Technical paper factsheet:

Options and portfolio shortlisting







Figure 1 – Shortlisting process

The draft Central Coast Water Security Plan lists our preferred water supply and demand option types. You may be asking, how did we come up with this shortlist?

Figure 1 shows the overall process – so let's break it down into the steps we took.

Firstly we revisited the potential options identified from our last strategy, WaterPlan 2050 (adopted in 2007).

We took an 'all options on the table' approach and combined:

- the options from WaterPlan 2050
- new options suitable for the Central Coast
- the option types considered by Hunter Water Corporation (HWC).

This resulted in a **long list of 52 options**, which were at varying stages of preliminary development.

With a group of experts and stakeholders, we then applied some engineering judgement using a range of criteria to reduce the longlist to a **preliminary shortlist of 35 options** that were marked for further consideration.

Engineering consultants were brought in to further develop some of the most promising options so that we'd have a better idea of the: cost, technical feasibility, delivery timeframes, regulatory approval pathways, environmental and social implications.

From there, the consultant's feasibility studies, community engagement and hydrological modelling (joint with HWC), helped us to land at a list of **10** shortlisted options.

Out of those 10 options, we formed **five shortlisted portfolios**, according to various themes.

An economic **cost benefit analysis (CBA) model** was then used to compare and rank the portfolios against each other according to total expected net present value (NPV) and comparative cost benefit. The model also outputted the indicative timing of options and overall Long Run Marginal Cost (LRMC) of the portfolios.

The results of the CBA model, and other earlier steps, then fed into our **Multi-Criteria Assessment (MCA)** which gave us our decision-making framework that assisted us in deciding what was the **preferred Portfolio**. You can read more about the MCA process in the Decision making framework technical paper factsheet.



Dam enlargement

We looked at enlarging the existing Mangrove Creek Dam. We investigated the following options:

- Storing an additional 40 billion litres of water
- Storing an additional 80 billion litres of water



Desalination

Desalination plants remove salts from seawater to create drinking water.

We looked at constructing one at the existing Toukley Wastewater Treatment Plant.

We also allowed for carbon offsets to account for the carbon created through the electricity requirements.

We considered a desalination plant that produces:

- 20 million litres of water per day
- 30 million litres of water per day



Groundwater

Groundwater can be found in fractured rock or layers of sand and gravel. It would be pumped out and treated for our drinking water.

We looked to produce a further 2 million litres of water per day with a peak of 5 million litres of water per day.



Purified recycled water (drinking)

We looked at purified recycled water – which would treat our wastewater through advanced treatment to make it safe and suitable to be stored in Mardi Dam for our drinking water.

We looked to produce 4.5 million litres of water per day with a peak of 6 million litres per day.



Rainwater tank scheme

We considered a rainwater tank program to subsidise the supply of rainwater tanks to around 45,000 existing homes.

We looked at saving approximately 3.5 million litres of water per day of drinking water.



Recycled water (non-drinking)

We already treat some wastewater to bring it to a standard for non-drinking uses.

We considered expanding the existing recycled water distribution and increase use by our major recycled water customers.

We looked at saving approximately 1.0 million litres of water per day of drinking water.



Water sharing between regions

We considered our current water sharing with Hunter Water by upgrading existing water sharing assets and providing additional storage at Mangrove Creek Dam. This particular option is only feasible if we proceed with enlarging the dam. There maybe other water sharing opportunities emerge from the Lower Hunter Water Security Plan. The combination of dam enlargement and inter region transfer would provide approximately 18.5 million litres of water per day on average.



Water transfers

We considered the construction of a pipeline that would transfer water from the Lower Mangrove Creek Weir into Mangrove Creek Dam – which would effectively increase the catchment area of the existing dam. This would provide approximately 2 million litres of water per day on average.

Figure 2 - Shortlisted options

Figure 2 shows a summary of the 10 shortlisted demand or supply options; both the dam enlargement and desalination options have two options listed within them.

Portfolio 2 - Summary

Climate independent (upfront capacity)	Water conservation	5 ML/d Groundwater	1.1 ML/d Recycled Water (non-drinking)	6 ML/d PRW	30 ML/d Desalination
Capital Cost (\$M)		0.5	6.6	47.7	230.1
Yeild - modelled (ML/d)		1.9	1.1	4.4	26.6
Year Commissioned		2035	2037	2038	2043
Shortfall in drought (ML/day) assuming 125 L/p/d		33.0	33.0	28.1	No further work

Figure 3 - Preferred Portfolio 2 - Climate Independent (upfront capacity)



Figure 3 shows the key information for the preferred portfolio: Climate independent (upfront capacity). Overall, this portfolio was cost effective, highly reliable, high yielding, while minimising environmental and social impacts, relative to the other portfolios.