Reasonable Regional Needs

South West Yarragadee Water Supply Development

Position Paper

Prepared for
Water Corporation
by Strategen

August 2005
Reasonable Regional Needs

South West Yarragadee Water Supply Development
Disclaimer and Limitation

This report has been prepared for the exclusive use of the Client, in accordance with the agreement between the Client and Strategen (“Agreement”).

Strategen accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any person who is not a party to the Agreement.

In particular, it should be noted that this report is a qualitative assessment only, based on the scope of services defined by the Client, budgetary and time constraints imposed by the Client, the information supplied by the Client (and its agents), and the method consistent with the preceding.

Strategen has not attempted to verify the accuracy or completeness of the information supplied by the Client.

Copyright and any other Intellectual Property arising from the report and the provision of the services in accordance with the Agreement belongs exclusively to Strategen unless otherwise agreed and may not be reproduced or disclosed to any person other than the Client without the express written authority of Strategen.
Reasonable Regional Needs

Table of Contents

1. Introduction 1
2. Scope of Reasonable Regional Needs Discussion 3
3. Issues for Reasonable Regional Needs 3
   3.1 Water Use, Entitlements and Demand Projections 3
   3.2 Demand Scenarios 4
   3.3 Balancing of State Interests with Regional Interests 5
   3.4 Understanding and Managing Risks 5
4. Considerations in Determining Reasonable Regional Needs 7
5. Preferred Approach 7
6. References 9

List of Tables

1. Current groundwater water use and forecast demands for groundwater 4

List of Figures

1. Project overview 2
2. Water Corporation preferred approach 8
1. INTRODUCTION

The Water Corporation is proposing to abstract 45 GL/yr of groundwater from the Yarragadee Formation aquifers in the south west of Western Australia. The current proposal is for 45 GL/yr to be drawn from a wellfield in the centre of the Blackwood Plateau as shown in Figure 1. Alternative wellfield layouts will be considered through the evaluation of the proposal. The water is proposed for delivery to the Integrated Water Supply Scheme (IWSS) to meet the growing demands of the south west of the State.

Approval to undertake this project is being sought from the Western Australian Government through a sustainability evaluation. This evaluation is being developed to allow the full breadth of the environmental, social and economic aspects of the project to be assessed through an integrated approach. The approach is aimed at achieving net environmental, social and economic benefits as an outcome of the project, in accordance with the State Sustainability Strategy (Government of Western Australia 2003). A detailed description of the approach to the sustainability evaluation is described in full in a report by Strategen (2005).

As highlighted in the State Water Strategy (Government of Western Australia 2003a), the South West Yarragadee source is proposed to be developed “for the benefit of communities in the South West and those serviced by the Integrated Water Supply Scheme”. While the source is being investigated at this time to meet strong growth in the existing IWSS, once connected these new assets would also be available to deliver water to high value uses in the South West.

The approach is in keeping with the historical development of the Water Corporation inter-regional water systems. The Goldfields pipeline enabled connection to many rural towns and industries across the agricultural region. The most recent extension of the IWSS, which linked in the Stirling Dam, resulted in the communities of Harvey, Binningup, Myalup and Waroona being connected to the scheme.

The South West Yarragadee proposal would extend the existing IWSS from Harvey to the proposed treatment plant on the Whicher Scarp. A transfer main along the Swan Coastal Plain would pass near the growing regional centres of Bunbury, Capel, and the Kemerton Industrial Park. Water supplied through an integrated system provides the greatest opportunity for economic benefits to both the region and the State. An enhanced water supply will support expansion of the population and a higher overall level of economic activity in the South West.

---

1 The Integrated Water Supply System (IWSS) is the integrated combination of surface and groundwater sources and their distribution system that currently services the Perth–Mandurah region, Eastern Goldfields and the Central Wheatbelt and is progressively being expanding to service the South West of Western Australia.
Figure 1  Project overview

![Project Overview Map]
The South West Yarragadee Water Supply Development was identified as a future source option in the State Water Strategy (Government of Western Australia 2003a). One of the key issues to be addressed in the evaluation is the requirement to satisfy all ‘reasonable regional needs’ before transfers of water from the region will be allowed to take place.

The State Water Strategy stated:

“… all reasonable regional needs including social, recreational and projected future development will be satisfied before transfers can take place. To achieve this requires consultation to ensure that needs are understood and reasonably addressed.”

(Government of Western Australia 2003a)

This position paper has been prepared following consultation with regional stakeholders on what the reasonable regional needs might be and how they should be approached. The paper presents the Water Corporation position on the issue, which will be included in the Sustainability Evaluation.

2. SCOPE OF REASONABLE REGIONAL NEEDS DISCUSSION

For the purposes of this paper, the scope of the discussion relates to the use of groundwater that would be abstracted from the Southern Perth Basin resource, of which the Yarragadee aquifer is a component. This abstraction may be for any commercial or non-commercial purposes. The scope does not extend to any in situ uses of water which will be considered as an aspect of the social and environmental values studies being undertaken as part of the overall South West Yarragadee Water Supply Development project. In situ use refers to use of the water resource where and as it occurs in the landscape.

3. ISSUES FOR REASONABLE REGIONAL NEEDS

A range of issues was raised for consideration through a consultation process to define what the reasonable regional needs associated with this project might be. These issues were:

• existing water use and entitlements and demand projections/scenarios
• maintaining regional development opportunity and balancing of State interests with regional interests
• understanding potential risks and identifying the management regime.

3.1 WATER USE, ENTITLEMENTS AND DEMAND PROJECTIONS

For the purposes of considering regional needs, the groundwater demand projections to be used in the Sustainability Evaluation will be based on studies by Economics Consulting Services (2003), modified by more recent information.

The total groundwater use within the Southern Perth Basin (May 2003) is about 72 GL/yr and growth was estimated to increase demand for groundwater from the Southern Perth Basin by about 101 GL/yr by 2033 (Economics Consulting Services 2003). This was adopted in the Water Study Report (Water and Rivers Commission 2004) which outlines investigations undertaken during 2002/2003. This estimate excludes the components of regional demand expected to be met from surface water and from other groundwater sources outside the Southern Perth Basin.

Recent proposals are emerging to develop the South West Yarragadee Formation as a public water supply source for towns east of the Darling Scarp whose water supplies are requiring augmentation.
because of a drying climate. The current groundwater use and 30 year forecast demand projections by Economics Consulting Services, updated with possible additional regional town water supplies are presented in Table 1.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Town/Industry/Urban</td>
<td>30</td>
<td>65</td>
<td>67</td>
</tr>
<tr>
<td>Agriculture</td>
<td>32</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Mining</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Other Uses</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>173</td>
<td>175</td>
</tr>
</tbody>
</table>

Notes: The future use projections are total use, assuming continuation of current (2003) use.  
# “ECS estimates” refer to estimates made by Economics Research Services (2003). Estimates include current use continuing.  
## “Updated estimates” are the Economics Research Services (2003) estimates, updated to include Bridgetown, Hester, Boyup Brook, Greenbushes, Balingup, Mullalyup and Kirup water supplies. Estimates include current use continuing at 72 GL/yr.

The actual current groundwater use of 72 GL/yr represents use of about 62% of the licensed allocations (38% of the 116 GL/yr of licensed allocations is currently unused). Of the current total groundwater use, about 50% is being drawn from the Yarragadee Formation.

These demand projections were discussed at the Reasonable Regional Water Needs Forum convened by the South West Zone of the WA Local Government Association in Busselton on 9 June 2005. The projections were accepted by the forum as being the best estimates possible, based on information available at the time.

It must be noted that projecting future growth in water demand is not an exact science, and the results will be affected by a wide range of factors that cannot be satisfactorily modelled. This is evident in changes that have occurred in the short time since the Economics Consulting Services (2003) report. However, it is important that best estimates are made of future demand to provide for planning, and regular reviews of demand growth are an important requirement to update projections.

In developing a proposal for allocating water to potential future competing uses, the approach needs to be flexible enough to accommodate actual water demands being different to those projected, in terms of time, location, volume and use sector.

### 3.2 DEMAND SCENARIOS

For the purpose of modelling the effects of the growth in groundwater abstractions from the aquifer systems, a straight line rate of growth has been assumed. The geographical distribution of future local private demands is largely based on considerations of:

- availability of private land
- use of the most accessible aquifers likely to produce the required yields
- soil types and suitability for various agricultural sectors (horticulture, dairying, etc).

The current abstractions are assumed to continue at their present rates at their present locations. The future use projections are based on assumptions that the growth in use will occur through a combination of take-up of unused portions of existing allocations and new allocations. It is not possible to predict precisely when, during the next thirty years, the currently unused portion of existing allocations will be taken up. It is also expected that allocations will exceed usage to some extent until allocations reach the sustainable limits of the resource. Under these circumstances, it is
expected that growth in use would then be largely through take-up of the unused portion of the existing allocations. This is expected to happen in a progressive manner on an area-by-area basis, rather than in an overall sense. For example, groundwater allocations from the Leederville Formation in the Jindong Area have reached the extent of the DoE assessment of sustainable yield, and growth in groundwater use can now only be permitted through use of unused portions of existing allocations, or through accessing groundwater in alternative formations, such as the Yarragadee.

3.3 BALANCING OF STATE INTERESTS WITH REGIONAL INTERESTS

An important consideration in assessing the merits of the Water Corporation proposal to extend the IWSS and abstract 45 GL/yr from the South West Yarragadee Formation is the need to maintain regional development opportunities in the South West. In identifying the Yarragadee Formation as a major supply option, the State Water Strategy discussed the issue of inter-regional transfer of water and noted that:

“The transfer of water from one area to another has long been a part of the history of water supply in this vast State. The most well known and visible example is the Goldfields Pipeline that transfers water more than 550 kilometres from Mundaring Weir in the Darling Range outside Perth to Kalgoorlie Boulder in the Goldfields, supplying water to towns and communities along the way.

There are many examples of inter-regional transfers in Western Australia, including the Pilbara in the North West, a scheme extending deep into the Great Southern from the Harris Dam outside Collie, while the most recent is water transferred to Perth from the Stirling Dam on the Harvey River through a 105-kilometre water pipeline.

Water is a State resource. Western Australia has low, intermittent and unreliable rainfall making it critically important that the State’s water resources can be accessed and transferred beyond regional boundaries. This ensures a more reliable and equitable access to water for all. Importantly, in undertaking this process all reasonable regional needs including social, recreational and projected future development will be satisfied before transfers can take place. To achieve this requires consultation to ensure that needs are understood and reasonably addressed.”

A major issue from the perspective of State and regional benefit is management of the resource to maximise the potential water that can be made available for use. A key factor in achieving this outcome is the spatial distribution of abstraction points such that abstraction is not concentrated in only a few areas. If water is not abstracted from the area within the State Forests on the Blackwood Plateau, the total availability of water from the resource will be reduced. As a result of the limited access to State Forests, abstraction from this area is unlikely to be available for uses other than public water supply or for development by other than water utilities.

3.4 UNDERSTANDING AND MANAGING RISKS

An important aspect in considering the provision of water for the integrated scheme is the risk to potential future regional needs in making the decision on currently available information that may be imperfect or incomplete. However, risks can be dealt with if they are understood and contingencies developed to deal with them if they materialise.

The principal risks relate to:

- the proposed abstraction resulting in impacts beyond those expected within the parameters of any environmental approval or licence issued
if there are unforeseen regional needs or growth in regional needs occurs at a rate faster than currently anticipated.

Contingency options could include currently unallocated surface water in the region, or temporary use of unused public water supply allocations. If such water was available as a contingency, it could be used under several different scenarios:

1. Contingency option: 45 GL/yr to be pumped from groundwater (Yarragadee Formation as proposed) with a pre-agreed mitigation contingency source to be initiated if and when impacts are beyond those expected. Groundwater pumping would be reduced and the water production shortfall made up from use of the contingency option.

2. Staged option: The development of groundwater abstraction could be staged with approval to abstract less than 45 GL/yr supplemented by the contingency source for a pre-set period. In effect, this is a means of progressively increasing draw rates from the aquifer. During that period, monitoring information would be gathered to allow decision-making on increasing the allocation using more robust predictions of the long-term impact of pumping. An example would be to allow 30 GL/yr groundwater with 15 GL/yr from the contingency source for say, 10 years, at which time the situation would be reviewed to determine if groundwater pumping could be increased. This option would be a solution if there is unreasonable uncertainty about the potential short-term effects of pumping the full amount as a result of the current studies.

3. Reverse-staged option: The development of groundwater abstraction could be “reverse-staged” with approval to abstract 45 GL/yr for a specific period, with a pre-planned reduction in that abstraction and the shortfall made up from use of the contingency option (eg: say 45 GL/yr groundwater for 15 yrs then 30 GL/yr ongoing with 15 GL/yr from the contingency source). There is a range of triggers for the reduction that could be pre-acknowledged, including competition with future local uses. The contingency option is essentially one specific form of the reverse-staged option, in which the trigger might be unexpected unacceptable environmental impact, and where the need to reduce groundwater pumping was expected to be in the longer rather than short-term.

4. Fixed combination option: Under this option, groundwater pumping plus the contingency option to provide 45 GL/yr is approved as the initial and ongoing proposal. This option might be adopted if the Sustainability Evaluation indicated that the likely effects of pumping 45 GL/yr from the Yarragadee Formation would not be sustainable, even in the short term.

5. Other options: A range of other options may be possible, these would be canvassed with the community and regulatory agencies if there are doubts about the likely effects of pumping 45 GL/yr from the Yarragadee Formation being sustainable, in either the short or the long term.

These options are preliminary and are intended to provide indicative examples of possible approaches to managing foreseen or unforeseen outcomes from the proposal, if the proposal is approved.

There are major undeveloped sources in the South West, such as the Donnelly River, that could be considered in terms of their potential for development as contingencies, and also in terms of their role in the future extension of the integrated public water supply system into the South West. The development of pipehead dams on streams such as St John Brook to take a portion of the winter flows may also be a possibility for inclusion as contingencies subject to gaining the appropriate approvals.

The June 2005 Reasonable Regional Water Needs Forum also identified that there are alternative sources available as forms of contingency for regional demands. These options are not universally available to private users, being dependent on the proximity of the user to the alternative source and their financial ability to access it. Nonetheless, the region is not entirely dependent on the Yarragadee Formation as its only future water supply source.
4. CONSIDERATIONS IN DETERMINING REASONABLE REGIONAL NEEDS

From identification and review of the issues, and with input from the community, the Water Corporation has determined that the following basic principles should be applied to considerations of how reasonable regional needs should be addressed. These principles are:

1. Water is a State resource available for the maximum benefit of all Western Australians.
2. Western Australians need reliable access to water.
3. Water must be permitted to be transferred between regions.
4. Current use and users should be protected.
5. Consultation should be undertaken to ensure regional needs are understood and reasonably addressed.
6. Decision-making on water allocation should consider the values and priorities of the regional community.
7. It is unreasonable to transfer water and leave a region deficient in water for any use that is of similar or higher social and economic value.
8. Risks, and the mechanisms to manage those risks, must be clearly stated and understood.
9. Known benefits should not be foregone to preserve uncertain future benefits.
10. To maximise the benefits, water should be used efficiently.

5. PREFERRED APPROACH

In considering the issues and competing interests, the Water Corporation position on reasonable regional needs is based on these principles and an understanding that there is considerable opportunity for additional water to be made available from the groundwater resources of the Southern Perth Basin.

From the current examination of the resource, the water available is expected to exceed demand by a significant margin. If competition does arise, through either increased regional demand or a reduction in water availability, this is unlikely to occur for several decades. The aquifer system is expected to be significantly underutilised in the short to medium term. This is an important factor in considering the transfer of water from the region. If competition between the various demands occurs, it is not expected to occur for several decades based on current demand projections. This provides an opportunity to develop the resource further, and learn more about its behaviour under higher levels of abstraction than it is now experiencing. The information gained will be invaluable in making future management decisions about limits on use.

Figure 2 is a diagrammatic representation of the Water Corporation preferred position. Within this, it is assumed that 45 GL/yr is able to be transferred to the IWSS servicing the areas north of Harvey in the first instance, commencing in 2009. As regional demands grow, subject to management at the local scale to ensure impacts are within appropriate limits, regional use is also expected to grow to meet those needs. By 2033, it is expected that a proportion of the 45 GL/yr being taken into the IWSS will be used within the Region to meet some of the South West needs, and only the remaining portion would be transferred out of the region.
If at some point in the future, there is competition for water between the IWSS and other regional demands, then this competition should be addressed on the specific merits of the competing uses, under the circumstances that apply at the time. Based on current information, it is not anticipated that such competition will occur in the near future and may be several decades away.

The longer-term implementation of this approach will require sound water planning for the extension of the IWSS into the South West. This should consider:

- all the demands in the broad region with potential to be linked within an integrated scheme in the long term
- all the sources that might satisfy those demands
- all the other competing interests in those sources.

The work should deliver a water resource development plan that optimises the allocation of potential resources for maximum economic and social output, within the constraints of environmental acceptability, and with flexibility to adjust if demands do not materialise in accordance with the plan assumptions. Such planning is beyond the scope of the sustainability evaluation for the Water Corporation project, but is a basic requirement to assist in the orderly development of the State’s water resources and could be a commitment that will be made as part of the approval of the Water Corporation proposal to develop the South West Yarragadee Water Supply Development project.
6. REFERENCES


