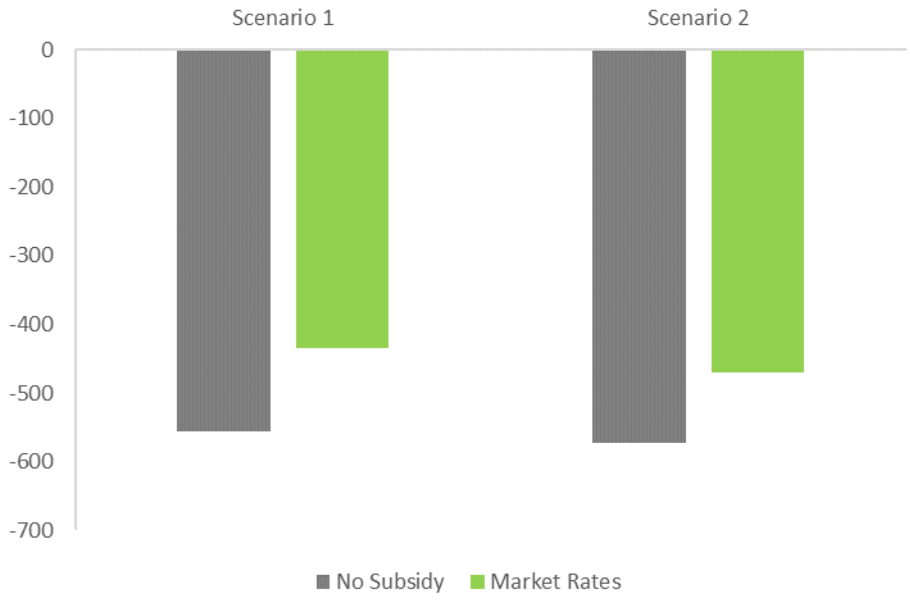
3.3 Whole of Life Financial Analysis

The figure below summarises the net financial impact (in FNPV terms using risk adjusted costs) to the proponent of delivering the Reference Project over a 50-year evaluation period, under the following pricing arrangements:

- No pricing recovery from customers (i.e. the gross financial cost to the proponent)
- Customers paying market rates for water allocations.

These results are discussed in more detail in the subsections below.

Figure 3: PV Summary of P90 Financial Analysis of the Reference Project, 50 Years of Operations



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3.3.1 Required Payment from Farmers

The analysis reviewed the up-front allocation charge farmers would need to pay in order fully fund the capital costs (i.e. negate the need for government funding). To undertake this analysis, the capital costs of the project were compared to the water allocation in each scenario. Where a higher cost per megalitre results, farmers would be required to pay a higher initial allocation.

Results are presented both discounted and undiscounted and considered with and without escalation. The discounted figures represent the cost of the project with considerations for the time value of money. Broadly, this captures peoples' preference to spend money in the future rather than today. Conversely, the undiscounted results may be looked at as a total with no consideration for when expenditure is incurred.

Escalated figures are adjusted for the expected inflationary impacts over the evaluation period. Unescalated figures are unadjusted. For the purposes of funding allocations, the undiscounted escalated figure is the most relevant as this an estimate of the cash cost of the project at the time of construction.

The results are shown in the table below.

Table 13: Required Payment from Farmers

	Discounted		Undiscounted	
	Unescalated	Escalated*	Unescalated	Escalated*
Scenario 1 – Mixed Cropping				
Capital Costs	$375,091,787	$418,260,839	$498,300,000	$556,370,015
Yield (GL, or '000 ML)	70	70	70	70
Cost per ML	**$5,358**	**$5,975**	**$7,119**	**$7,948**
Scenario 2 – Grazier Support				
Capital Costs	$386,006,559	$430,431,785	$512,800,000	$572,559,790
Yield (GL, or '000 ML)	84	84	84	84
Cost per ML	**$4,595**	**$5,124**	**$6,105**	**$6,816**

Source: NineSquared

** Capital costs are escalated based on the historic non-residual construction index. Capital expenditure occurs between 2022 and 2024 with escalation being incorporated up to expenditure is incurred.*

The magnitude of these costs and the unproven nature of agricultural production in the Hughenden region suggests that farmers would not be willing or able to cover the entirety of the upfront capital cost. As such, some level of government funding would be required.

In practice, a uniform upfront allocation payment would not be charged. Rather, the price would differ based on the associated water priority. If this pricing structure was adopted, it would be expected that cost of medium priority allocations would be higher than the calculated figure, with the cost of low priority allocations being lower.

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3.3.2 Funding Required from Government Assuming Market Rates

Since government funding is required, an analysis was undertaken to quantify how much funding is required assuming farmers pay the rates detailed in Section 3.2.8. The results of this analysis is detailed in the table below.

Table 14: Government contribution

	Discounted		Undiscounted	
	Unescalated	Escalated*	Unescalated	Escalated*
Scenario 1 – Mixed Cropping				
Capital Costs	$375,091,787	$418,260,839	$498,300,000	$556,370,015
Up-Front Payment	$52,597,060	$65,686,520	$100,000,000	$121,840,290
Government Contribution	**$322,494,727**	**$352,574,319**	**$398,300,000**	**$434,529,725**
Scenario 2 – Grazier Support				
Capital Costs	$386,006,559	$430,431,785	$512,800,000	$572,559,790
Up-Front Payment	$44,181,530	$55,176,677	$84,000,000	$102,345,843
Government Contribution	**$341,825,029**	**$375,255,108**	**$428,800,000**	**$470,213,947**

Source: NineSquared

** Capital costs are escalated based on the historic non-residual construction index. Capital expenditure occurs between 2022 and 2024 with escalation being incorporated up to expenditure is incurred.*

3.3.3 Discount rates – Financial analysis and regulatory pricing

For the FNPV analysis, SunWater's pre-tax Weighted Average Cost of Capital (WACC) of 7.4% was used evaluate the revenue and cost cashflows (also on a pre-tax basis).

3.3.4 Ongoing Farmer Contributions to Cover Ongoing Costs

It has been assumed that farmers will cover the ongoing cost requirements for the project. This ensures government is required to pay a share of the upfront cost only with no ongoing funding liability. To calculate this value, the ongoing costs over the 50-year evaluation period are compared to the availability of water over the same period.

The results of this analysis are presented in the table below.

Table 15: Ongoing farmer contributions ($/ML p.a.)

	2019 dollars	Year 1 dollars
Scenario 1 – Mixed Cropping		
Ongoing Costs per ML - Bulk	$21	$24
Capital Refresh	$1	$1
Ongoing Costs per ML - Distribution	$67	$76

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	2019 dollars	Year 1 dollars
Total	**$89**	**$101**
Scenario 2 – Grazier Support		
Ongoing Costs per ML - Bulk	$17	$20
Capital Refresh	$0	$1
Ongoing Costs per ML - Distribution	$74	$83
Total	**$92**	**$104**

Source: NineSquared

These results are inputs to the economic analysis. In the gross margin calculations, Peritus Ag assume an ongoing water price of $80 in 2019 dollars. By comparison, the ongoing farmer contributions required for this project appear within market standards relative to other irrigation schemes, albeit on the high side.

3.4 Sensitivity Analysis

Sensitivity analyses have been performed on the central case assumptions and key data inputs to provide further insight on the potential impact of movements in key variables on the NPV results of the Reference Project. The table below summarises the assumptions that have been adjusted for the purposes of completing the sensitivity analysis on the NPV of the Reference Project.

Table 16: Reference Project Sensitivities

Assumption / Key Data Inputs	Description
Water demand/pricing	Percentage variations ± 10/20%
Capital expenditure	Percentage variations ± 10/20%
Escalation	Absolute variations ± 1/2%
Discount rate	Absolute variations ± 1/2%

3.4.1 Required Government Contribution – Scenario 1 (Mixed Cropping)

The figure below illustrates the variation in the required government contribution for various unit values. As shown by the wider spread, variation in capital expenditure leads to significant changes in the required contribution. As such, the capital expenditure requires further evaluation at the next stage of analysis.

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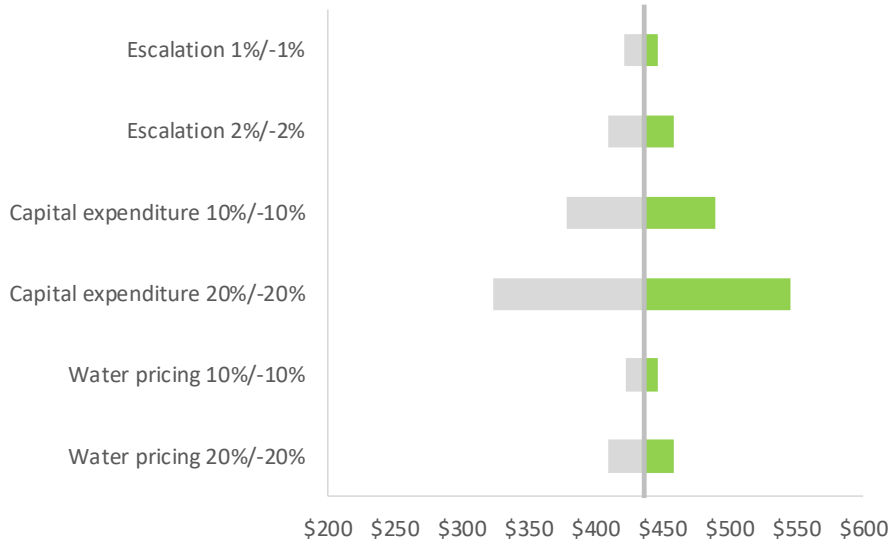
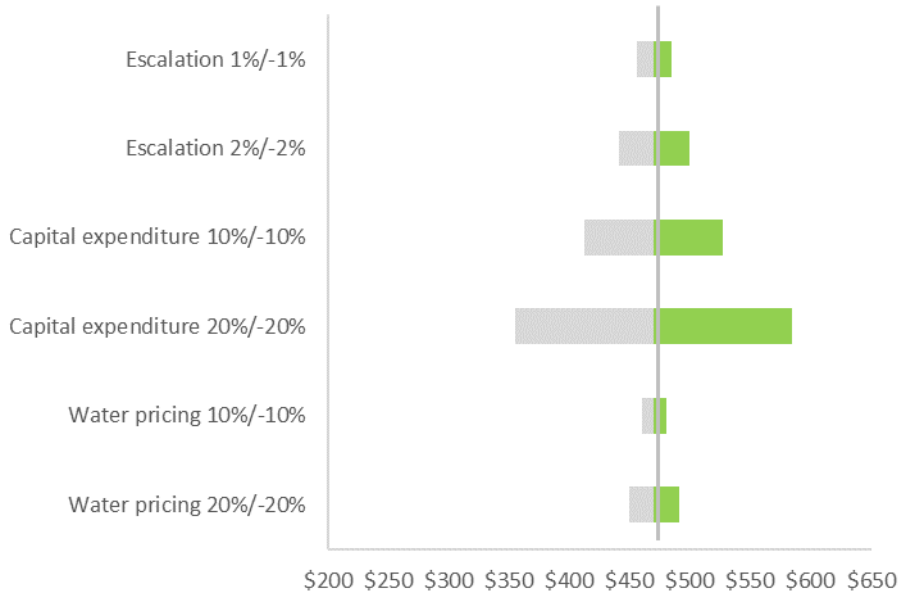
Figure 4: Scenario 1 Sensitivity Testing



3.4.2 Required Government Contribution – Scenario 2 (Grazier Support)

As with Scenario 1, capital expenditure leads to the widest variation in the required government contribution. This is illustrated in the figure below.

Figure 5: Scenario 2 Sensitivity Testing



3.4.3 Ongoing Charges

Two sensitivity tests were undertaken to determine the impact of increased ongoing costs or sustaining capital allowances on the variable water charge paid by producers. These tests include:

- Ongoing dam and distribution costs increase by 20%

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- Additional sustaining capital allowance of $1 million per annum.

When ongoing costs increase by 20%, the required farmer contribution per ML of water also increases by approximately 20%. This may occur where additional maintenance is required in the future.

Increases in the sustaining capital has a more significant impact on the ongoing cost. A $1m increase per annum leads to a 25% increase in ongoing costs. In the main case results, sustaining capital is only incurred in a single year 25 years post the end of construction. In practice, additional maintenance costs may be required throughout the evaluation period, which would lead to the increase in sustaining capital requirement.

The results are shown in the table below. Where there are variations in farmer contribution, the economic analysis is also impacted as the implied gross margin changes. As such, it is recommended that the sustaining capital allowance and the ongoing distribution and maintenance costs are reviewed as part of the next stage of work.

Table 17: Ongoing farmer contributions ($/ML p.a.) – Sensitivity Analysis

	2019 dollars	Year 1 dollars
Scenario 1 – Mixed Cropping		
Main Case	$89	$101
Ongoing Costs +20%	$107	$121
Sustaining Capital - $1m per annum	$112	$127
Scenario 2 – Grazier Support		
Main Case	$92	$104
Ongoing Costs +20%	$110	$124
Sustaining Capital - $1m per annum	$110	$125

Source: NineSquared

3.5 Findings and Conclusions

A Financial Net Present Value (FNPV) model was developed to calculate discounted net present values over 50 years.

In summary, the FNPV analysis concludes:

- Farmers are unlikely to be able to cover the upfront capital costs by themselves, meaning government funding will be required.
- The required government contribution is expected to range between $398m and $435m. However, market testing is required to minimise demand and revenue risk. Scenario 2 requires the highest capital contribution due to the larger area of irrigated land.
- It is expected that farmers will be able to cover the ongoing requirements of the project. This requires testing at the next stage of analysis with the market.

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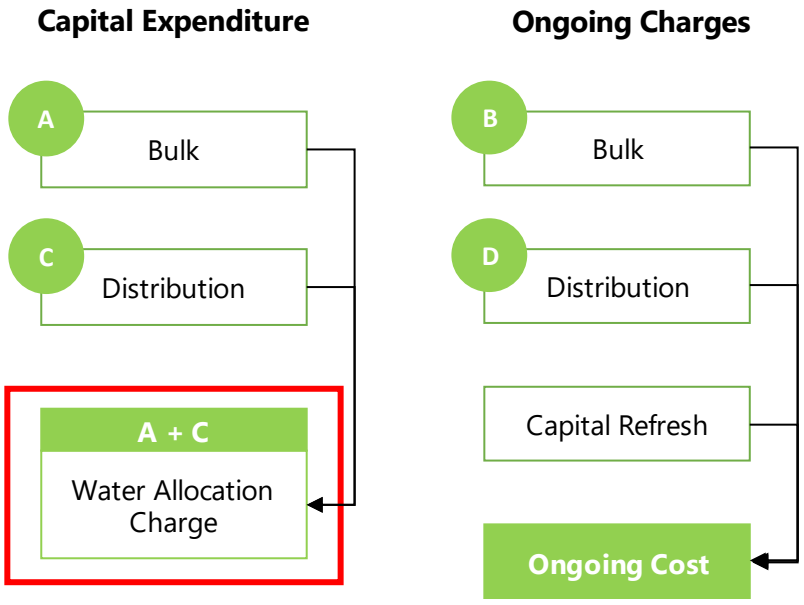
4. Affordability Analysis

4.1 Approach to assessing affordability

Earlier in this report the approach to water pricing and its modelling for this analysis was described. For the purposes of measuring affordability, it is assumed that customers will be charged the full ongoing project costs through their B and D tariffs, leaving the question of who pays for the capital charges, both the bulk and distribution components.

Figure 6 illustrates the approach to affordability analysis.

Figure 6: Affordability analysis process



4.2 Sources of funding for capital costs

The previous section discussed the costs and revenue projections for the project. The magnitude of the capital costs, especially relative to upfront revenue from the sale of water allocations, was apparent. Whilst government funding from the Australian Government has already been identified as an option, for completeness it is relevant to consider other funding sources and their impacts on affordability of the project.

Generally, capital costs for these types of projects can be funded through one or more of the following:

- Customers
- Government
- Private investors
- Value uplift.

The remainder of this section of the report focusses on the first two, customers and Government.

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The third – private investors – is considered an unlikely funding because current modelling suggests that to provide a commercial return the dam's water would have to be charged at price which would make the farming uneconomic, there would be no customers.

The option of value uplift - which involves sourcing funding contributions from those who benefit from the project, outside of the customers themselves – is also not considered relevant in this circumstance. Sourcing funding through value uplift could be done through applying a new tax, levy or charge on those who benefit directly or indirectly from the project. For example, landowners surrounding the dam who do not use the water for irrigation but now benefit from higher property prices could be made to contribute some of the capital cost.

In this case, however, land valuation and water allocation are separately priced commodities and it is expected that any value generated by the increased supply of water is captured in the price of water itself. Further, the introduction of a new tax or charge would be challenging in the Hughenden region. There is potential for this tax or charge to undermine community support for additional water supply if it comes at a personal cost to local stakeholders.

4.3 Customer affordability

Achieving full capital recovery from customers can be achieved through one of three pricing mechanisms:

1. All capital costs are included in the one-off allocation fee paid at the commencement of the water sales for the projects, and recurring annual water tariffs thereafter to be set to cover ongoing operational and sustaining capital costs only (i.e. no other capital component included);
2. No water allocation charges at the commencement of water sales, but recurring annual water charges set at levels to recover all costs, including all capital costs;
3. Allocation charges set at whatever the market is willing to pay (for this project the estimates are $2,000 and $1,000/ML for MP and LP water respectively), with recurring annual water charges thereafter set at the appropriate margin below full costs to take account of these upfront payments.

Each of the above pricing mechanisms over the same evaluation period will produce equivalent pricing outcomes for customers and revenue outcomes for the project owners.

However, this is a largely theoretical exercise because the evidence to date suggests there is no capacity for customers to fully pay for the costs of constructing, operating and maintaining the project, regardless of which of the three cost-recovery pricing mechanisms are chosen.

The FNPV calculations from the previous section shows that, using the first customer funding option described above, customers would need to make upfront payments for their water allocations of:

- Scenario 1 (Mixed Cropping): $7,948/ML
- Scenario 2 (Grazier Support): $6,816/ML

Under both scenarios these are at least several times greater than the assumed customer willingness-to-pay for water allocations of $2,000 and $1,000/ML for MP and LP allocations, respectively.

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4.4 Government as a funding source

Scenario 2 (Grazier Support) is considered less affordable than Scenario 1 (Mixed Cropping) because of lower revenues, even those capital and operating costs are marginally higher. The size of the funding task to be between $434.5 million and $470.2 million, as shown previously in Table 14.

Table 18: Government contribution as a funding source

	Discounted		Undiscounted	
	Unescalated	Escalated*	Unescalated	Escalated*
Scenario 1 – Mixed Cropping				
Capital Costs	$375,091,787	$418,260,839	$498,300,000	$556,370,015
Up-Front Payment	$52,597,060	$65,686,520	$100,000,000	$121,840,290
Government Contribution	**$322,494,727**	**$352,574,319**	**$398,300,000**	**$434,529,725**
Scenario 2 – Grazier Support				
Capital Costs	$386,006,559	$430,431,785	$512,800,000	$572,559,790
Up-Front Payment	$44,181,530	$55,176,677	$84,000,000	$102,345,843
Government Contribution	**$341,825,029**	**$375,255,108**	**$428,800,000**	**$470,213,947**

Source: NineSquared

** Capital costs are escalated based on the historic non-residual construction index. Capital expenditure occurs between 2022 and 2024 with escalation being incorporated up to expenditure is incurred.*

4.5 Sources of Government funding

The previous section identified the need for government funding for the project.

In theory, there are several potential sources of government funding available. However, this needs to be considered in the context of:

- The Flinders Shire Council has very limited capacity to fund the project in a substantial manner, and hence, the Australian and Queensland Governments are considered the only realistic sources of public funding;
- The Australian Government has already funded the initial stages of the project assessment studies and other related project activities, and has indicated a willingness to make further contributions towards the project;
- The Queensland Government has not publicly expressed any interest in making funding contributions to the project or any interest in being the proponent for this project;
- Grant funding is by far the preferable government funding option, in terms of minimising costs and hence affordability for customers, as opposed to debt or equity contributions (both of which increase the project cost base).

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Table 19 provides additional information on the impact of affordability, from a customer's perspective, in relation to the three types of funding – grant, equity or loan (this table is partially based on material previously provided by NineSquared to Building Queensland, as part of a previous financial advisory engagement).

Table 19: Funding sources

Funding Source	Mechanism	Impact on Customers' Affordability	Comment
Australian Government grants	National Water Infrastructure Development Capital Fund	Potentially large, as there would be no return on capital requirement and customers would be paying lower bound prices only if this funding covered all capital costs	The magnitude of the funding gap as highlighted in this section suggests full funding from this source is unlikely, noting that this is a capped funding scheme shared across all of Australia
Queensland Government grants	No specific funding source exists, at least for amounts of the size needed to make a material difference to customer affordability	Potentially large, as there would be no return on capital requirement and customers would be paying lower bound prices only if this funding covered all capital costs	It is noted that the Australian Government's funding commitment to Rookwood Weir in 2017 had a requirement of a matching State contribution to capital funding, however, no suggestion from either government has been made publicly for this project
Government equity contribution	The Queensland Government (e.g. via SunWater or other Government owned entity) could make an equity injection (investment), but only if it was the ultimate project proponent, which is not proposed	Nil, because return on investment required (presuming the Government funding has an expectation of a commercial return on the investment)	This would only impact affordability if there was a reduced return on investment requirement
Australian Government subsidised loan facility	Northern Australia Infrastructure Facility and National Water Infrastructure Development Loan Facility	Marginal impact only as both funds require repayment of loan principal and interest (although subject to a level of subsidy)	Both funds offer concessional loan funding, however these require repayment with interest.

The option of funding the project via subsidised loan funding from the Australian Government is discussed in the table. This option merits further consideration as it has been the subject of discussions between the proponent and the Government.

Partial funding of the capital costs of the project may be worthy of further consideration in the next phase of project assessment; however, this is closely linked to more detailed customer willingness and capacity to pay for water information being assembled.

As outlined earlier, customers will contribute in the form of upfront capital contributions - to buy their water allocations - or through ongoing water charges after service delivery commences. If loan funding is sourced, this increases project costs and ongoing charges that will need to be passed on to the customers.

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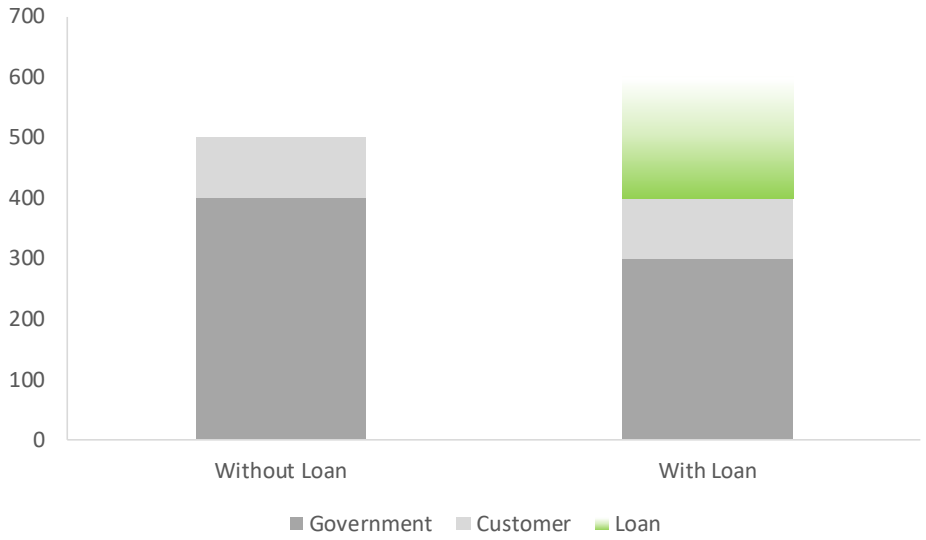
In the following simplified example, the capital costs are $500 million and customers contribute $100 million, with the Australian Government contributing the remaining $400 million through grant funding; i.e. there is no requirement for interest or loan repayments on the Government's contribution.

However if, say, the Government's grant funding was $300 million and $100 million was via subsidised Government loan funds, the customers would, over time, have to fund a further $100 million for repayment of these loans over time ***plus interest costs*** incurred during this loan repayment period.

Figure 7: With and without loan comparison



The capacity of customers to pay even the currently assumed upfront water allocation charges and ongoing water charges are identified later in this report as areas needing further refinement. This will have a large bearing on the capacity of the project to support loan fund repayments and is recommended to be further assessed after this additional customer information is attained.

In addition, if customer water allocation charges were to remain as currently assumed ($2,000 and $1,000/ML for medium and low priority allocations) and additional ongoing customer water charges were incurred, this would impact the economic assessment of the project's viability, which would also need to be reassessed in the next stage.

In the Cost Benefit Analysis described in the separate Economic Analysis Report, the size of the gross margin for each of the irrigators' crops impacts the Benefit Cost Ratio (BCR) of the project. If ongoing water charges were increased to cover costs associated with loan funding, the gross margins would be reduced, which would lead to a reduction in the BCR for the project.

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4.6 Findings and Conclusions

The affordability of the project is primarily driven by how the capital costs are funded. Consistent with the findings of the financial analysis, this is because the capital costs are sizable and the water sales (from which revenues can be earned) are relatively modest by comparison.

Both project scenarios require significant capital contributions if they are to produce a positive FNPV.

In both scenarios assessed (i.e. diversified cropping and grazier support), if customers only contributed their nominated willingness to pay towards capital funding, then substantial funding from alternative sources would be required.

In terms of alternative funding sources, government capital grant funding would have the most impact. Funding through subsidised government loan programs does not materially impact the levels of affordability, as these would still require principal and interest repayments.

Assuming customers only contributed the assumed willingness-to-pay capital contributions (i.e. water allocation charges of $2,000 and $1,000 for MP and LP allocations), the size of the funding gap for the project is of the range of $398 to $429 million, expressed in 2019 dollars. The difference in these estimates relates to which of the two modelled cropping scenarios is adopted, as there are differing distribution infrastructure requirements between the two.

When account is taken of cost escalations between now and when construction and operational costs are incurred, this rises to between $435 and $470 million.

The sensitivity analysis undertaken highlights how certain assumptions – especially capital costs – can have a material impact on this funding gap.

Further negotiations with the Australian Government are considered essential.

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5. Further Refinement of Financial Analysis

The engineering, agronomic and other studies undertaken as part of the Hughenden Irrigation Project Preliminary Business Case has provided sufficient information to develop a comprehensive financial model to assess the viability of the project and assess the extent of government funding support that might be required.

However, a number of areas of further project assessment will help refine the financial modelling results (most of which will allow further refinement of the economic modelling analysis also).

Areas of further project refinement that will improve the veracity of the financial modelling include:

- **Overall project size and scope** – likelihood of obtaining the level of water allocations required and further assessment on the level of reliability of the allocations; i.e. MP versus LP allocations.
- **Cropping options** – further assessment of cropping options, including marketing opportunities; desirably this would involve direct engagement with potential customers with an interest in purchasing land and water allocations from this project.
- **Willingness-to-pay** – further assessment of customer willingness to pay for water allocations and other ongoing water charges.
- **Foundation customer** – identification of one or more large potential "foundation customers" with an interest in making a commitment to the project at this early stage, desirably through financial commitment to the further development of the project, in return for a priority position when water allocations are granted.
- **Construction risk assessment** – refinement and, where possible, elimination of project risks, leading to increased certainty of capital costs, including reduced contingency allocations in the costings.
- **Construction cost escalation** – project-specific analysis of construction cost escalation assumptions.
- **Implementation costs** – are all regulatory approvals likely within the projected timeframes and cost estimates?
- **Water pricing model** – price model refinement to more closely align with how an economic regulator (such as the Queensland Competition Authority) would assess the various water tariffs (A, B, C and D), including whether a Headworks Utilisation Factor adjustment is requirement for Tariff A to take account of differences in reliability between MP and LP customers.
- **Peer reviews** – this could relate to some of studies developed as part of the Preliminary Business Case.

These are areas which would ordinarily be expected to be assessed during a Detailed Business Case phase, or some equivalent project assessment exercise.

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