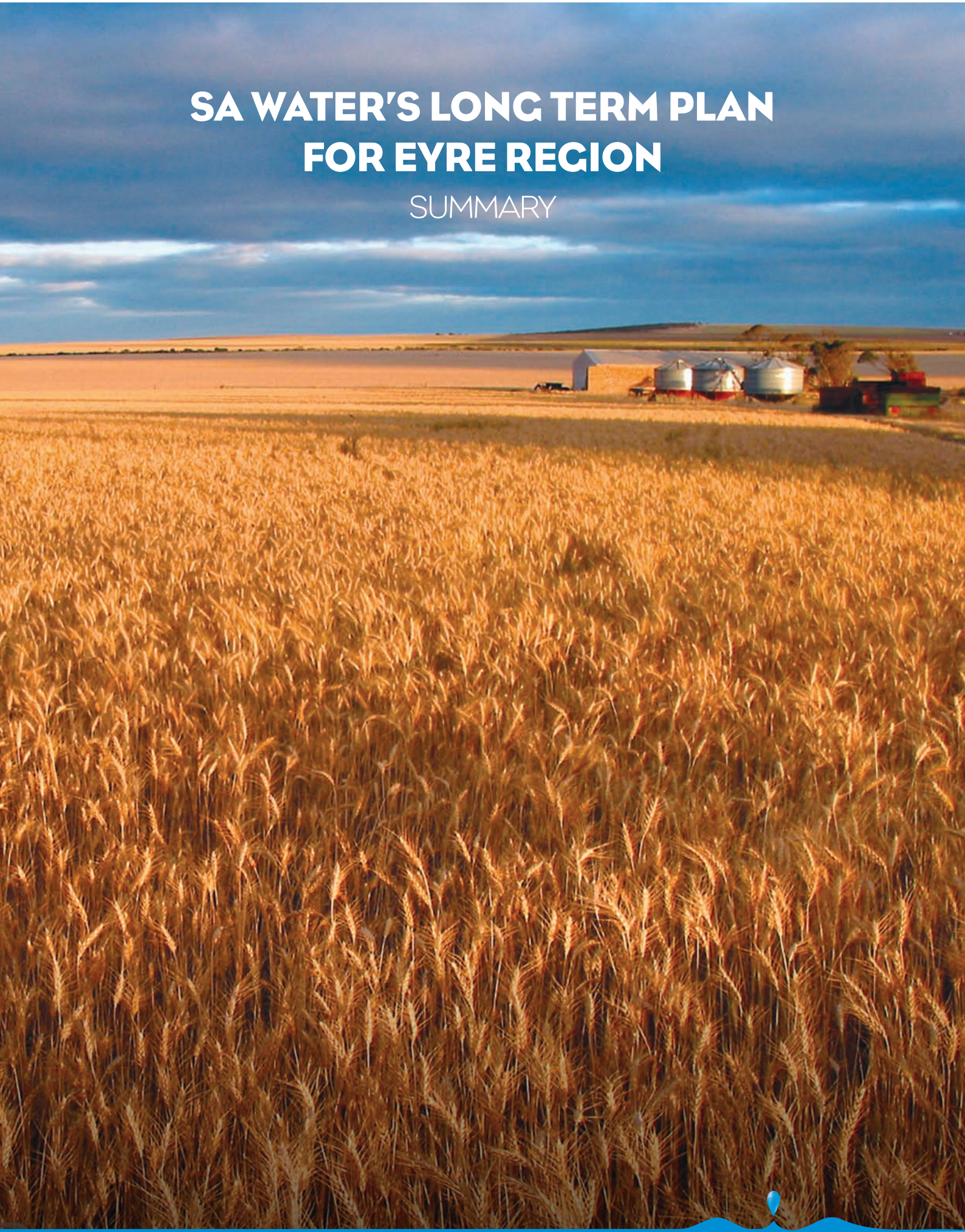
# SA WATER'S LONG TERM PLAN FOR EYRE REGION

## SUMMARY



Government of South Australia

SA Water

Securing tomorrow's water today

## Forward

*Meeting Future Demand – SA Water's Long Term Plan for Eyre Region* is an initiative of the South Australian Government, through SA Water, to establish a framework to ensure Eyre Peninsula has a secure water supply to meet increases in demand for the next 25 years.

The Long Term Plan presents a number of recommendations to better manage water systems and develop new sources of water for this important region of our State. Investigations into demand projections undertaken in developing this plan indicate a new source of water will be required for the region in 2014/15. However, these projections will be reviewed annually and the timing for a new resource assessed accordingly.

Through careful planning we will know if we have to act sooner and what the best options will be. Desalination and an expansion of the Iron Knob – Kimba pipeline are two of the recommendations we will more fully investigate.

Reviewing this information every year is a critical part of the planning process.

It means our delivery of water security for Eyre Peninsula is based on the most up-to-date, sound data we have available. We will need to continue our monitoring and planning ahead, taking into account changes brought about by climate change, population growth and other development needs of Eyre Peninsula.

Community engagement has been integral to the development of the Long Term Plan with a number of information sessions, forums and opportunities for comment included in the process. This has resulted in the Eyre Peninsula community having significant input into, and providing their endorsement of, the Long Term Plan.

The Eyre Peninsula, along with the rest of the State, is experiencing the worst drought conditions in recorded history. While this severe drought has reminded us our climate can have devastating impacts, we also have to ensure we are prepared for the longer term impacts of climate change, including likely reduced rainfall and reduced inflows into farm dams and waterways.

This Long Term Plan is an adaptive management tool that can respond to changing environments to ensure security of water supply to the Eyre Region for the next 25 years and beyond.

**Hon Karlene Maywald**
Minister for Water Security
November 2008

## The Plan in Action

SA Water's Long Term Plan for Eyre Region (Long Term Plan) is a new initiative intended to establish a framework for water security that is responsive to changing circumstances currently being experienced through drought conditions and climate change.

The Long Term Plan provides for an annual review process in order to ensure such future changes are addressed and appropriate adjustments made to the Long Term Plan if required. In this context, the Long Term Plan has been structured as an adaptive management tool able to respond to changes in climate conditions, resource allocations and increases in demand.

Since the writing of the Long Term Plan, changes to the condition of the groundwater resource at Polda Basin have been identified. The long term decline in recharge has had an impact on the Polda Basin that was unknown at the time of writing the Long Term Plan.

Subsequent to the completion of the draft Long Term Plan the Department for Water, Land and Biodiversity Conservation (DWLBC) advised SA Water on 7 July 2008 that the annual water allocation from Polda Basin had been reduced from 326.4 ML/a to 283 ML/a, in response to reduced recharge.

Given this, and in accordance with the fundamental principle of the Long Term Plan that assumptions will be reviewed as necessary, investigations have commenced into the status of the other groundwater basins in the southern Eyre Peninsula region, including the Lincoln and Uley South Basins.

Salinity profiles taken from the production bores in the Lincoln Basin revealed a significantly reduced extent of fresh water in the lens. Results for Uley South showed no significant change in the available resource.

As a consequence of the completion of these investigations, a number of initiatives are already in place and will contribute to a review of the Long Term Plan in 2009 in line with the recommended annual review process. These initiatives include the following:

- SA Water has temporarily ceased pumping from Polda Basin (other than for emergency situations) until a full assessment of the condition of the Basin can be undertaken.
- SA Water is planning to reduce the amount of water it pumps from the Lincoln Basin.

DWLBC, the Eyre Peninsula Natural Resources Management Board (EPNRMB) and SA Water have commenced a comprehensive monitoring program over the Uley South Basin to cover knowledge gaps in relation to the salt water/ freshwater interface at the coast in order to inform the 2009 review process.

SA Water has commenced work on the recommendations contained in the Long Term Plan to investigate desalination and system enhancement as they relate to security of the potable supply.

This Long Term Plan estimates that a new water source will be required in approximately 2014/15 based on a medium demand projection and 2011/12 based on a high demand projection. This timing was based on a range of assumptions, including SA Water's existing allocations from the groundwater basins and assumptions regarding future demands.

The work currently underway in response to the ongoing drought conditions will inform the 2009 review process and necessary adjustments will be made to the Long Term Plan if required. This may include changes to the timing for a new resource dependent upon the outcomes of the monitoring and research work under the combined management of DWLBC, EPNRMB and SA Water.

# MEETING FUTURE DEMAND
# SA Water's Long Term Plan for Eyre Region (Summary)

The Long Term Plan for Eyre Region (Long Term Plan) is an initiative by the South Australian Government, through SA Water, to establish a framework to ensure Eyre Peninsula has a secure water supply to meet increases in demand for the next 25 years.

This brochure is a summary of SA Water's Long Term Plan for the purposes of engaging with the Eyre Peninsula community.

## MEETING DEMAND

In meeting future demand, SA Water acknowledges the need to manage existing resources sustainably while identifying new and alternative solutions to allow for the growth of the region. SA Water will work with relevant local, State and Federal Governments and the community to achieve this objective.

Effective water planning is now recognised as fundamental to managing the nation's water resources and competing uses. Communities across Australia are feeling the need to improve water planning processes to address growing demand for water and the uncertainty of climate change and stressed water systems. To this end the Federal Government has made water a key priority and is developing a "Water for the Future" Plan that will address issues of water security across both urban and regional areas of Australia.

Within this broader framework, the South Australian Government has a specific role to play in managing water resources across the State and has commissioned a range of infrastructure programs to secure water supplies to both metropolitan and regional communities. A great amount has been done in the past five years to build on our water infrastructure needs and secure our water supplies for the future – not least of which has been South Australia's leading role in helping to secure a national approach to managing the River Murray. Capital expenditure across the State over the past five years has increased by 52% and is set to increase a further 60% in the next five years.

Management of existing resources, encouraging responsible water use and sound infrastructure planning are critical to delivering water security for South Australia's future. Eyre Peninsula is experiencing many similar issues as broader Australia and the community is seeking a more proactive approach to long term water security through sustainable management practices and identification of new water sources.

In March 2008, the South Australian Government established the Office for Water Security to provide a single point focus for water security planning across government. A key task of the Office is to develop a South Australian Water Security Plan (Water Security Plan) which, given the geographic and climatic variability across South Australia, will initially concentrate on the overarching strategies, policies and reforms needed to underpin water security. The

focus will then shift to developing individual regional plans, tailored to the unique conditions and needs of each of the State's regions.

In the case of Eyre Peninsula, the engagement process undertaken during 2007-08 to inform the development of SA Water's Long Term Plan means the region is well placed to contribute to the state-wide planning process, and to quickly finalise a broad Water Security Plan for the Eyre Region. SA Water's Long Term Plan will in time form a key part of the overarching Water Security Plan. The Water Security Plan will build on the initiatives identified in SA Water's final Long Term Plan by introducing new strategies to address those issues not within the scope of SA Water's infrastructure planning process.

In March 2007, community leaders came together for a Water Summit hosted by the Minister for Water Security, Karlene Maywald MP where water security planning was discussed. At this Water Summit, concern was raised as to the long term sustainability of the southern groundwater basins and the extent to which they could supply an increase in demand for water on Eyre Peninsula. With possible future growth anticipated in agriculture, mining and aquaculture along with the uncertainty of climate change, a robust long term plan was needed.

In order for the Long Term Plan to effectively address these issues, a number of key elements required careful consideration. These elements and their relationship to the Long Term Plan are documented in figure one.

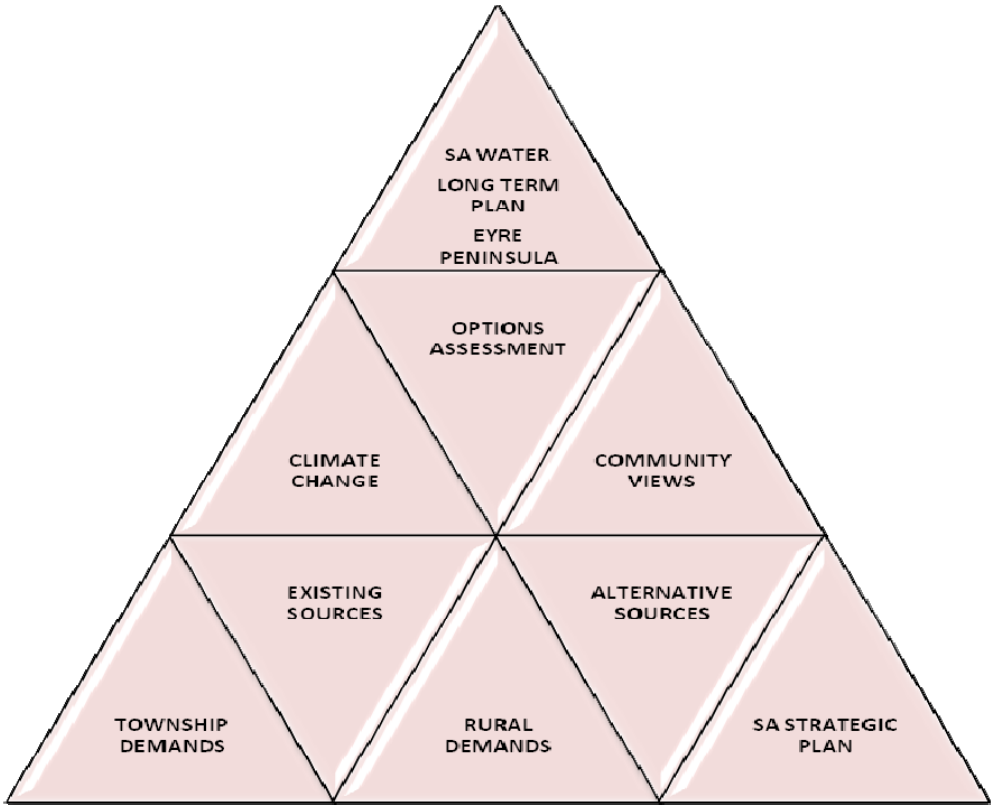



*Figure 1: Key Elements of the Long Term Plan for Eyre Region*

The recommendations detailed throughout the Long Term Plan have been developed in response to these elements. Relevant sections from South Australia's Strategic Plan, Water Proofing Adelaide, the State Natural Resources Management Plan, the Initial Eyre Peninsula Natural Resources Management Plan (inclusive of associated Water Allocation Plans) and Planning SA strategies have been referenced in the preparation of the Long Term Plan.

Included in the process has been a comprehensive review of SA Water's previous 2003 five year plan which has provided a basis for further technical and scientific research.

The recommendations made in the Long Term Plan directly respond to the various scenarios assumed from the research and may be summarised as follows:

- System enhancement
- New water sources

While the Long Term Plan promotes an integrated water cycle planning approach, many of these initiatives are being driven by the community and Local Government. A significant component of the Long Term Plan therefore focuses on the management of the potable water system. The Long Term Plan looks at opportunities for system enhancement and new water sources, as and when required, to complement demand management initiatives and community/local government water cycle initiatives already in place.

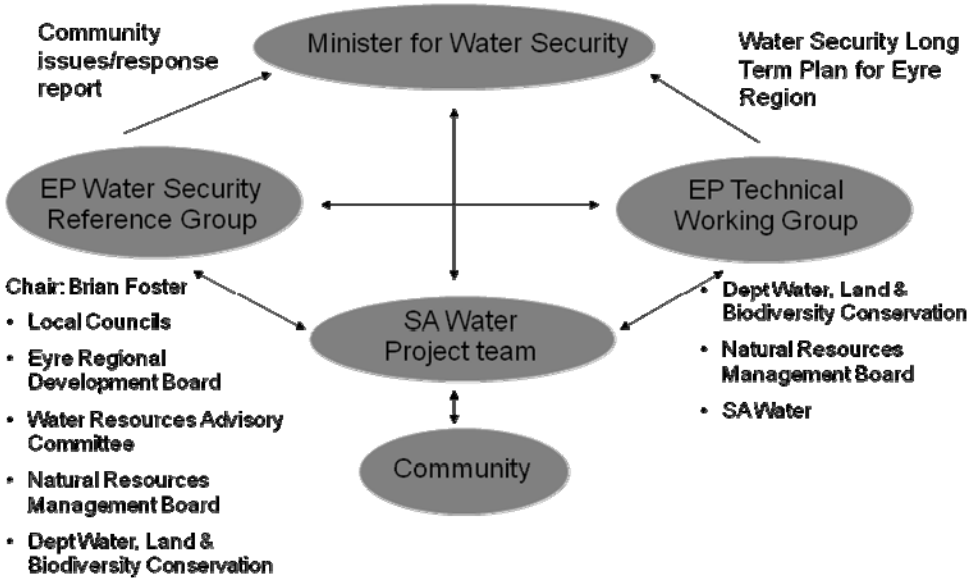
## COMMUNITY ENGAGEMENT

Integral to the development of this Long Term Plan has been the level of involvement from the community in identifying key issues and reviewing water security options. Every property owner on Eyre Peninsula was given the opportunity to contribute to the community engagement process. Nineteen community information sessions were held in 13 towns at the commencement of the planning phase to canvass issues and concerns relative to water security. The 13 towns (inclusive of surrounding districts) participating in the workshops included Arno Bay, Ceduna, Cleve, Coffin Bay, Cowell, Cummins, Kimba, Lock, Port Lincoln, Port Neill, Streaky Bay, Tumby Bay and Wudinna.

Subsequently, five community forums were convened comprising volunteers from the information sessions. These forums have been established to provide input to the development of the Long Term Plan. The forums cover the following areas:

- Lower Eyre (Coffin Bay, Cummins and Tumby Bay)
- Eastern Eyre (Cowell, Cleve, Arno Bay and Port Neill)
- Far West (Ceduna, Streaky bay, Smoky Bay and Wirrulla)
- Mid West (Lock, Wudinna, Elliston, Kimba)
- Port Lincoln

To support the community engagement process and ensure contribution from local government and key organisations, a committee structure was established as illustrated below.




The Eyre Peninsula Water Security Reference Group (EPWSRG) comprises two representatives from each Eyre Peninsula Council (one elected member and one staff member), the Chair and Chief Executive of the ERDB, the General Manager and Program Manager from the EPNRMB, a representative of the EPNRMB Water Resources Advisory Committee (WRAC) and representatives of the Department of Water, Land and Biodiversity Conservation (DWLBC) and SA Water. The group is chaired by the Chair of the EPNRMB.

During the community engagement process a number of issues were raised with respect to water management and planning. The need to account for increases in demand by planning effectively for changes in population, industry growth and agriculture was expressed by many communities across the Eyre Peninsula. Other topics raised included the future of the Tod Reservoir, climate change, the need to consider alternative options to secure water supply and water quality as it relates to new sources.

While the above issues specifically relate and have been considered as part of the Long Term Plan there were a number of additional issues that sit outside, and in some instances, do not sit clearly within SA Water's areas of responsibility.

These issues have not been included in the Long Term Plan but have been documented in the draft Community Response Report which has been prepared to capture all issues raised during the engagement process and provide a means for the community to express their views on the Long Term Plan.

## DEMAND

A fundamental component of the Long Term Plan was to ascertain likely demand projections for the Eyre Peninsula in order to determine the timing for the implementation of any future water security measure.

A review of SA Water's historical information on demands in Eyre Region indicated a steady decrease in the five year average demand since 2000-01, as shown in Figure 2.

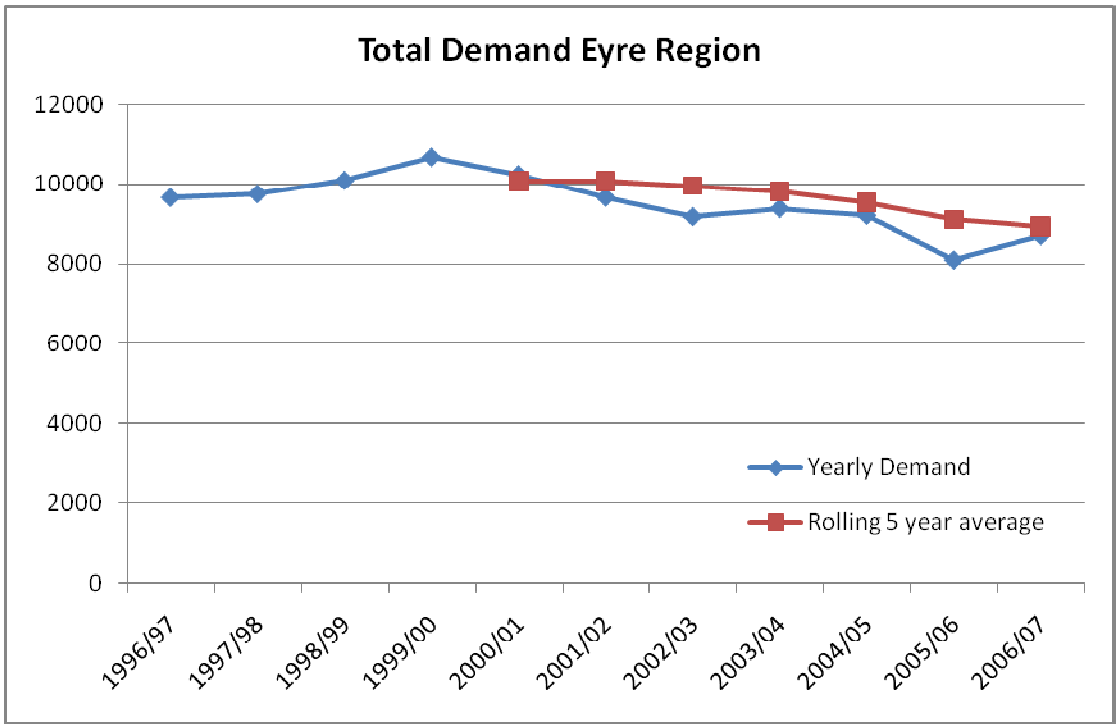



*Figure 2: Total historical demand, Eyre Region 1996 - 2007*

The decline in demand in Eyre Region is due to a number of factors that may include recent water restrictions (based on water conservation measures but specific to Eyre Region), increased use of rainwater tanks, community projects involving reuse of stormwater, wastewater reuse schemes established by Councils and changing farming practices. These factors can assist in reducing the overall reliance on SA Water sources.

While the five year average demand has been reducing in recent years, longer term water use data indicates that overall demand can fluctuate. Planning for the future has to include scenarios where demand increases.

In order to develop the projected demand, historical demand was split into township and rural demands using a 48:52 ratio based on historical information. These categories were then analysed separately.

**Township Demands**

Growth in the townships in Eyre Region were based on a demand increase of 1.5% per annum for residential properties and 0.3% per annum for non-residential properties. A review of historical figures suggested that these predictions are consistent with past trends.

An allowance was also made for any change to restrictions to be in line with Permanent Water Conservation Measures and the possible impact that this may have on overall demand.

Water demand for tourism industry has been estimated to increase by 4% per annum as per advice received from the ERDB.

**Rural Demands**

Based on industry information, an increase of 1.5% per annum in the demand for water in rural areas has been allowed.

**SA Water Projected Demands - Summary**

SA Water's demand projection, discussed above, suggests augmentation of the existing regional water supplies of Eyre Peninsula will be required in approximately 2014-15 as shown in the figure below.

It is understood that while a trend of increasing demand is possible, there will be some fluctuation and variability in this trend. To allow for this possibility and to allow for delivery time for options, it is proposed that further investigations be commenced immediately, with a new source to be available for supply in 2014-15 based on the projections shown in Figure 3. Should this demand projection change, then the date for a new source to be available will likewise change. The need for any such changes to be made will be the subject of the annual review process.

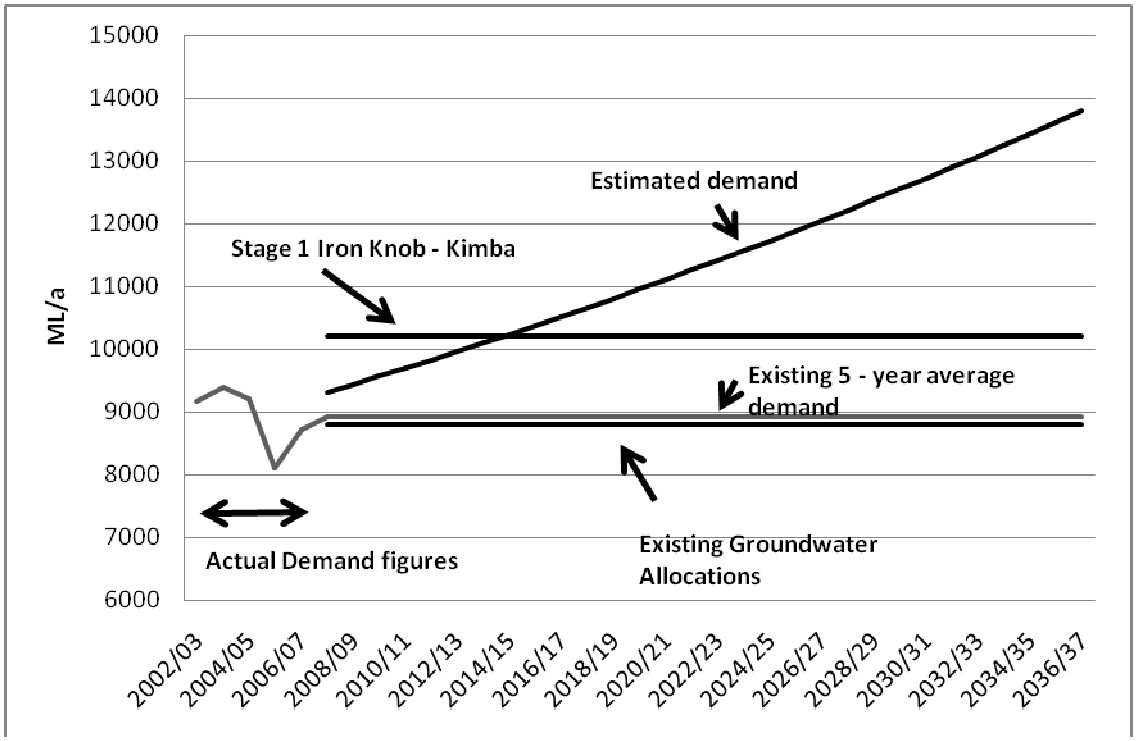



*Figure 3: Total future projected demand 2007 - 2037*

**Alternative Demand Projections**

In June 2007, Planning SA released a document titled "Population Projections for South Australia (2001 – 31) and the State's Statistical Divisions (2001 – 21)". The projections were based on the 2001 Census of population and housing. When reviewed for Eyre Peninsula, the projected demand is lower than SA Water's calculations (Figure 4). If this low projection were to eventuate, then a new option would not be required until 2015-16.

In developing projection scenarios, Eyre Peninsula Councils were asked to provide information on the type, size, nature and timing of developments within their Council area. Some were able to provide significant information regarding prospective future developments, including dwelling numbers and timing. Others were able to provide some of these details. When assessed, the demand based on the statistical information provided by Councils is higher than the SA Water projection (figure 4). Under the high projection scenario, an alternative option could be required as early as 2011-12.

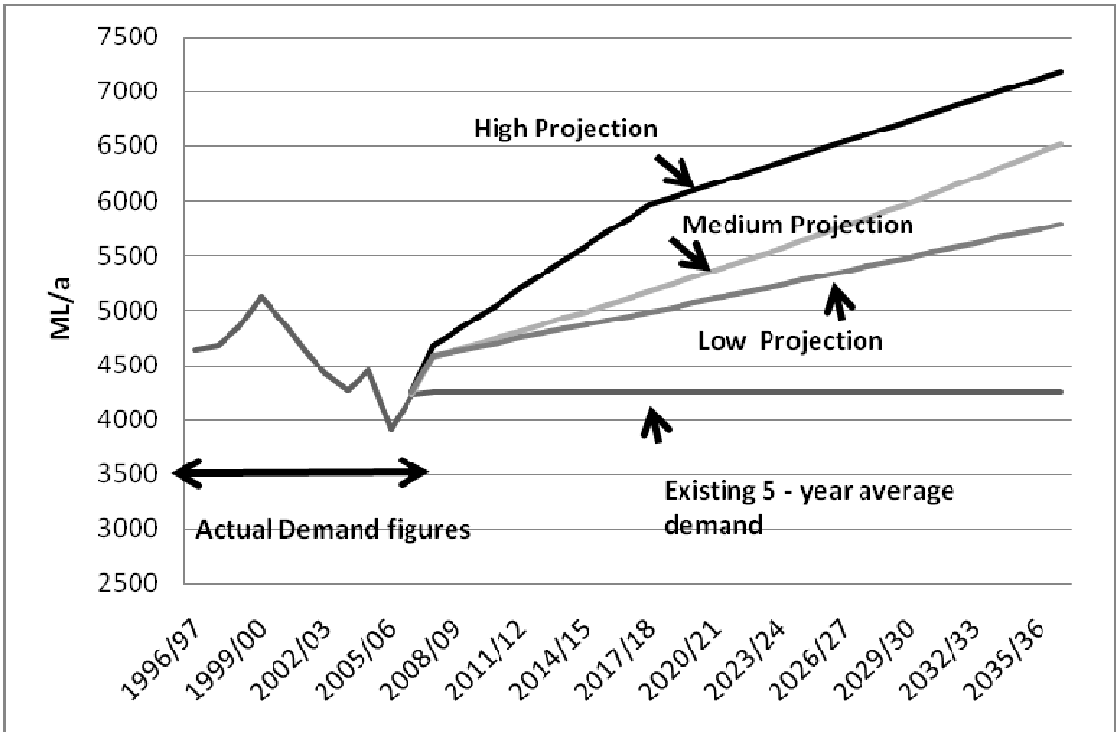



*Figure 4: Demand projection scenarios (Township component of demand only)*

While SA Water has worked to the medium projection scenario, this will be monitored and reviewed annually and changes made to the timing of the implementation of key options if required.

**Demand from Mining Ventures**

SA Water's demand projection has allowed for growth in residential demand due to Mining developments. There has however been no allowance for water demands from Mining operations themselves. Mining companies will be expected to source their own water for extraction and mining operations.

In some situations, SA Water may be in a position to provide water requirements associated with trial or pilot mining schemes. Any supply provided by SA Water will be dependent on

- SA Water's ability to maintain suitable supply to existing customers (including allowing for reasonable growth in this customer base, as outlined in this document)
- The availability of the resource and infrastructure capacity in SA Water's supply system at the time of application
- The conditions and legislative requirements of licenses issued to SA Water to allow us to provide a public water supply
- Specific arrangements with SA Water for full cost recovery of any augmentation to the supply or resource required to meet demand requirements from a mining venture

SA Water will assess applications from Mining companies for water requirements associated with trial or pilot mining schemes on a case by case basis. SA Water will also assess opportunities to partner with mining companies on new resources (such as desalination plants) to provide water for mining operations as well as supplement the public water supply on a case by case basis and in the context of the strategy presented as part of this long term plan.

## EXISTING SOURCES

While demand on Eyre Peninsula has been declining over the past 8 years, the community, local Councils and other stakeholders anticipate that significant growth will occur on the Eyre Peninsula over the next 20 – 25 years. The installation of a pipeline from Iron Knob to Kimba has increased the available resource on Eyre Region by 15% providing some scope for an increase in demand over the short term. In addition, existing information provided by the DWLBC suggests that groundwater basins are currently managed sustainably and there is no indication at present that SA Water allocations from these sources will need to reduce significantly.

There is a strong link between groundwater levels and rainfall - that is, when there are high levels of rainfall, there are high levels of recharge. However, groundwater systems continue to discharge no matter what the seasonal conditions, so in times of low rainfall the overall groundwater levels fall. It's important for appropriate risk management practices to be in place to ensure groundwater extractions meet demands in a sustainable way.

Currently in the Uley Basin, about 60 wells are monitored for groundwater levels and 30 are monitored for groundwater quality (including salinity). Water levels are recorded monthly throughout the year and water quality measurements are monitored daily by SA Water at the major pumping stations.

Water allocation plans aim to balance social, economic and environmental demands against the long-term sustainability of the available resource, under a regime of below average rainfall and reduced recharge.

The basic objectives for managing the available groundwater resources include:

- Sustainable use of the underground water
- Encourage efficiency within new water using industries
- Efficient use of the water
- Equitable allocation of water
- Adequate portion of water to meet environmental demands

Annual allocations from each resource are calculated based on the past ten-year average of recharge, taking into account rainfall and aquifer storage. Consideration is also given to

natural discharge required for environmental needs and the balance is then made available for extraction.

Current Water Allocation Plans ensure that even where there is a continued below average rainfall for extended periods of time there is still a capacity to reduce allocations and ensure the long-term sustainability of the resource. Water Allocation Plans do not stop the decline in groundwater levels, this can occur even if there is no pumping demand.

In addition to the current level of monitoring, over the next two years, the EPNRMB together with partners SA Water and DWLBC will undertake a significant research project titled the Groundwater Allocation, Planning and Management Project. With approximately $700,000 in funding from the Australian Government National Water Commission the research will increase understanding of the ground water resources and assist in developing future management plans. The project involves a number of different elements including:

- Reviewing the monitoring process for the groundwater resources
- Preparing new conceptual groundwater models
- Assessing impacts of climate change on recharge
- Investigating the relationship between soils, vegetation and recharge
- Undertaking predictive modelling to inform future groundwater allocation and management plans.

This research project commenced in February 2008 under the leadership of the EPNRMB. Outcomes from the study will contribute to the updating of the final Long Term Plan particularly as it relates to current groundwater allocations. The research will assist the EPNRMB to develop new Water Allocation Plans that will include a much more detailed assessment of the capacity of the resource to meet the demands for water on a continuing basis. Any change to allocations arising from this research will impact upon the timing for a new resource and will be addressed through the annual review process.

**River Murray**

The Morgan-Whyalla water supply system provides filtered River Murray water to the mid - North region of South Australia.

Water delivered via the Morgan – Whyalla pipeline is from SA Water's existing Country Allocation from the River Murray. Unrestricted, this allocation is 50 GL/a. However, recent drought conditions have seen the allocations drop to 31 GL/a in 2007-08.

In July 2007, Stage 1 of a pipeline and pumping system was commissioned which connects the Morgan-Whyalla system at Iron Knob with the Eyre Peninsula system at Kimba. This enables water to be transferred from the Morgan-Whyalla system to the Eyre Peninsula system. Stage 1 can supply up to 1,400 ML/a (over 15% of the Peninsula's total demand over last five years and 3% of SA Water's country allocation from the River Murray) to

supplement Eyre Peninsula supplies. The pipeline's design allows further stages if necessary to augment this capacity.

BHP Billiton has announced that they have commenced an EIS (environmental impact statement) into a proposed desalination plant at Port Bonython to supply their expansion of Olympic Dam. In the long term there is the opportunity that the townships of Whyalla, Port Augusta, Port Pirie and the current connection from Iron Knob - Kimba could receive desalinated water.

## CLIMATE CHANGE

Water sources that supply Eyre Peninsula, like most in Australia, are climate dependent. To further improve the understanding of the impact of climate change on water resources DWLBC has commissioned the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to undertake a downscaling project that would, among other areas, cover the Eyre Peninsula. This project is due for completion by early 2009.

The Groundwater Allocation, Planning and Management Project recently commissioned by the EPNRMB is expanding the work undertaken by DWLBC to explore further the impacts by using the synthetic data on the hydrological models that represent the groundwater basins on Eyre Peninsula.

**Potential Impact on Demand**

As rainfall decreases and temperature and evaporation generally increase it is expected that the demand for further resources will rise.

Using this scenario SA Water have undertaken an analysis of population, stock numbers and climatic variables against demands between 1996-97 to 2006-07 financial years assuming that:

- average rainfall decreases by up to 10%
- average temperature increase by up to 1.2$^{o}$C
- annual evaporation increases by up to 5%.

This analysis indicated that climate change could potentially increase the overall Eyre Peninsula demand by 8-9% by 2030. The biggest impact is anticipated beyond seven years. SA Water's demand projections forecast a new resource will be required by 2014-15 regardless of climate change. No adjustment has therefore been made in this timing for the impact of climate change. Changes in demand (due to climate change) and in predictions of the impact of climate change will be assessed as part of the annual review as further information becomes available.

## SOUTH AUSTRALIA'S STRATEGIC PLAN

The updated version of South Australia's Strategic Plan was released in January 2007 and contains 7 main targets that are considered relevant to this Long Term Plan, namely:

- Reduction of greenhouse gas emissions
- Reduction of ecological footprint
- Managing water supplies within sustainable limits
- Supporting the development of renewable energy
- Maintaining regional share of SA's population (18%)
- Maintain minerals exploration
- Increase minerals production.

Consideration of the South Australia's Strategic Plan targets has been fundamental in the development of the Long Term Plan. To achieve the Strategic Plan's targets, Eyre Peninsula will need to share in and contribute towards them. A balance will need to be achieved that is practical and reasonable, for example any increases in population impact upon the ecological footprint, but impacts can be balanced through option selection and technology choices.

## OPTIONS

A number of different options were considered to secure existing potable water supplies on Eyre Peninsula including:

- A desalination plant on the lower west coast of Eyre Peninsula
- A desalination plant on the north west coast of Eyre Peninsula
- Rehabilitation of the Tod Reservoir
- Augmentation of Stage 2 of the Iron Knob to Kimba pipeline
- Construction of a new trunk main from Whyalla to Cowell
- Additional ground water resources.

The six options provide a number of alternatives to secure potable water supplies each with different benefits and risks. While the specific details for each option such as site selection for a desalination plant, pipeline routes and pumping stations will require further detailed assessment, the Long Term Plan identifies which combination of options may best meet predicted demands towards 2036 – 37.

The EPWSRG, when reviewing the list of possible options, suggested the addition of artificial catchments. The use of artificial catchments (or modified catchments) for rainwater harvesting was discussed in the original Eyre Peninsula Master Plan (PB, 2003) and their use forms part of the objective and principles of the Eyre Peninsula Catchment Management Plan (part of the Initial Natural Resources Management Plan).

If used as source water for a drinking water system, artificial catchments introduce a much higher risk than other existing sources. As it is a rainfall dependent option it is affected by climate variability and long term change and in times of drought such an option is unlikely to provide a sufficient supply. Natural catchments act as a barrier to filter out and biodegrade many pollutants that occur in catchments such as bird and animal faeces, pesticides and other pathogens. In a modified catchment this natural barrier is removed and many of these pollutants typically end up in the storage if appropriate treatment is not carried out.

While artificial catchments may have benefits for non-potable water supplies in certain environments, they are not considered appropriate to securing SA Water's existing potable supply for Eyre Peninsula.

## OPTION ASSESSMENT

In order to determine the benefits and risks of each option a Multi Criteria Analysis (MCA) approach was used. This required options to be measured against specific criteria in order to determine the merit of each.

While an MCA is particularly helpful to prioritise options it should only be considered as a supporting tool as there may be other externalities which may influence certain decisions.

In general, MCA processes use a "triple-bottom line" approach which considers environmental, social and economic factors. As part of this analysis, a fourth category was added namely 'Technical and Functionality' to ensure that the most sustainable solution is also a practical solution.

An MCA provides significant benefits compared with other tools, such as:

- Providing a framework for incorporating complex and large amounts of information
- Combining quantitative and qualitative aspects of decision making
- Is able to highlight the strengths and weaknesses of any particular option
- Provides an open and transparent methodology which can involve stakeholders
- Can incorporate a diverse range of opinions and expertise.

Criteria were grouped under the four main categories of sustainability, namely:

- Environment
- Economic/Commercial
- Social/Community
- Technology/ Functionality.

This process enabled the planning team to identify those options that will deliver the most benefit for the security of Eyre Peninsula's potable supply.

Within the economic criteria, a broad cost analysis was undertaken on high level concepts for comparative purposes only. For the purposes of the analysis, notional sites were considered and will require further investigation during the next stage of project development. Allowances were made for provision of necessary power supplies and land acquisition but did not include the costs for vegetation offsets that may be required with the clearance of native vegetation or to make the option carbon neutral.

Given this, a broad capital cost estimate has been selected for each option in order to allow some flexibility subject to further detailed analysis on the preferred option(s). These estimates are presented in Figure 5.

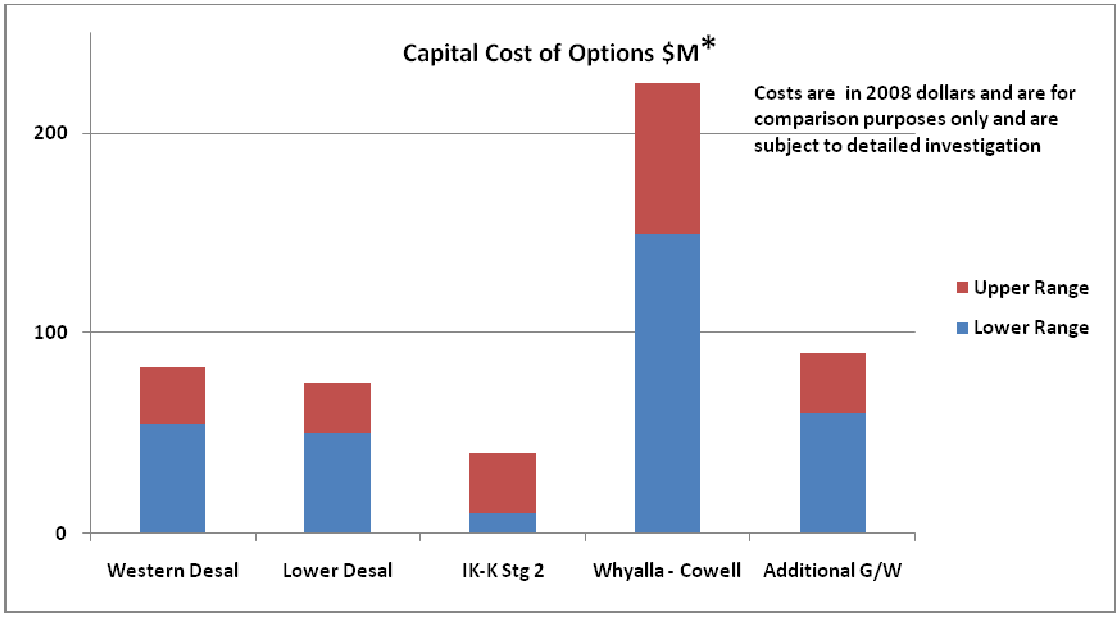



*Figure 5: Estimated capital cost.*

* Notes:

- No costs have been prepared for the option of rehabilitating the Tod Reservoir as there is not sufficient information to make a suitable cost estimate.
- The Whyalla to Cowell pipeline option would involve the construction of a new pipeline connecting Whyalla to the existing water distribution system at Cowell, a distance of approximately 120 km. It would also include several booster pump stations and significant augmentation to the existing East Coast Main. Native vegetation would also need to be offset against significant environmental benefits. These issues contribute to the high cost of this option.

- A large storage may be required in the Iron Knob to Kimba Stage 2 pipeline to address water quality issues. The lower range cost does not allow for this storage while the upper range includes a storage plus contingencies as per the other options.

On the basis of cost alone, Stage 2 of the Iron Knob to Kimba Pipeline is the most economically viable of the five options costed. However, when considered in relation to the volume of water able to be produced, the lower desalination plant appears more favourable.

Initial estimates show a slightly higher cost for a desalination plant on the north-west coast near Ceduna. However, this is due largely to system integration estimates and will require further analysis.

## STRATEGIES

The primary purpose for SA Water's Long Term Plan is to identify those options required to secure a water supply to Eyre Peninsula to meet projected demand for the next 20 – 25 years. These options are intended to complement other initiatives including water conservation measures and community water schemes either already in place or to be considered by the Office of Water Security through the water security planning process.

The MCA identified two options for further investigation. These options will form the basis for securing Eyre Peninsula's future potable water supply with implementation to be staged in accordance with the outcomes of the recommended investigations discussed below.

**System Enhancement**

In 2007 SA Water completed the construction of a pipeline extension from Iron Knob to Kimba with an approximate capital cost of $48.5 million. Stage 2 would involve further system enhancements to allow an additional 900 ML/a to be transferred to Lock township.

The implementation of Stage 2 of this system and the introduction of a new source water to the western region of the Eyre Peninsula via this pipeline would assist in the reduction of scaling thereby improving water quality.

While the lead time for Stage 2 of the Iron Knob to Kimba pipeline is favourable (approximately 6 – 12 months) the additional volumes of water produced are relatively low in comparison with other options and this will need to be considered in light of future demand projections.

**New Water Sources**

The Long Term Plan also recommends further investigation into a seawater desalination plant located in the lower region of Eyre Peninsula that could provide approximately 2,200 ML/a or 16% of the projected 2036-37 demand.

By constructing a plant in the lower region of Eyre Peninsula, the close proximity of the Uley South Borefield, the Uley South main (transporting groundwater from the Uley South to the North Side Hill Tanks) could be used to transport desalinated water into the reticulated water supply network of Eyre Peninsula. From North Side Hill Tanks, desalinated water can then be pumped throughout the reticulated water supply system of Eyre Peninsula, including Port Lincoln and the East Coast system.

Further work on the desalination proposal will address its complexity and environmental sensitivities including site selection, baseline environmental investigations, power supply, Aboriginal and Cultural Heritage assessments and system augmentation.

A private consortium in partnership with Ceduna Council prepared a submission for funding to the Federal Government in 2006 to construct a desalination plant near Penong on the north west coast of Eyre Peninsula to supply potable water to Ceduna and surrounds. The

submission for funding included reference to the use of alternative technologies and the opportunities for the re-use of the brine in a commercial salt works.

The MCA undertaken by SA Water suggested the lower desalination plant to be a more favourable location based on standard Reverse Osmosis technology. This analysis provides a benchmark for further research and review on the benefits and risks of desalination on the west coast of Eyre Peninsula.

It is acknowledged however that should other technologies be adopted (such as those reference in the 2006 submission for funding by Ceduna Council and the private consortium) the MCA scores for the north west desalination plant may be improved. Such delivery mechanisms would be considered in any procurement process and the benefits measured against the further investigations outlined in this plan.

For the purposes of further investigations existing standard technologies will continue to be applied so as not to compromise any future private sector submission should a decision be made to build a desalination plant on the north west coast.

**Process**

The demand projections adopted in this Long Term Plan indicate that a new resource will not be required until 2014/15. Clearly if demand projections are higher, as suggested using Council projections, then a new resource may be required earlier (approximately 2011/12).

While the annual review process will monitor demand, further work will be required in the short term to determine which option should be implemented first to meet any demand increase. The Long Term Plan therefore recommends the immediate implementation of a three phase process as follows:

*Phase 1 - Investigation (2008/09)*

- Undertake further investigations into Stage 2 of the Iron Knob to Kimba Pipeline
- Commence further investigation into a desalination plant on the lower west coast of the Peninsula
- Continue investigations into the merit of a desalination plant on the upper west coast near Ceduna or Penong in order to effectively compare with the lower west coast option
- Investigations to commence in 2008-09 financial year (investigation scope to be finalised)
- Investigation progress to be reported to the Water Security Reference Group at the 12 month review (November 2009)
- Preferred option for implementation selected
- Determine timing for implementation based on projected demand 12 month review.

*Phase 2 – Preferred Option*

- Complete any outstanding work required for the preferred option for implementation
- Prepare project scope
- Determine timing for implementation based on projected demand 12 month review.

*Phase 3 - Implementation*

- Ensure preferred option is implemented in sufficient time to meet projected demands (currently predicted in 2014-15)
- The remaining option to be implemented subsequently as required dependent upon demand.

## IMPORTANT ISSUES

The many efforts of the community to conserve and harness water are fundamental to planning effectively for the future. The importance of these water management initiatives by the Eyre Peninsula community cannot be underestimated both in terms of the reduced demand on SA Water supplies, and in heightening the awareness of the need for water conservation in the community. The Eyre Peninsula community is a leader in South Australia in water conservation and management and this should continue to be recognised in water security planning.

As previously stated, the primary purpose of this Long Term Plan is to address supply and demand for potable water for the Eyre Peninsula for the next 20 – 25 years. During the community engagement process however, a broad range of issues were raised, a number of which are unrelated to this purpose. These issues have been documented in the Community Response Report for further consideration by Government. SA Water has however identified opportunities to contribute in the management of some of these issues and these are documented under the following five key areas.

**Water Conservation**

Water conservation initiatives are fundamental to water security and the Eyre Peninsula community has embraced a range of measures including the installation of rainwater tanks and various household appliances that assist in reducing consumption. These measures will continue to be supported through the South Australian Government's $H_2OME$ rebate scheme.

In some communities there is a strong desire to gain greater independence from the potable system through water conservation plans and projects. SA Water acknowledges its role as a contributor to encouraging responsible water use through such projects and programs. Where appropriate, SA Water will work together with relevant authorities to assist communities looking to actively conserve water.

SA Water will also continue to work closely with industry and business to reduce water use through the preparation and implementation of water efficiency plans.

South Australia is moving from a two tiered to a three tiered water pricing system to ensure high water use is appropriately charged. This initiative will help promote water conservation across the State as well as on Eyre Peninsula.

**Community Water Schemes**

Ongoing investment in community water schemes and domestic water harvesting is an important part of the overall water supply picture on Eyre Peninsula. Such initiatives have been instrumental in reducing the demand on SA Water supplies. Stormwater harvesting, wastewater reuse and installation of rainwater tanks while not directly administered by SA Water should continue to be promoted by local government and relevant State Government Agencies across Eyre Peninsula.

Specific initiatives to assist communities seeking to initiate community projects that replace potable water with alternatively sourced water such as reuse of wastewater and stormwater harvesting, where sustainable benefits can be demonstrated should be encouraged.

In Port Lincoln for example, the Council initiated wastewater reuse scheme has provided an additional water source for the irrigation of open space. This initiative is an important contributor to the overall management and conservation of existing supplies and SA Water will continue to work with the City of Port Lincoln to improve overall quality of the reuse water and usage.

SA Water is currently working towards improving the salinity of the wastewater at Port Lincoln which will lead to improvements in the quality of wastewater provided to the reuse scheme. Two projects relevant to this objective include:

- Reducing infiltration of saline groundwater in the sewer network
- Splitting the wastewater treatment plant into a high saline and lower saline stream to better manage waste disposal from the fish processing industry.

The average annual reuse from the plant by the City of Port Lincoln Reuse Scheme has been 62 ML during the past four years.

It is estimated that the existing users of the Port Lincoln effluent reuse plant could increase their annual usage to approximately 120 ML/a. In order to increase annual reuse above 120 ML/a, it would be necessary for additional users of treated effluent to be identified, potentially within the township of Port Lincoln, with additional pipelines installed in order to supply the treated effluent.

Other opportunities exist to capture stormwater through reinstating abandoned water harvesting infrastructure. The Eyre Peninsula Catchment Report (Eyre Peninsula Catchment Management Board, 2004) notes that there are more than 200 abandoned water harvesting schemes across Eyre Peninsula, including dams, reservoirs and tanks. The ownership and

management over these sites varies and includes private owners, Local Councils, Department for Environment and Heritage and SA Water.

An example of recommissioning older projects is the Polda Rock scheme, originally commissioned in the 1920s, which was reinstated in 1998 to provide irrigation water for local amenities in the Wudinna township, some 7 km away. On average 40 ML/a can be harvested from this scheme, which exceeds the average volume of 25 ML/a used on public spaces in the township of Wudinna.

It is recommended that an investigation be undertaken into the abandoned water harvesting schemes currently owned by SA Water to determine future ownership and management options.

**Venus Bay, Port Kenny and Coffin Bay**

Three options to supply water to the towns of Venus Bay and Port Kenny were also considered in the Long Term Plan. These towns are currently not connected to the Eyre Peninsula water supply network.

The feasibility of providing a water supply to Venus Bay and Port Kenny will need to be the subject of commercial discussions between the South Australian Government, SA Water and the District Council of Elliston.

The options available for augmenting supply to Coffin Bay were also reviewed including additional allocation from the existing groundwater supply (Coffin "A" lens), seawater desalination and a pipeline from the Eyre Peninsula system connected at Uley Wanilla.

Investigations into the extent of the lens at Coffin Bay are continuing however, the initial results indicate that the aquifer may be able to support additional extraction. In light of this information, SA Water will look to review the augmentation charge (including the use of funds already collected) for development at Coffin Bay.

**Water Quality**

Given the community concern in relation to water quality, some consideration has been given to possible options that could be further investigated independently from the water security initiatives and recommendations.

The issue stems from the calcium carbonate content of the water on the Eyre Peninsula, which tends to be precipitated when water temperature increases. This can occur in above ground steel mains, but more particularly in hot water services and in small diameter agricultural pipes that may run above ground for many kilometres within customers' properties.

It has been suggested that hardness could be reduced across the entire network by installing a large scale water softening plant. While such a plant would not directly increase the available resource on the Eyre Peninsula, it would reduce the salinity of treated water through less saline discharges to the wastewater system from individual water softeners. This may increase the range of end uses for recycled water schemes.

There are issues associated with such practice on a large scale. A regional water softening plant would require significant quantities of chemicals, including over 3 tonnes/day of lime. This process would generate significant quantities of waste "sludge" that would have to be removed to landfill, or treated further. In addition, while it is understood that household water softeners are widely used in Eyre Region, it is considered impractical in large scale applications.

The Western Australian Water Corporation has adopted the CALGON (sodium hexametaphosphate, or "SHMP") treatment option to reduce the build up of scale in some of their water supply systems. It is possible that the use of SHMP represents a cost effective means of dealing with the scaling issue on Eyre Peninsula and could assist the farming community.

The Long Term Plan recommends further investigation of SHMP and engagement with the community as to its practicality and application for the Eyre Region. Other ways of reducing hardness will be considered in parallel with this investigation.

**Future of Tod Reservoir**

Tod Reservoir does not currently form part of the water supply system on Eyre Region, however it is still an integral part of the overall contingency plan for the system. If recreational access is to be permitted to this site in the future, then funding would be required to address land management, public safety issues, water quality issues and emergency contingency planning issues associated with opening the reservoir land for limited public use. The nature of the uses permitted would be subject to satisfactorily addressing these issues. The financial and resource implications of permitting access to SA Water's reservoirs would be substantial.

In the event that recreational use of the reservoir was permitted, SA Water would look to other state or local authorities to manage the upgrade of facilities and subsequent annual costs. This would need to be done under a memorandum of understanding regarding the use of the Tod Reservoir as water supply during emergency situations.

**Contingency Planning**

It should be noted that SA Water has various contingency plans in place should a sudden change occur due to unforeseen circumstances. For example, sudden and unexpected changes to stock numbers, or a substantial reduction in allocation from the Southern Groundwater basins may result in the need for an additional resource earlier than anticipated. In such an event, SA Water would implement its contingency planning that would ensure supplies are maintained to the Eyre Region.

## ANNUAL REVIEW

The Long Term Plan recommends an annual review of demand projections and key recommendations in line with SA Water's Long Term planning procedures.

For Eyre Peninsula, a number of key triggers have been identified that will impact water security. These triggers include sudden increases in population, increases in rural and

township demand, decreases in water allocation from the Southern Groundwater basins and uncertainty of climate change. In consultation with other relevant agencies, including the DWLBC and the EPNRMB, SA Water will annually monitor and review the initiatives documented in the Long Term Plan.

In this context, it is recognised that there is potential for a major mining expansion on Eyre Peninsula although this expansion cannot yet be quantified. There is likely to be an increase in demand from service industries and residential development in townships as a consequence. Other industries such as aquaculture and tourism could also expand significantly adding to future demands on the potable water supply. Again, these increases at this point are difficult to quantify and will therefore be subject to the annual review process undertaken by SA Water.

The EPWSRG will meet annually (November) and SA Water will report against the Long Term Plan's demand assumptions at these meetings. The November timing will also allow the EPNRMB to report the water allocation plan for the forthcoming year.

It is also expected that as part of the Annual Review process, that members of the Water Security Reference Group will provide the SA Water project team with updated information on projected development in their respective council areas one month prior to the annual meeting of the EPWSRG.

A mechanism will also be established to ensure the community remain informed of the status of the Long Term Plan and any relevant changes.

A key outcome from the annual review process will be to confirm trends and whether the timing proposed in this report for the implementation of the recommendations is appropriate or needs to be amended. The first annual review process will therefore be critical in assessing these timeframes in relation to any changes in demand.

## CONCLUSION

Water security is the responsibility of a range of parties including the community, water authorities and the three levels of Government. While this Long Term Plan focuses on the role of SA Water, water security can only be delivered through a range of parallel initiatives driven by other authorities and embraced by the community. The National Water Commission now has an integral role in water planning across Australia through policies and funding initiatives. The South Australian Government has given high priority to proactive water security planning by establishing the Office for Water Security to develop a South Australian Water Security Plan. This work will include Eyre Peninsula by expanding on the work already undertaken by SA Water through this planning process. In addition, Local Governments are contributing through local water harvesting and recycling projects and the EPNRMB continue to research and manage the existing ground water resources. Combined, these projects and initiatives will complement the strategies proposed in this Long Term Plan.

With the ongoing support of the community and local, State and Federal Governments, this Long Term Plan when finalised will enable SA Water to deliver a sufficient water supply to meet increases in demand over the next 25 years.

This Long Term Plan aims to identify sustainable initiatives that can compliment a continued emphasis on water conservation and demand management while enabling the region to grow and develop with water security.

**More Information**

More information and copies of this brochure can be obtained by:

- Visiting the SA Water website - www.sawater.com.au
- Phoning the SA Water Customer Contact Centre on 1800 812 362
- Sending an email to epwater@sawater.com.au

## SUMMARY OF SA WATER INITIATIVES

| STRATEGY | DELIVERABLE | TIMING | LINKAGES |
|---|---|---|---|
| **Annual Review of Long Term Plan** | | | |
| Review demand projections and progress against key recommendations | Confirm existing trends and whether timing for implementation of recommendations proposed in this report is appropriate or needs to be amended | Yearly (Commencing November 2009) | Eyre Peninsula Water Security Reference Group<br>EPNRMB<br>DWLBC |
| **Water Security (System enhancement and new water sources)** | | | |
| Undertake investigation and feasibility study into desalination and compare with system enhancement. | The staging for the implementation of the preferred water security options are identified | Nov 2009 | Private Consortium and Ceduna Council Proposal |
| **Water Quality** | | | |
| Investigate possible initiatives (e.g. SHMP) and engage with the community as to their practicality and application for the Eyre Region. | The feasibility of improving water quality through this method is identified | Nov 2009 | West Australian Water Corporation |
| **Small Town Supply** | | | |
| Undertake commercial discussions with the District Council of Elliston regarding the provision of a water supply to Venus Bay and Port Kenny. | An appropriate water supply is identified for Venus Bay and Port Kenny including options for delivery | Nov 2009 | Government<br>District Council of Elliston |
| Continue investigations into the extent of the lens at Coffin Bay and review the augmentation charge (including the use of funds already collected) for development at Coffin Bay. | Augmentation charges for Coffin Bay are reviewed in association with an increase in knowledge concerning the Coffin A lens | Nov 2009 | EPNRMB<br>DWLBC |
| **Groundwater Basins** | | | |
| Contribute to the Groundwater Allocation, Planning and Management Project | Project enables an increase in understanding of the ground water resources assisting to develop robust water allocation plans | February 2010 | EPNRMB<br>DWLBC<br>National Water Commission |

| STRATEGY | DELIVERABLE | TIMING | LINKAGES |
|---|---|---|---|
| **Water Conservation** | | | |
| Embrace opportunities to partner with Local, State and Federal Government authorities to assist communities looking to actively conserve water. | Water Conservation projects are identified in partnership with other relevant agencies | Ongoing | Federal, State and Local Government authorities |
| Work closely with industry and business to reduce water use through the preparation and implementation of water efficiency plans. | Industry and business assisted to conserve water | Ongoing | Industry |
| **Community Water Schemes** | | | |
| Investigate abandoned water harvesting scheme sites currently owned by SA Water to determine future ownership and management options. | Future of sites resolved | Nov 2009 | Local Government |
| **Tod Reservoir** | | | |
| Hold discussions with the District Council of Lower Eyre and the District Council of Tumby Bay to determine an appropriate strategy for managing the issues associated with the possible recreational access to the facility | Possibility to allow recreational access determined and if allowed nature of activity permitted. | Nov 2009 | District Council of Lower Eyre<br>District Council of Tumby Bay |
| **Recycled Water – Port Lincoln** | | | |
| Reduce infiltration of saline groundwater in the sewer network | Quality of wastewater available for reuse is improved | Ongoing | |
| Split the wastewater treatment plant into a high saline and lower saline stream to better manage waste disposal from Fish Processing industry (subject to industry support) | Quality of wastewater available for reuse is improved, Port Lincoln Fish industry are able to dispose of waste and environmental benefits | 2010 | Fish Processing Industry<br>Environment Protection Authority<br>ERDB |
| | | | |

This table represents SA Water's contribution to a number of areas. It is not intended to be a comprehensive list of all initiatives that may be undertaken by other agencies.

## WATER VOLUMES

Throughout this document it has been necessary to refer to water volumes using various units of measurement depending on the context. A summary of these is given below:

**Kilolitre (kL)** - One kilolitre is 1,000 litres. In volume it represents one cubic metre and one kilolitre of water weighs one tonne. Kilolitres are the units most commonly used in referring to household water consumption with the average Adelaide household using about 280kL each year.

**Megalitre (ML)** – One megalitre is 1,000 kL or one million litres and is roughly the volume of most 50 metre public swimming pools.

**Gigalitre (GL)** – One gigalitre is 1,000 ML or 1 billion litres and represents a volume of water one square kilometre by one metre deep. When full, the Tod Reservoir holds about 211.3 GL.

## GLOSSARY OF TERMS

| | |
|---|---|
| **Aquifers** | Underground sediments or fractured rock that hold water and allow water to flow through them. |
| **Basin** | An area drained by a given stream and its tributaries. |
| **Bore** | A hole drilled to extract groundwater. |
| **Catchment** | An area of land draining rainfall into a river or reservoir. |
| **Catchment yield** | The annual average volume of run-off from a catchment. |
| **Desalination** | The process of removing dissolved salts from seawater (or brackish water) so that it becomes suitable for drinking or other uses. |
| **Environmental flow release** | Release from a water storage intended to maintain appropriate environmental conditions in a waterway. |
| **Filtered water** | Water that has been passed through sand or membrane filters to remove impurities. Filtration is normally followed by disinfection. |
| **Flow rate** | Volume of water per unit of time (e.g. kilolitres or megalitres per day). |
| **Greywater** | Wastewater from the laundry, bathroom and kitchen. |
| **Groundwater** | Sub-surface water, particularly that which is in aquifers. |
| **Potable water** | Water fit for human consumption (drinking water). |
| **Run-off** | That part of precipitation which flows from a catchment area into streams, lakes, rivers or reservoirs. |
| **Treated effluent** | The treated water discharged from a sewage treatment plant. |
| **Water harvesting** | The process of collecting water run-off resulting from rainfall. This is undertaken primarily in protected catchments but is also used to describe the extraction of water from rivers or groundwater. |
| **Wastewater** | Contaminated water before it undergoes any form of treatment. The water may be contaminated with solids, chemicals or changes in temperature. |