5 Strategic context and need

5.1 Overview

As Canberra has grown, so has the demand for water. Significant planning has been undertaken to identify options for securing the supply of water for existing and future ACT and Queanbeyan residents, leading to recommendations by the proponent to the ACT Government in 2007. Those recommendations recognised the need to diversify the source of water supply. The work was based on six key assumptions:

- The ACT Government water conservation targets will be met;
- Environmental flows will be delivered according to ACT Government guidelines;
- Catchment re-growth will respond to bushfires;
- The population will continue to grow according to the ACT Government's spatial plan;
- · ACTEW will meet its service obligations to customers; and
- Projections of climate change and variability will occur in line with predictions.

More recently, the proponent advised the ACT Government that assumptions relating to climate change and climate variability no longer appeared to hold. This was demonstrated by declines in inflows to the ACT's water storages compared to the long term average. There has been a significant decrease in runoff to the ACT's water storages over the past six years. In 2006, inflows were the lowest on record.

The proponent's advice was that the medium to long term outlook was for a further significant deterioration in inflows.

Population projections also changed with projections by the Australian Bureau of Statistics of increases greater than foreshadowed and used in the Canberra Spatial Plan.

The proponent indicated that the key challenge for the medium to long term was to build additional water supply assets that could cope not just with substantially reduced inflows but also with more frequent and longer droughts.

The proponent recommended that the ACT Government agree ACTEW should:

- Immediately commence the detailed planning and construction of an enlarged Cotter Dam to 78 gigalitres capacity (construction commenced in November 2009);
- Add to its capacity and operational flexibility to extract water from the Murrumbidgee River by undertaking the work necessary to proceed to construction of a pumping capability near Angle Crossing (the preferred project); and
- Obtain additional water from a source not largely dependent on rainfall within the ACT catchments through either:
 - The Tantangara transfer option; or
 - The Water Purification Scheme.

The strategies that set the context for these recommendations and the preferred project need are described in section 5.2. The preferred project need is also driven by the future growth and development of the ACT region, guided by forward planning documents such as the Canberra Plan (refer to section 5.3.6). Information on preferred project benefits, objectives and timing is provided in section 5.4.

5.2 Strategic context for the preferred project

The Murrumbidgee River forms part of the Murray-Darling Basin. Planning and policies in relation to the Murray-Darling Basin form part of the strategic context for the preferred project.

5.2.1 Murray-Darling Basin and national water planning

Water availability in the Murray Darling Basin

At the Murray-Darling Basin Water summit, convened by the Prime Minister on 7 November 2006, it was agreed to 'Commission the CSIRO to report progressively by the end of 2007 on sustainable yields of surface and groundwater systems within the Murray-Darling Basin, including an examination of assumptions about sustainable yields in light of changes in climate and other issues.'

As a result, the CSIRO was contracted by the National Water Commission to report on current and future water availability in the Murray-Darling Basin. The findings of this assessment are documented in the report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project (CSIRO 2008a).

The Sustainable Yields Project is a rigorous and detailed basin-scale assessment of the anticipated impacts of climate change, catchment development and increasing groundwater extraction on the availability and use of water resources. It represents the most comprehensive hydrologic modelling ever undertaken for the entire Murray-Darling Basin and includes modelling of rainfall-runoff and groundwater recharge. The information is linked to modelling of all major river systems and modelling of the major groundwater systems of the Murray-Darling Basin and their connections to the surface water system.

The study summarises a number of key findings for the Murrumbidgee River region, which includes the ACT, including:

- Average surface water availability for the Murrumbidgee River under the historical climate is 4,270 GL/year. The relative level of surface water use under current development is 53% (2,257 GL/year) which represents an extremely high level of development;
- If the recent climate (1997 to 2006) were to persist, average surface water availability would reduce by 30 %, diversions by 18 % and end-of-system flow by 46 %. The relative level of surface water use would be 6 %; and
- The best estimate of climate change by 2030 is less severe than the recent past. Average surface water availability would reduce by 9 %, diversions by 2 % and end-of-system flow by 17 %.

The study states that 'New South Wales and Australian Capital Territory urban water demand would be met under ... the dry or wet extreme 2030 climates'.

The findings of this report are consistent with CSIRO climate change advice that was used to inform the ACT Government before it made its decisions in October 2007 on ACTEW's major water security projects.

The proponent has modelled water extraction from the Murrumbidgee River for the preferred project and has determined that the most likely annual average extraction rate would be 8 to 10 GL initially. This amount represents approximately 15 % of the ACT and region annual average water use. This would result in less than 1 % change in flows leaving the ACT via the Murrumbidgee River and less than 5 % of the average flow at Angle Crossing. The extraction from the Murrumbidgee River could also be increased should additional flows be released from Tantangara Reservoir via ACTEW's so called Tantangara Transfer, providing additional flexibility to the preferred project and additional water security to the ACT region.

The proponent acknowledges that flow in the river is highly variable. When flow is low, water extraction will be limited or cease so that the flows necessary to maintain the environmental health of the Murrumbidgee River are protected.

The National Water Plan

On 23 May 2008 the Murray-Darling Basin Ministerial Council approved the ACT Water Cap, the total amount of water the Territory is allowed to use or divert from the Murray Darling Basin. The ACT Water Cap is:

- 40 GL net (42 GL minus a 2 GL saving allocated to the Living Murray Initiative);
- · Climate-adjusted as recommended by the Independent Audit Group; and
- Reviewed and increased by 0.75 % of the current per capita consumption of water for population growth of Canberra and Queanbeyan.

The ACT Water Cap allows the ACT, mostly through ACTEW's network (as presented in Figure 3.2), to take a net 40 GL of water per year from rivers in the Basin within the ACT, that is, total water extracted less water returned to the river system from sewerage treatment facilities in the ACT and Queanbeyan.

The 40 GL/year ACT Water Cap is enough water for the ACT to use sustainably. For example, in 2007-08, the ACT and Queanbeyan net use was approximately 21 GL, made up of 44 GL through ACTEW's network, plus about 4 GL used by others, less 27 GL returned to the river.

The National Water Initiative

The National Water Initiative is Australia's enduring blueprint for water reform. Through it, governments across Australia have agreed on actions to achieve a more cohesive national approach to the way Australia manages, measures, plans for, prices, and trades water. The Intergovernmental Agreement on a National Water Initiative was signed at the 25 June 2004 Council of Australian Governments (COAG) meeting.

Under the National Water Initiative, governments made commitments to:

- Prepare water plans with provision for the environment;
- Deal with over-allocated or stressed water systems;
- Introduce registers of water rights and standards for water accounting;
- Expand the trade in water;
- Improve pricing for water storage and delivery; and
- Meet and manage urban water demands.

Each state and territory government was required to prepare a National Water Initiative implementation plan, accredited by the National Water Commission. Under its plan, the ACT Government committed to provide a long term, reliable source of water for the Territory and region, by improving water use efficiency and by augmenting the source of supply.

This preferred project is one of the principal means of augmenting the source of supply proposed in the National Water Initiative.

5.3 Preferred project need

The ACT Government's water resources strategy, '*Think Water, Act Water*', is consistent with the National Water Initiative. The preferred project is one element of an integrated strategy that is seeking to improve the efficiency of water utilisation, implement demand management measures and diversify and supplement water supply sources. Chapter 7 describes the options and alternatives considered by ACTEW to provide a secure future water supply for the ACT.

5.3.1 ACT's current water situation

The ACT region has experienced severe drought conditions over the period 2001-2006. Total inflows into Cotter Dam and Googong Reservoir over the period 2003 to 2009 has averaged approximately 71 GL/year, well below average inflows of 200 GL/year over the past 130 years (ACTEW 2008b).

In 2006 alone, water storage decreased from 51% to 39%. Inflow of water into the ACT catchments for 2008 were also down by almost 90% from the long term average, exceeding the decrease from the long term average storage inflow by 2030 as predicted by CSIRO. The medium and long term outlook (i.e. beyond 2030) of water supply suggests a further decline to long term average inflows.

These dramatic reductions in storage inflows can be seen in Figure 5.1 and Figure 5.2. Figure 5.1 shows the combined inflow for Corin, Bendora and Googong reservoirs between 1871-2008 and Figure 5.2 shows the gradual decline of the total water storage of Corin, Bendora and Googong reservoirs from 2000 to 2009.



Figure 5.1 Combined Corin, Bendora and Googong inflows (1871-2008)

There is increasing evidence that the recent climatic patterns that have resulted in a significant decline in inflows will now occur more frequently and with greater variability (ACTEW 2008g).



Figure 5.2 Total water storage of Corin, Bendora and Googong reservoirs from 2000-2009

5.3.2 Demand management

The ACT Government's water resources strategy, '*Think Water, Act Water*', encompasses and supports the elements of the National Water Initiative that are applicable to the ACT. The strategy provides key targets on water saving and water re-use:

- A 12 % per person reduction in mains water by 2013 and 25% by 2023 through water efficiency measures, sustainable water recycling and the use of stormwater and rainwater; and
- An increase in the use of reclaimed water from 5% to 20% by 2013.

It is intended that a variety of means be used to achieve these targets, including:

- Education and advertising;
- Permanent water conservation measures;
- Effluent reuse;
- Stormwater harvesting;
- · Rainwater tanks;
- Greywater reuse;
- Water efficient appliances and fittings;
- · Leakage reduction;
- · Government subsidised indoor and outdoor water tune-ups;
- A requirement for new developments to achieve a 40% reduction in water use through water-sensitive urban design; and
- Ongoing pricing reforms.

It is predicted that demand management alone could achieve the 12% by 2013 target. Indeed, permanent water conservation measures and a general increased awareness of the need for water conservation may well have already delivered this saving.

Even with this saving, it is expected that source substitution (for example, rainwater tanks, greywater reuse, effluent reuse, stormwater harvesting) will be required to reach the 25% by 2023 reduction target. As source substitution methods are relatively expensive, it is expected that the 12% target by 2013 will be more easily achieved than the 25% target by 2023.

Permanent water conservation measures were introduced in Canberra and Queanbeyan in November 2005. However, they only applied for a year before temporary water restrictions were reintroduced. The component of the permanent measures that has the most significant impact on consumption is limiting sprinkler and other irrigation systems to the hours of 6 pm to 9 am, except during winter. This measure encourages garden watering in the morning or evening when absorption rates are higher than in the middle of the day. The intent behind the permanent measures is to discourage inefficient water use through means that should cause very little inconvenience to the community.

The target reduction for the permanent measures was 8%. A 23% reduction in consumption was observed during the year that they were introduced, relative to the pre water restriction consumption pattern. However, this reduction is unlikely to be sustained in the long term because:

- The permanent measures were applied after a severe drought. Awareness of water conservation was at a very high level and many gardens that required high water use were adversely affected by the drought and had not been re-established; and
- Many users may be maintaining habits established during the water restrictions scheme, such as only watering every second day. These patterns may not be maintained indefinitely.

5.3.3 Meeting the demand for water in the ACT

The report *Options for the Next ACT Water Source* (ACTEW 2004) predicted when a new water source was needed for the ACT by analysing estimates of population growth, measuring existing water consumption patterns, current environmental flows and used historical climate data. This information was then modelled to predict the timing of a new supply based on the size of the population that could be served. The output from this model identified the need for a new water supply when the population of the ACT and Queanbeyan reached 405,000. The Australian Bureau of Statistics mid-range forecast estimates that this population would be reached in 2017. As a result, the *Options for the New ACT Water Source* (ACTEW 2004) report identified that there was a need to re-examine these assumptions, as well as the modelling methodology, and include effects due to bushfires, climate change, climate variability, water consumption and possible water supply to NSW.

The report *Future Water Options for the ACT and Region* (ACTEW 2005a) suggested that bushfire, climate change impacts and other factors mean that it would not be feasible for more efficient water use alone to meet the needs of the future population. The report suggested that based on the outcomes of a preliminary assessment, the likely timing for a new water source would need to be bought forward.

Options for the Next ACT Water Source (ACTEW 2004) noted that the need to consider water supply options for the ACT arises from possible shortages in water availability from the existing storages (dams in the Googong and Cotter catchments) that are predicted to emerge within the next ten to twelve years. While in most years the water supply system is adequate for the ACT's needs, a repeat of the worst sequence of drought years experienced in the last 100 years combined with increased population growth means that the water supply is at risk of not being able to meet the territory's requirements.

While drought contingency projects enable ACTEW to avoid stage 4 restrictions (no use of potable water for gardens, and permits system for other external uses of potable water), it became clear that additional supply was required to secure long term supply. To combat the effects of climate change and variability, additional supply capacity and greater diversification of water sources was required.

The proponent completed a comprehensive and detailed review of the ACT and region's water supply options and submitted four key water security recommendations to the ACT Government in July 2007, when it released the report '*Water Security for the ACT and Region: Recommendations to the ACT Government*' in light of the significant reductions of inflows to storages. The purpose of this report was to recommend options to further secure the water supply for Canberra and the region. The impact of climate change and climate variability meant that it was necessary to review water security and the need for diverse supply options. These circumstances meant that options less dependent on rainfall and local catchments, such as water purification and the Tantangara transfer, were examined.

Ten supply options were examined in detail. Modelling of the options revealed that if only one option was to be implemented, recovery from the drought is likely to be protracted, unless there is a return to average rainfall conditions.

The recommendations of the report are as follows:

'1.Immediately commence the detailed planning and construction of an enlarged Cotter Dam to 78 GL capacity;

2. Add to its capacity and operational flexibility to extract water from the Murrumbidgee River by undertaking the work necessary to proceed to construction of a pumping capability near Angle Crossing, which could also be used to transfer additional flows released from Tantangara Dam if such flows become available;

3. Obtain additional water from a source not largely dependent on rainfall within the ACT catchments through either:

- a. The Tantangara Transfer option; or
- b. The Water Purification Scheme; and

4. Assess how any additional energy used may be offset through measures such as carbon offsets (such as planting of trees) or renewable energy capacity.'

These recommendations were generally accepted by the ACT Government, and work commenced on initial design and seeking approvals for enlargement of the Cotter Reservoir and the Murrumbidgee to Googong Water Transfer.

In December 2008, ACTEW released the report '*Water Security for the ACT and Region: Progress Report and Recommendations to ACT Government*'. The report made recommendations to continue work on the enlarged Cotter Dam; to begin work on the Murrumbidgee to Googong Water Transfer; to pursue the Tantangara Transfer; and to defer the construction of the Demonstration Water Purification Scheme subject to the successful implementation of the other three water supply projects and no further deterioration in dam inflows. In March 2009 the Government announced it had accepted ACTEW's recommendations.

5.3.4 Meeting the demand for water in NSW

Importance of ACTEW's Water Security- Major Projects to NSW

ACTEW's Water Security-Major Projects has key benefits for the NSW Government's Sydney-Canberra corridor, particularly in securing the future availability of water to sustain Queanbeyan's expected substantial growth over the next thirty years, including new growth areas. Additionally, all modeling undertaken by ACTEW in the development of the Major Projects included an allocation for future cross border supply to areas such as Yass, Bungendore or Goulburn should the need arise.

Supplying water to the growth area

The NSW and ACT governments have a Regional Management Framework to manage cross border matters, which includes a memorandum of understanding on Cross Border Water Supply, which has also been ratified by the Commonwealth Government.

The NSW Department of Planning's Departmental Review of the Queanbeyan City Council Residential and Economic Strategy 2031 states:

'The power of the ACT Government to be involved with the decision making process over the proposed residential development proposals in the area derives from its control of the water supply.

Both the Settlement and Water Supply MOUs require the NSW Government to consult and work with the ACT Government in the preparation of a cross border water strategy before water is allocated.'

The NSW government's objectives for the corridor; to provide for the ongoing flow of trade, tourism and ideas within the region and between capital cities and the eastern seaboard, relies on appropriate natural and built resources. Water is a key resource that has the capacity to constrain development if its availability cannot be secured.

The infrastructure, which is proposed under ACTEW's Water Security – Major Projects, is aimed at securing supply for the ACT and region, which includes Queanbeyan. The Murrumbidgee to Googong Water Transfer is a vital part of the ACT's water security, transferring water from the Murrumbidgee River to the Googong Reservoir via Burra Creek in NSW. The pipeline will travel through NSW and therefore NSW planning approvals are required.

ACTEW's modelling and planning for the future water supply has taken into consideration the developments that are taking place in Queanbeyan. The NSW Government has a 25 year land use strategy which will provide up to 25,200 new homes for the 46,350 additional people expected to be living in the region by 2031. This includes 14,200 in the southern sub region, most of which will be in the Queanbeyan area. These include the developments of Googong and Tralee.

Council also recognises that the cross border management framework has influence on the residential and employment land development in Queanbeyan.

5.3.5 The link between the Murrumbidgee to Googong Transfer and the Tantangara Transfer

The Tantangara Transfer, although a discrete project amongst ACTEW's water security projects, is closely linked to the project. The transfer will provide extra water security and further diversity to the region's water supply, as it does not depend upon rainfall falling in local catchments. In prolonged and severe droughts of the kind that now need to be accommodated; the Enlarged Cotter Reservoir and the Murrumbidgee to Googong Water Transfer together may not suffice. The Tantangara Transfer will give access to water purchased from downstream NSW irrigators who are willing to sell.

The Tantangara Transfer involves the following main actions:

- Purchasing water licenses from irrigators downstream of the ACT;
- Storing purchased water in Tantangara Reservoir, a reservoir located well upstream of Angle Crossing;
- Transferring that water from Tantangara to the ACT via the Murrumbidgee River; and
- Transferring the water from the Murrumbidgee for storage in Googong Reservoir.

Alternatively, the water from Tantangara releases can be pumped from the Murrumbidgee River to the Mount Stromlo Treatment Plant via the Cotter pump station, although this is unlikely to be a frequent occurrence (refer to section 7.2.2). Economic and hydrologic studies show that the Murrumbidgee to Googong Water Transfer is viable without the Tantangara Transfer.

The Tantangara Transfer, while endorsed by the ACT Government, requires the following steps to take place before it can be implemented:

- The purchase of about 20 GL of general security water entitlements and conversion to about 11 GL of high security water entitlement;
- Intergovernmental arrangements to allow water trade to occur between NSW and ACT; and
- A commercial agreement between ACTEW and Snowy Hydro Limited for use of infrastructure to store and release water purchased by ACTEW to the ACT when required from Tantangara Reservoir.

Water entitlements are currently being purchased by ACTEW on the water market. These entitlements will remain within the Murrumbidgee Regulated River Water Source. In order to transfer water allocations to the Googong Reservoir, ACTEW will enter into a commercial agreement with Snowy Hydro Limited and negotiate intergovernmental arrangements between NSW and ACT Governments. The preferred project involves a high level of legal and political assurance to provide the confidence to rely on this option. The proponent is confident that water can be transferred from NSW to the ACT due to the significant amount of cooperation and support from the NSW Government. The Tantangara Transfer is relatively low cost, would enhance the diversity of the ACT and Queanbeyan water resources and improve water security.

5.3.6 Future development of the ACT

The Canberra Plan (ACT Government 2004d), released in March 2004, sets out the long term vision for the ACT. As a strategic planning framework for the ACT Government and the community, it provides the direction for Canberra's future growth and development. *The Canberra Plan* has three key planning components Building our community: *the Canberra Social Plan* (ACT Government 2004f), *The Economic White Paper*,(ACT Government 2004e) and *The Canberra Spatial Plan* (ACT Government 2004c).

The draft Canberra Spatial Plan (2003) stated (page 60) that '[recent] events and the strong urban growth within the region have highlighted the need to plan for water supply on a regional basis. In particular, the viability of potential development areas outside the ACT is dependent on the availability of a potable water supply. The Territory will, through a range of strategies, defer as long as possible, the need for a new dam. However, with the continued development of the ACT and surrounding region, additional potable water supplies are expected to be required in the long term.'

One of the actions recommended by the final Canberra Spatial Plan (ACT Government 2004c) is 'planning for an adequate new water supply undertaken with ACTEW in the context of an agreed regional water supply strategy.' Thus, Canberra's key planning document endorses the continued planning for the next supply, and assumes that planning would occur, taking regional growth into consideration.

The preferred project also supports the strategic aims of the NSW Government for intergovernmental collaboration to support growth in the NSW southern region as outlined in the draft *Sydney-Canberra Corridor Regional Strategy 2007-31* (NSW DoP 2008).

5.4 Preferred project benefits and objectives

5.4.1 Benefits

The preferred project is beneficial because it:

- · Increases the diversity of water sources in the ACT region;
- Provides additional supply into Googong Reservoir. Inflows into Googong Reservoir have decreased by about 85 % during the period from 2001 to 2008;
- Provides greater operational flexibility in extracting water from the Murrumbidgee River than is possible solely with the Murrumbidgee River pumping station located near the Cotter Pump Station;

- Importantly, in the case of severe bushfires in the Cotter catchment (such as occurred in 2003), it provides a reliable alternate water source to Googong Reservoir and therefore will lower the risk of adverse impacts on the ACT region's water supply, should any fires occur in the future; and
- The most recent modelling (March 2009) indicates a net economic benefit in excess of \$500 million over the period 2010 to 2030 (CIE, 2009).

5.4.2 Preferred project objectives

The overall objective of the preferred project is to secure a water supply for the ACT that can account for the more frequent, longer, drier droughts that are predicted to occur without having to go into high-level water restrictions for extended periods.

The preferred project will assist in securing the ACT's water supply by transferring water from the Murrumbidgee River to Googong Reservoir in a sustainable manner, which:

- Protects the health and ecology of the Murrumbidgee River, Burra Creek and Googong Reservoir;
- · Does not cause significant impact in the pipeline corridor; and
- Does not significantly impact local communities.