EXPLANATORY GUIDE

Water Allocation Plan

McLaren Vale Prescribed Wells Area

2007

Government of South Australia
Adelaide and Mount Lofty Ranges
Natural Resources Management Board

Explanatory Guide to the Water Allocation Plan for the McLaren Vale Prescribed Wells Area

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FOREWORD

BACKGROUND□□□□

The McLaren Vale Prescribed Wells Area (PWA) covers an area of approximately 320 square kilometres, bounded by the Onkaparinga River to the north, Gulf St Vincent to the West and the ridge of the Sellicks Range to the south-east. The area contains several productive aquifers.□□If you have any additional questions, please seek further information from officers at the Department of Water, Land and Biodiversity Conservation or the Adelaide and Mount Lofty Ranges NRM Board.

The Water Allocation Plan, adopted in February 2007, aims to ensure that a balance is maintained between the extraction of groundwater for social and economic development and any adverse environmental impacts such as groundwater levels or water quality decline. The WAP contains detailed descriptions of the groundwater resources of the McLaren Vale region, and an overview of trends in groundwater levels and salinity.

This guide is designed to accompany the WAP for the McLaren Vale PWA and provides information on:

1. Background to the development of the policies in the WAP;
2. Explanation of the policies contained within the WAP; and
3. Answers to many 'frequently asked questions'.

If you have any additional questions, please seek further information from the staff at Adelaide and Mount Lofty Ranges Natural Resources Management Board or the Department of Water, Land and Biodiversity Conservation.

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1 INTRODUCTION

1.1 The McLaren Vale Prescribed Wells Area Water Allocation Plan

The location and boundaries of the McLaren Vale Prescribed Wells Area (McLaren Vale PWA) are shown in **Figure 1**. The McLaren Vale PWA covers an area of approximately 320 square kilometres, with the Onkaparinga River forming part of the northern boundary, while much of the south-eastern boundary follows the ridge of the Sellicks Range.

The McLaren Vale PWA comprises groundwater resources contained within the sediments of the Willunga Basin, the fractured basement rocks underlying the Willunga Basin and the fractured basements rocks present east of the Willunga Fault.

The Water Allocation Plan (WAP) provides the rules for the extraction of groundwater from the productive aquifers occurring within the McLaren Vale PWA.

The objective of implementing the WAP is to maintain the current condition of the groundwater resources in the region and allow for the use of water for social and economic development, whilst controlling adverse environmental impacts associated with groundwater extraction, in particular groundwater level and quality decline.

1.2 Purpose of this guide

This non-legal document is designed to accompany the WAP for the McLaren Vale PWA and provides information on the following:

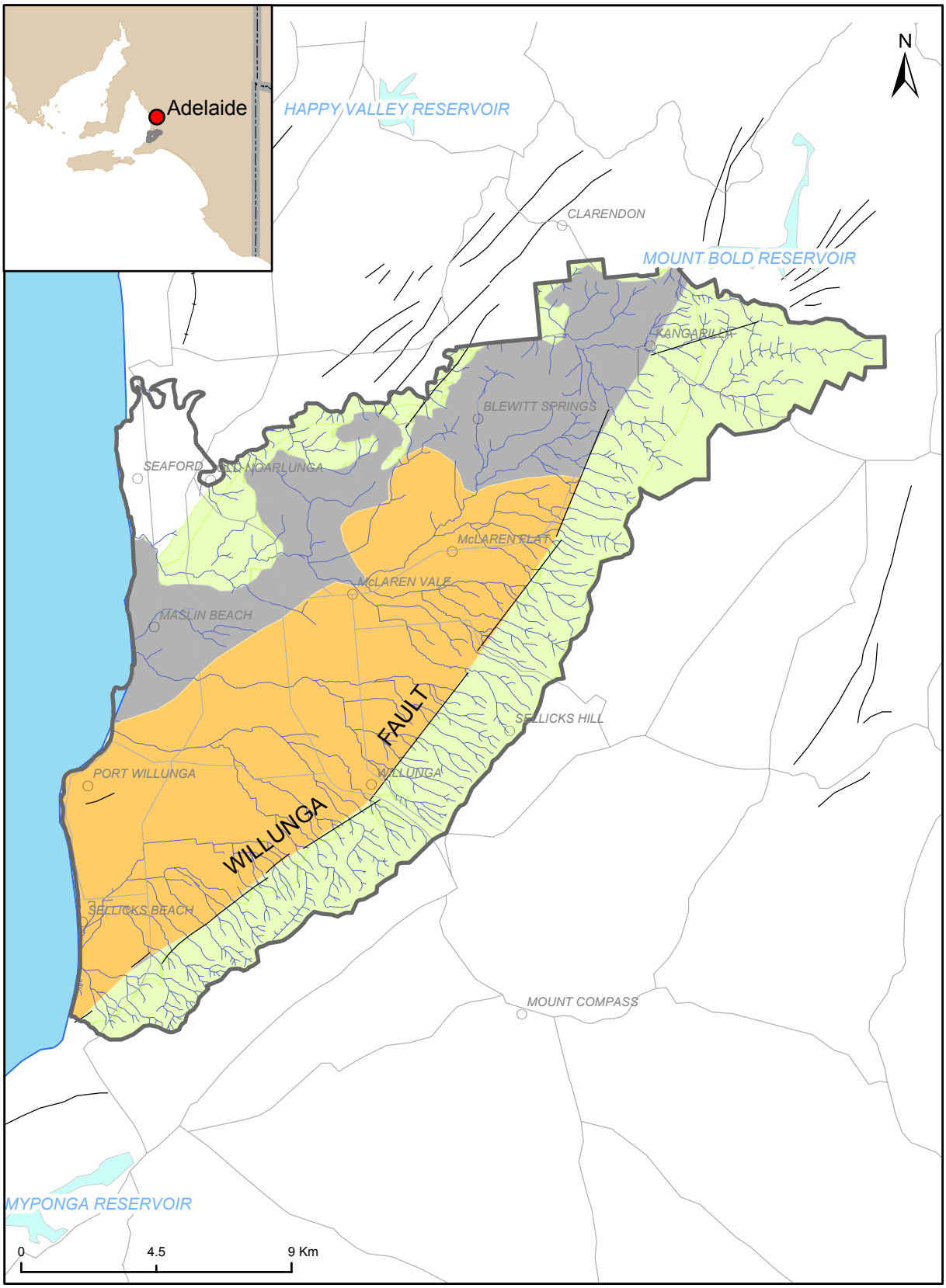
1. Background to the development of the policies in the WAP;
2. Explanation of the policies contained within the WAP; and
3. Answers to many ‘frequently asked questions’.

The WAP contains detailed descriptions of the groundwater resources of the McLaren Vale region and an overview of trends in groundwater levels and salinity.

1.3 What is a WAP?

A Water Allocation Plan, commonly referred to as a WAP, is a legal document prepared under the *Natural Resources Management Act 2004* that outlines the rules for allocation, transfer and use of available water from prescribed resources.

A WAP sets the limits on the amount of water that can be taken and used for all uses. In setting the limits, a WAP considers the needs of both the environment and other water uses. It also considers the water resource’s capacity, the demands upon it and the potential impacts on other water resources. The WAP is required to be reviewed at least once every five years under the *Natural Resource Management Act 2004.*



McLAREN VALE PRESCRIBED WELLS AREA

FIGURE 1

1.4 Why do we need a WAP?

In 1999 the groundwater of the Willunga Basin and Upper Willunga Catchment were prescribed under the provisions of the *Water Resources Act 1997* (now the *Natural Resource Management Act 2004*). The groundwater resource was prescribed in a response to the depletion of the resource and increasing salinity. Without a well-organised WAP, unrestricted use would result in continued depletion and salinisation of the groundwater.

1.5 Who is affected by the WAP?

The WAP applies to anyone who has a licence to take and use groundwater within the McLaren Vale PWA. This includes irrigation, recreational, industrial and commercial users.

Stock and domestic use does not require a licence under the McLaren Vale PWA WAP. Stock use is defined as any application of water to stock not used for intensive farming, where intensive farming is a method of keeping animals in the course of carrying on the business of primary production in which the animals are usually confined to a small space or area and usually fed by hand or by mechanical means. Domestic use is any water used for a domestic purpose. This does not include taking water for the purpose of watering or irrigating more than 0.4 ha of land; or, taking water to be used in carrying on a business (except for the personal use of persons employed in the business e.g. hand-washing, toilet etc.)

1.6 Who is responsible for ensuring the WAP is implemented?

The Minister administering the *Natural Resources Management Act 2004* (currently the Minister for Environment and Conservation) is responsible for the implementation of the McLaren Vale PWA WAP. In carrying out this responsibility, the Minister is assisted by the Adelaide and Mount Lofty Ranges Natural Resources Management Board and the Department of Water, Land and Biodiversity Conservation (DWLBC).

All licensed water users have the responsibility to ensure their water use complies with the policies in the McLaren Vale PWA WAP.

2 A HISTORY OF WATER RESOURCE MANAGEMENT IN THE MCLAREN VALE PWA.

The McLaren Vale PWA was gazetted on 7 January 1999, under the provisions of the then operational *Water Resources Act 1997*. Pursuant to regulation changes under the Act, the gazettal amalgamated the areas known as the Willunga Basin Prescribed Wells Area and the Upper Willunga Catchment Moratorium Area to establish the McLaren Vale PWA.

With the declaration of the McLaren Vale PWA under Section 8 of the *Water Resources Act 1997*, it became a legal requirement for the then operational Onkaparinga Catchment Water Management Board to prepare a WAP for this prescribed water resource.

The Adelaide and Mount Lofty Ranges Natural Resources Management Board was established in May 2005, and is now responsible for water allocation planning in the McLaren Vale PWA.

The relevant provisions of the *Water Resources Act 1997* have now been replaced by the *Natural Resources Management Act 2004*.

The Minister approved the first McLaren Vale PWA WAP in November 2000 and groundwater licences were varied to allocate water in accordance with the WAP at the end of 2000. The aim of the WAP was to ensure the condition of the groundwater and salinity levels measured when the WAP was prepared and to ensure that the resource could be used sustainably.

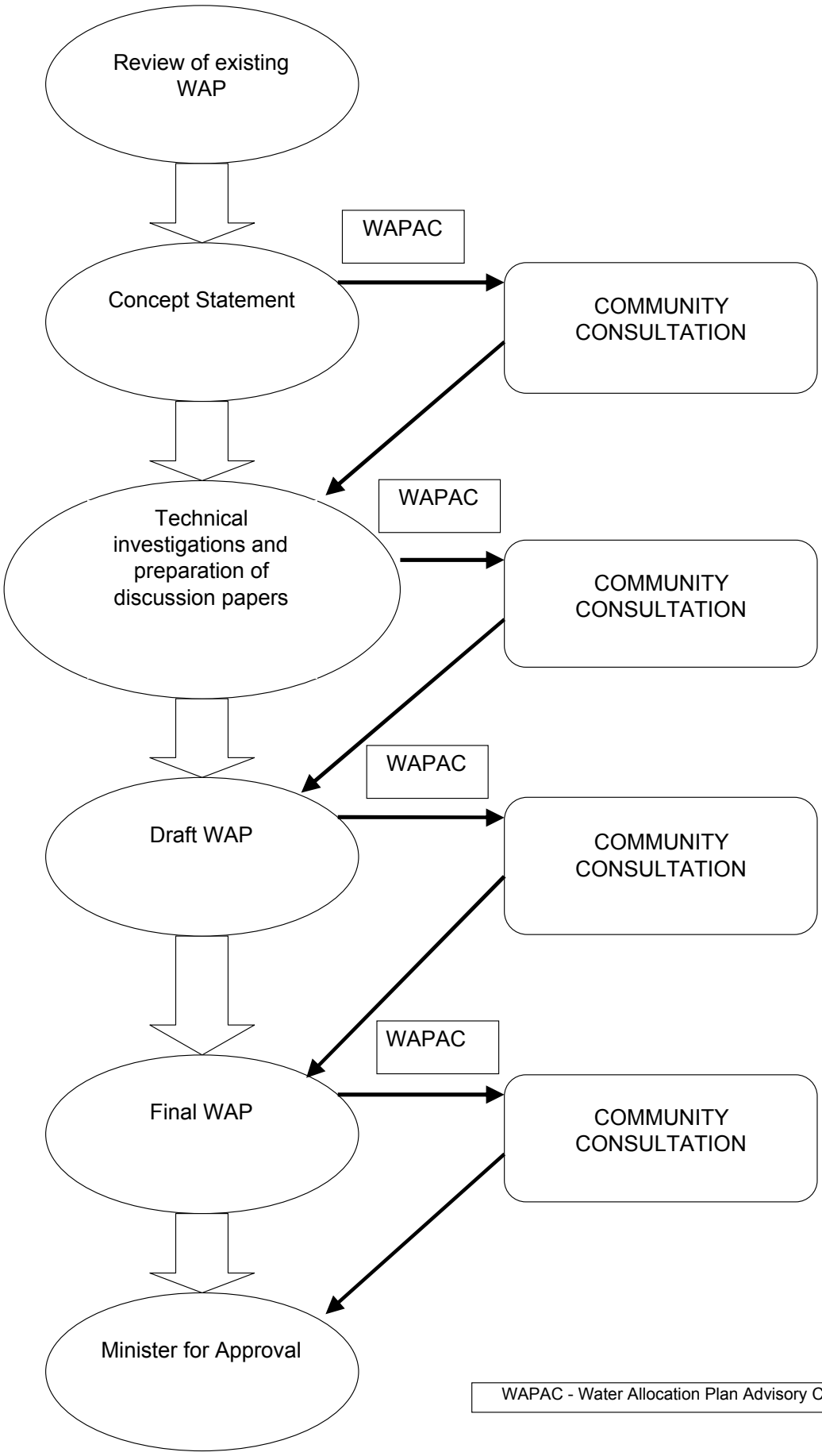
2.1 Process for development of the new WAP

The former Onkaparinga Catchment Water Management Board completed a review of the existing WAP in 2003, which considered the administrative performance of the WAP (that is, whether the policy was workable) and the impact of the WAP policy on the condition of the groundwater resource. The review was undertaken in close consultation with the McLaren Vale Water Allocation Plan Advisory Committee (WAPAC) and the DWLBC. New information regarding the status of the groundwater resource (from studies and monitoring) was taken into account in the review.

The former Onkaparinga CWMB prepared a Concept Statement, which was released for public consultation in 2004. This statement outlined the proposed format and terms of reference for the policy to be included in the final WAP. This was assessed by the WAPAC and suggestions and changes were incorporated into the statement. This was then released to the community for consultation. Feedback on the Concept Statement and outcomes from the review were taken into account when a revised set of selected WAP policies were developed (see **Figure 2**).

A series of discussion papers based on technical investigations were written to examine issues arising out of the first round of consultation. These were assessed by the WAPC and suggestions were incorporated into the release of these technical and discussion papers for community consultation. A further round of consultation incorporated the comments from the community consultation and a Draft WAP was written. The Draft WAP underwent the same cycle of consultation with the WAPAC, revision and release to the community which then led to the writing of the final WAP. The final WAP was also passed through the cycle of review by the WAPAC, revision and community consultation before finally going to the Minister for approval.

This WAP replaces the water allocation plan approved by the Minister in November, 2000.



Explanatory Guide to the McLaren Vale Prescribed Wells Area

Flow chart representing the process for development of the WAP

FIGURE **2**

PROJECT FF-18-01

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2.2 Links to the prescription of the Western Mount Lofty Ranges

The McLaren Vale PWA falls within the Western Mount Lofty Ranges (WMLR) Prescribed Water Resources Area. The Adelaide and Mount Lofty Ranges NRM Board is currently preparing a Water Allocation Plan for the whole of the WMLR. The WMLR WAP will include policies for the McLaren Vale PWA covering all water sources *including groundwater and surface water* and will replace this plan. The process for preparing the WAP for the WMLR will involve further consideration of the issues of climate change, which is not considered in the McLaren Vale WAP. It will also involve further consideration of the role of groundwater in supporting ecological outcomes.

2.3 Implications of the National Water Initiative

The National Water Initiative (NWI) is a comprehensive strategy driven by the Australian Government to improve water management across the country The NWI was agreed to and signed at the 25 June 2004 meeting of the Council of Australian Governments (COAG).

In particular, the NWI places an emphasis on (amongst other issues) maintaining the allocation and use within the limit set by sustainable yield, accounting for the interaction between surface water and groundwater, and the provision of water for groundwater dependent ecosystems.

This WAP maintains allocation within the limits set by sustainable yield as it is currently understood and there is recognition of the needs of groundwater dependent ecosystems as well as the need for more technical investigations to underpin future policy for the protection of ecosystems. The conceptual groundwater model accounts for the interaction between surface water and groundwater, but there is currently no quantification of the exchange where groundwater extraction can impact on stream flow. There will be an opportunity to ensure that surface water and groundwater resources are not double-accounted when this WAP is rolled into the WAP for the WMLR.

2.4 Implications of climate change

Climate change presents a significant challenge to South Australia. An increasing body of scientific observations gives a collective picture of a warming world and other changes in the climate system. The debate among scientists is generally not whether climate change is happening, but how quickly it will happen, and how significant its effects will be.

The likely future effects of climate change in South Australia include:

- More hot and very hot days;
- Reductions in average annual rainfall;
- An increase in the frequency and severity of droughts;
- An increase in the frequency and severity of floods;
- An increase in the risk of bushfires;

- Rising sea levels; and
- Increased evapo(transpi)ration.

Agriculture, natural ecosystems and water resources have the potential to be significantly affected if rainfall declines. Annual rainfall is projected to decrease by up to 8% or 9% in 2030 and up to 25 or 30% in 2070. Spring shows the strongest rainfall decreases. Across the southern agricultural regions, spring rainfall decreases of up to 20% by 2030 and 60% by 2070 are indicated. Increased evaporation is projected and this will also increase water stress.

Reduced rainfall and timing of rains will cause altered streamflows (including the timing of flows) and groundwater recharge (with implications for floodplains and biodiversity, water resources, and natural resource industries that rely on rainfall, surface water and groundwater resources).

Hotter drier conditions will lead to an increased demand for water and an associated increased length of irrigation seasons, potentially placing stresses on groundwater and other water resources.

The Board is currently working with DWLBC on an assessment of the impact of climate change on the capacity of the groundwater resources to meet demand.

3 LICENSING AND ALLOCATION

For more details on licensing and allocations please refer to Section 5 of the WAP.

3.1 What is a water licence?

All water users as described in Section 1.5 of this guide require a licence to extract groundwater from the McLaren Vale PWA. A licence identifies the volume of water that can be extracted and contains conditions on the use of that water. A water licence is a property right that is tradeable, and is separate from a land title or land ownership.

It should be noted that a water allocation is legally different from a water licence, although the terms 'licence' and 'allocation' are often used interchangeably during informal conversation. A **licence** authorises the taking and use of a **water allocation** that is endorsed on the licence. A licence describes conditions relating to the use of the water allocation.

3.2 What are the different types of water allocations?

See Section 5.1 of the WAP.

There are several ways groundwater can be allocated. These different allocations are designed to ensure that the use of the groundwater resource is sustainable and flexible. Water allocations are defined on the basis of a **water-use year** from 1 July to 30 June.

Water (taking) allocation
This is the amount of water that the licensee is entitled to take and use from a specified water resource (In this case the aquifers within the McLaren Vale PWA).

Water (holding) allocation
A licence may have an amount of water endorsed for 'holding'. This represents a volume available for licensed allocation in the PWA but it cannot be extracted and used without converting it to a water (taking) allocation. A holding allocation can be created when a landowner sells their property but retains their water rights. This water (holding) allocation can be converted to a water (taking) allocation if it is then sold to another landowner or if the licensee purchases a new property. **The conversion of a water (holding) allocation to a water (taking) allocation is considered a water transfer**. Refer to Section 4.2 of this guide for further information on transfers.

Roll-over allocation
If a water user does not use their full water (taking) allocation over the water-use year, they may roll-over 50% of their unused water for use within the next three years. This water is over and above the water (taking) allocation and is called a roll-over allocation. Refer to Section 3.5 of this document for more detail.

Recharge allocation
If a water user establishes or participates in an aquifer storage and recovery (ASR) sceme, they are entitled to a percentage of the water that they store within the aquifer following a recharge period. Refer to Section 5 of this document for more detail.

3.3 How have the limits to allocation been set?

3.3.1 Estimation of sustainable yield

The limit to allocation is set by the sustainable yield. An initial estimate of the sustainable yield (then referred to as the safe yield) of 5,700 ML/yr was provided by Martin (1998; Refer to section 11) based on a water balance calculation. The water balance looks at all sources of water going into the system and compares that with all sources of water going out of the system. These should balance.

The former Onkaparinga CWMB calculated a water balance during the development of the first McLaren Vale WAP (Table 1). A negative result for the annual water balance suggests loss of storage and declining groundwater levels in the aquifer. The volume of the deficit in the water balance (-450 ML) was subtracted from the pumped volume (6450 ML) to derive an estimate of the sustainable yield of 6000 ML.

Groundwater resource condition limits (e.g. threshold groundwater levels) were not explicitly defined for the evaluation of the sustainable yield. However, there was an implicit objective in the method to minimise further degredation of the resource beyond that measured at the start of the planning process.

The water balance method requires a number of assumptions to be made in order to assign values to components of the water balance. Consequently there are error bands implicit in the use of this method. The initial estimate of the water balance was supported with an analysis of trends in groundwater levels relative to rainfall and extraction. It was assumed that trends in groundwater levels reflected all stresses placed on the aquifer system.

The former Onkaparinga CWMB estimated the sustainable yield to be 6,000 ML/yr based on the water balance and trend analysis. It was assumed that the extraction at no more than 6,000 ML/yr would result in a reduction in the rate of decline of groundwater levels and stabilisation of groundwater levels. This would ensure that users of the groundwater resource (including groundwater dependent ecosystems) would not be adversely affected.

DWLBC revised the estimate of sustainable yield to 6,600 ML/yr on the basis of new information on the volume of groundwater extracted within the Upper Willunga Catchment Moratorium Area.

The estimate of the sustainable yield has not been altered for this WAP on the basis of an analysis of trends in groundwater levels (to 2003/04) that indicated general recovery of groundwater levels. No other significant data has been made available to suggest that the value should be altered.

There are limitations to the estimate of sustainable yield and more investigations and on-going monitoring is required to allow for a review of sustainable level of extraction

The Adelaide and Mount Lofty Ranges NRM Board has invested in the development of a groundwater flow model for the McLaren Vale region. The model has the capacity to simulate the response of the groundwater system to various extraction scenarios and policy options. For example, it can be used to estimate the relative impact of a drier climate on groundwater levels. Further investment in the model is being planned by the Board so that it can be more confidently used to test the effect of future WAP policy. (Refer to REM (2006) in Section 11 of this guide).

Table 1: Summary of the McLaren Vale PWA water balance

Component	Volume In (ML/yr)	Volume Out (ML/yr)	Balance
Rainfall Recharge	6170		
Lateral Groundwater Inflow	1430		
Recharge from Streams		0 (Net)	
Evapotranspiration		0 (Net)	
Discharge to the ocean		1600	
Licensed Pumping		6450	
Total	**7600**	**8050**	**-450**

3.3.2 Volume of groundwater available for allocation

The maximum amount of groundwater available for allocation (taking and holding) from the McLaren Vale PWA is 6,600ML per annum, less the amount of saved water plus the amount available from roll-over allocations and recharge allocations (See Equation 1).

Equation 1	MAX. ALLOCATION = 6600 ML/yr – SAVED + ROLL-OVER + RECHARGE

3.4 How do I get a licence?

There is no additional groundwater available for allocation from the McLaren Vale PWA. However, allocations can be purchased from existing licensees under the transfer rules outlined in Section 6 of the WAP.

If a water licence and allocation is issued, it is on the basis of the information provided on the application form. It is therefore imperative that when first filling out an application, all questions are answered indicating exactly where and how the water is going to be used. If the water is not used in the same manner or at the same location as specified in the application, a breach of the licence may occur. A breach of licence can result in fines or, in extreme cases, the licence being revoked.

Licensees must comply with the policies in the WAP for the McLaren Vale PWA.

3.5 How much am I allocated?

The amount of water you are entitled to take is indicated as your water (taking) allocation on your licence. The volume allocated at the start of this planning period is the same as that which existed on the licence on the 5th of November, 2000 (the date of inception of the first WAP); unless an allocation transfer has been made since.

Roll-over credits can only be accumulated once this WAP is adopted from the start of the water-

use year and cannot be back-dated. If you choose to roll-over unused water from a previous year, or use water that has been drained or discharged into a well, your allocation will be increased through the addition of either a roll-over allocation or recharge allocation for a specified period.

3.6 What is a roll-over credit and how do they work?

Refer to Section 5.1 of the WAP.

There was considerable feedback from irrigators that a simple fixed annual allocation was not flexible and did not allow for protection against droughts. The Board received requests for the use of a roll-over credit system to allow irrigators to plan their groundwater use across growing seasons.

A range of scenarios was examined by the Board for the use of roll-over credits. These are detailed in REM (2004a; refer to Section 11 of this guide). This study showed that having access to a proportion of an unused allocation rather than all of the unused allocation will have less impact on downstream systems. Also, that staggering the use of roll-over credits over a number of years will have less impact than taking it over short periods.

A roll-over credit is created when a licence holder does not use their full water (taking) allocation for a water-use year. 50% of the amount left over may be used in the following three years. This figure is arrived at by taking into account the natural loss of groundwater over time, through outflow to the ocean and losses through other processes such as evaporation, streams and plants. The roll-over credit will be expressed as an increase in the volume of water allocated on a license for that water-use year. See **Figure 3** for an explanation of the roll-over credit procedure.

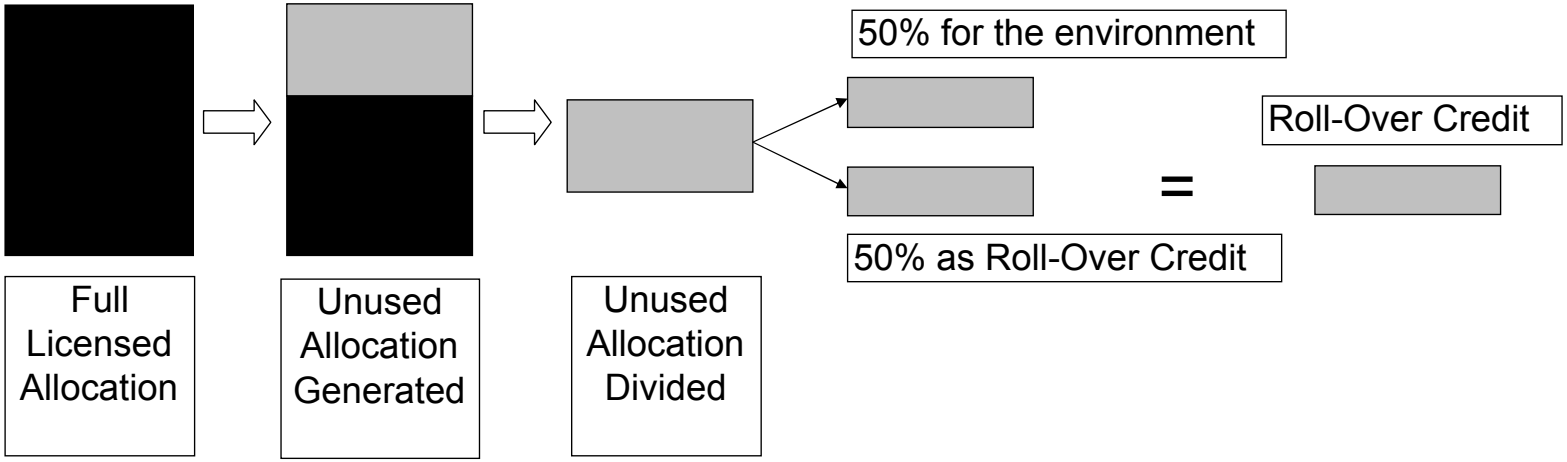
Roll-over credits are converted to roll-over allocations in the order they occur and the credit expires if it has not been used within three years. In addition the roll-over allocation:

- cannot be larger than 30% of the original water (taking) allocation; and
- can only be used after the full amount of the water (taking) allocation has been used up.
- cannot be used at the same time as a transfer is in effect. This includes transfers involving all or part of a water (taking) allocation either temporary or permanent.
- cannot be transferred.

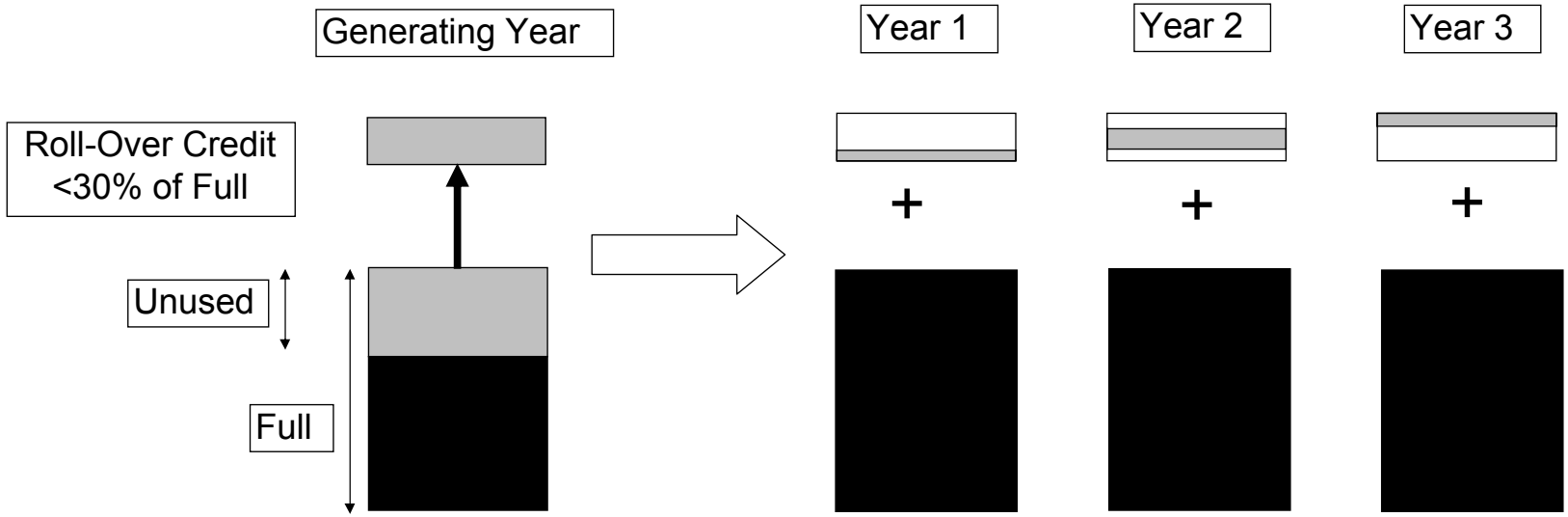
3.7 What will happen with saved water?

Saved water is groundwater that has not been allocated.

A range of options were examined for the use of saved water. These included:



The full licenced allocation is not used.
50% of the remainder makes up the roll-over credit to a volume equal to 30% of the full allocation.



The roll-over credit is then available for up to three years provided the full licensed allocation is used up first

FIGURE

3

Explanatory Guide to the McLaren Vale Prescribed Wells Area
Roll-over credit allocation procedure

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- using a “water bank” for environmental purposes where revegetation, Aquifer Storage and Recovery (ASR) schemes and others could apply for an allocation;
- to provide direct assistance to users disadvantaged by the WAP;
- to sell the saved water at a water auction; and
- to retain the saved water within the aquifer.

After examining each of these scenarios, the Board determined that in order to assist in the sustainable management and protection of the groundwater resource for social, economic and environmental benefit, saved water will not be allocated for any purpose and shall be retained within the aquifer. This provides water for groundwater dependent ecosystems and the environment, and offsets the effects from water use in stressed areas (refer to Section 4.4 of this guide for more detail on stressed areas).

4 TRANSFERS

For more details on Transfers please refer to Section 6 of the WAP.

4.1 What is a transfer?

A transfer is when all or part of a licensed allocation is moved to a new location. This includes bought and sold water and water that is currently used in one area that is to be used in a different location not specified on the original licence agreement. This transfer can involve all or part of the water (taking) allocation. The transfer of an allocation is generally subject to similar principles as the granting of an allocation. In cases where an allocation is sold with the land and the location of the taking of water does not change, the only principles that need to be considered are the principles relating to the impact.

4.2 Can I transfer my allocation?

Allocations can be transferred on a temporary or permanent basis.

Whether a transfer is approved or not depends on the circumstances surrounding the site where the transferred water is intended to be used. Generally, if the transfer is from the same well to a different location of use to that indicated on the original licence, it is approved.

4.3 Factors that may affect the transfer of allocations

The guiding principle behind these policies is that there should be a transfer only if it can be proved that there is no negative impact on the environment, the resource or other users. For example, a water (taking) allocation cannot be transferred where the taking of water in accordance with the transfer will cause the aquifer to change from a confined to an unconfined aquifer. Refer to Section 6 of the WAP for more details on transfers.

4.4 Preventing transfers to stressed areas

There are areas of the aquifer within the McLaren Vale PWA that are considered stressed. The WAP aims to manage the impact of taking groundwater by preventing the transfer of an allocation to stressed areas. Stressed areas are defined by the rate of change of groundwater parameters and is designed to identify those locations that are at risk.

An area is considered stressed if:

- the maximum groundwater level has fallen 500 mm or more over three years; or
- the maximum salinity of groundwater has increased by 50 mg/L or more over three years; or
- there are adverse effects caused by the volume of groundwater extracted, the proximity of wells or the timing or duration of extraction within 500 m of the proposed well.

If there is sufficient technical evidence to show that the extraction of water resulting from a

proposed transfer would in fact reverse the trends outlined above, the transfer may be approved.

4.5 Who administers the licensing, allocation and transfer process?

The licensing section of the Department of Water, Land and Biodiversity Conservation (DWLBC) administers the licensing and allocation process for the McLaren Vale PWA. For further details please refer to the organisations listed on the contact information table at the start of this guide.

4.6 Do I need to notify anyone of my transfer?

It is a requirement that public notice must be given for all transfers of water (taking) allocations greater than 20 ML whether they are temporary transfers or permanent. Public notification is also required if a series of transfers to the same area of land add up to 20 ML or more within three years of the date of the application.

Notification is required for the transfer of an allocation rather than a whole of licence. The sale of a property with a transfer of the licence to the purchaser does not require notification, assuming that the point of taking groundwater has not changed.

To give public notice requires publication in the Public Notices section of local newspapers and written notification to the owners of land that is adjacent to the proposed well. Any person can make a representation in writing in relation to the granting or refusal of the application. The applicant then has an opportunity to respond to those representations.

5 ESTABLISHING AQUIFER STORAGE AND RECOVERY (ASR) SCHEMES

The drainage or discharge of water into a well (recharge) and the subsequent recovery of that water for re-use is called 'Aquifer Storage and Recovery' (ASR). The objective of ASR is to store surplus supplies of water underground and to withdraw an amount (recovery) of the water at a later date for use (**Figure 4**). Under the *Natural Resources Management Act 2004* a permit is required to drain or discharge water into a well and a license is required to extract and use the water recovered. For further details concerning ASR refer to Section 7 of the WAP.

5.1 What is the difference between a Water Licence and a Permit?

A permit is required because ASR is considered a water affecting activity. Water affecting activities require assessment and management techniques, as outlined in the *Natural Resources Management Act 2004,* to drain or discharge water into a well. A licence is required to extract water from the ASR scheme.

The McLaren Vale PWA is part of the Western Mount Lofty Ranges Prescribed Water Resources Area and as such there are controls on the use of **surface water** as a water affecting activity. Examples of surface water include:

- rural stormwater runoff;
- urban stormwater runoff;
- watercourse water;
- roof runoff;
- reticulated mains water; and
- treated effluent.

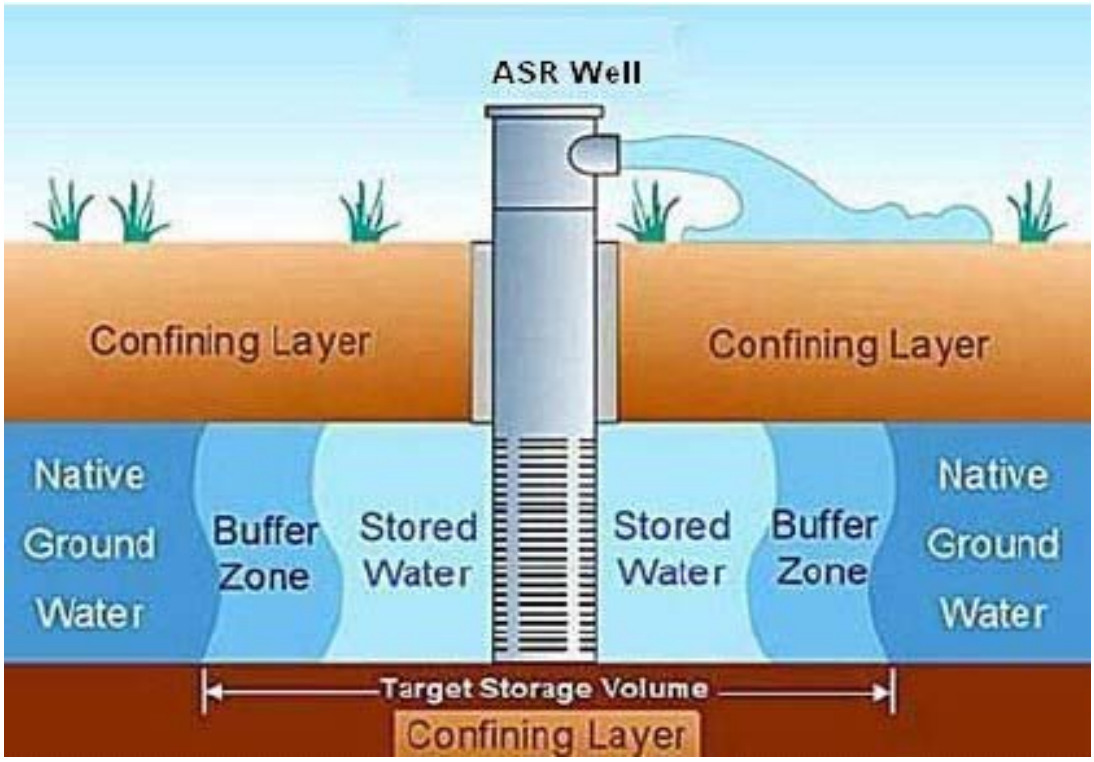
More stringent definitions are provided under Section 127 of the *Natural Resources Management Act 2004.*

5.2 How do I get an allocation from an ASR scheme?

Once an individual has established an ASR scheme, water becomes available for extraction and use after the first report is submitted to the DWLBC (see Section 5.6 of this document for more details on reporting requirements). This will demonstrate that the ASR scheme has generated a recharge allocation. The amount available for extraction and use will be calculated by the DWLBC who will notify you in writing and amend your licensed allocation accordingly.

5.3 Where can I put my recharge well?

Around each recharge well is a zone referred to as an **attenuation zone**. The attenuation zone is designed to protect the groundwater quality, the aquifer, ecosystems that depend on that



Explanatory Guide to the McLaren Vale Prescribed Wells Area

Diagram of an ASR well showing the water stored around the bore and the buffer zone with naturally occurring groundwater

FIGURE **4**

PROJECT FF-18-01

March-07

groundwater and other people from any possible damaging effects when draining or discharging water into the ASR recharge well. In particular, the attenuation zone is designed to prevent unwanted chemicals spreading widely into the groundwater supply.

The attenuation zone around an ASR recharge well is a radius of 300 m within which there may not be any groundwater dependent ecosystems, any adjacent bores or other properties. However, exceptions do exist and the reader is referred to Section 7.1 of the WAP for further details.

5.4 How much of the recharged water am I allocated?

A recharge allocation is a form of water (taking) allocation that depends on the amount of water drained or discharged into the aquifer by an ASR scheme. The amount of water you may be entitled to as a recharge allocation depends on the type of water supplied to the ASR scheme.

If either treated or imported water provides the source water for the ASR scheme, then the recharge allocation will be equal to 100% of the amount of water drained or discharged into the scheme. If the source water is surface water, roof runoff or watercourse water then the recharge allocation will be equal to 75% of the amount of water drained or discharged into the scheme. This is because imported water adds water to the aquifer from outside the system and may therefore be recovered without upsetting the natural ecological balance. Other forms of water would normally provide water for ecosystems that depend on the groundwater and therefore an allowance is made to return 25% of the water recharged back to the environment.

If it is not used, an allocation of recharge water expires within three years of the end of the recharge period that created the allocation.

5.5 Can I transfer my recharge water?

It is possible to transfer recharge water, however, the water that is drained or discharged into an aquifer must always be recovered from the same aquifer. In addition, an allocation of recharge water shall not be transferred where the proposed new point of taking is within a stressed area.

5.6 Are there any monitoring requirements?

The operators of an ASR scheme are required to submit analyses of source water and recovered water, groundwater level monitoring, the volume of water recharged and the volume of water taken. An annual monitoring and evaluation report is required by DWLBC. The sampling timing and frequency depend upon the type of source water used to recharge the aquifer and on the volumes of water stored and recovered. Further details are given in Section 10 of the WAP.

5.7 Do I need to notify anyone?

Public notice of applications to drain or discharge water into a well are required under the *Natural Resources Management Act 2004*. This means that the DWLBC will notify the general public by publication of details in the local newspapers and by written notification to landowners adjacent to the proposed recharge well prior to the construction of the well. Anyone who opposes the planned well may do so by writing to the DWLBC, within the timeframe specified in the notification. The DWLBC will then forward a copy of the representation to the owner of the proposed well, who may then comment on the representation. The DWLBC will then make a decision on the application. A person who is entitled to be given notice of the decision may appeal the decision in the Enviromental, Resources and Development (ERD) Court within 15 days. For further details refer to Sectio*Management Act 2004* and Section 7 of the WAP.

6 USE OF IMPORTED AND EFFLUENT WATER

For further details concerning Imported and Effluent Water please refer to Section 8 of the WAP.

6.1 What is imported and effluent water?

Water from outside the McLaren Vale PWA is considered imported water and may include surface or groundwater from other catchments or mains water. Water supplied from the Christies Beach Wastewater Treatment Plant, because it comes from outside the McLaren Vale PWA, is considered imported water. Other sources of treated waste water may exist within the catchment and are considered effluent.

6.2 What do I need to do if I use imported or effluent water?

In order to use more than 1 ML/yr of imported or effluent water, WAP policy requires that a permit be issued, and that the use of that water will not cause harm to ecosystems, water resources or the land where the water is used.

Any necessary facilities for storage of imported or effluent water must be constructed and operated in a manner that prevents any detrimental impact on the quality of groundwater or the health of surface water ecosystems. It is recognised that the use of imported and effluent water significantly eases the pressure on groundwater resources, nevertheless imported and effluent water will still have an impact of their own and the Board has established policies to protect the groundwater resource from these impacts.

The policies require that imported or effluent water only be used where the groundwater level is more than 2 metres below the ground surface and that the use of that water should not cause groundwater levels to rise to a level that adversely impacts ecosystems or structures (Refer to Section 7.2.5 of this guide and Section 8 of the WAP for further details).

For further details regarding policies on the use of effluent and imported water please refer to Section 8 of the *Natural Resources Act 2004.*

7 PROTECTION OF GROUNDWATER DEPENDENT ECOSYSTEMS AND SPRINGS

7.1 What is a groundwater dependent ecosystem?

Groundwater Dependent Ecosystems (GDEs) are ecosystems (including springs) that have their species composition and natural ecological processes determined either wholly or in part by groundwater. They may be adversely affected where groundwater regimes are altered, for example due to groundwater pumping, to such an extent that normal ecological function cannot be maintained. Examples of GDEs include springs, wetlands, watercourses and River Red Gum flats. A schematic of the range of GDEs that can occur within a typical catchment is provided in **Figure 5**.

A more in-depth discussion of GDEs is incorporated in the WAP under Section 2.

7.2 How will they be protected?

A program to identify and monitor GDEs (including springs) has been established and is being developed, as there is currently insufficient knowledge about the requirements of GDEs in the McLaren Vale PWA. Protection of GDEs has been incorporated into the WAP through the systematic identification of possible threats from activities within the McLaren Vale PWA and incorporating regulation of these activities to protect GDEs.

7.2.1 Saved water

Saved water from improved irrigation efficiency and other measures has been retained within the groundwater system and will contribute to GDE requirements.

7.2.2 Stressed Areas

Stressed areas have been defined incorporating a clause to prevent the transfer of water to any extraction point that may have an adverse effect on GDEs within 500 metres of the well.

7.2.3 Groundwater Levels

The GDE provisions will be met if groundwater levels are not significantly affected by extraction.

7.2.4 ASR Recharge wells

ASR recharge wells must be constructed at least 300m from a GDE and the taking of recharge water from an ASR scheme must have no adverse effect on any GDE.

7.2.5 Imported and Effluent Water

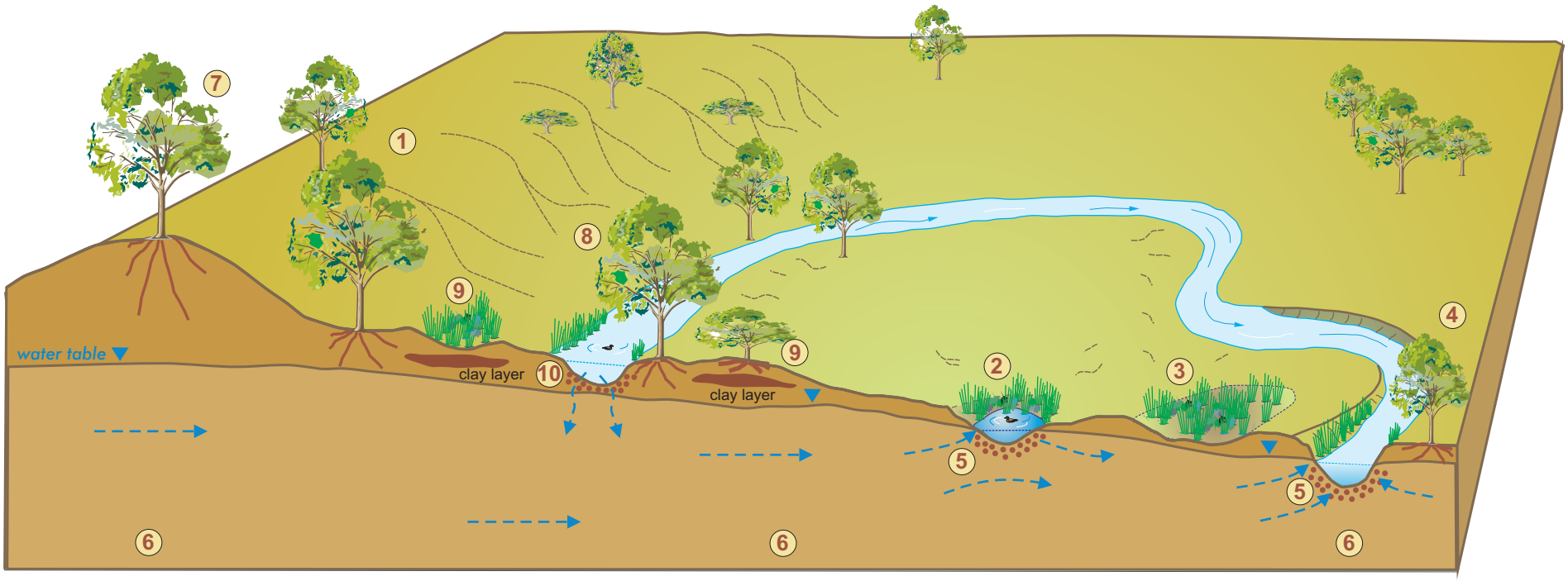
Restrictions have been applied on the use of imported and effluent water so that a permit may be revoked if there is a significant adverse impact on GDEs.

7.2.6 Monitoring & Evaluation

Monitoring and evaluation requirements for all water use activities have been tightened, reflecting the need to gather more data for better management of the resource to preserve GDEs.

7.2.7 Further work

The process of developing the WAP for the WMLR will look in more detail at GDEs and their requirements.



Groundwater Dependent Ecosystems

1. Terrestrial GDE – accessing water table
2. Flowthrough wetland GDE
3. Wetland dependant on shallow water table
4. Riparian GDEs along gaining stream reaches
5. GDEs in stream sediments
6. GDEs in the aquifer

Non Groundwater Dependent Ecosystems

7. Vegetation that uses soil water
8. Riparian zone along losing stream reach
9. Perched water table ecosystems (terrestrial + wetland)
10. Ecosystems in stream sediment

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Schematic of GDE types

FIGURE 5

8 WELL CONSTRUCTION

8.1 Are there rules I need to follow when constructing or maintaining a well?

A well - or bore - is a borehole that has been cased with pipe, usually steel or PVC plastic, in order to keep the borehole open in inconsolidated sediments or unstable rock.

When constructing or maintaining a well, there is the potential for contamination of the water resource. In order to prevent pollution caused either by deterioration of the well itself, poor drilling techniques or incorrect completion a set of rules has been developed. The basic principle is that a licensed driller is required to install and maintain a well. In addition, a permit is required to construct a well. Further details are in Section 9 of the WAP.

8.1.1 Impact of well works on water quality and integrity of the aquifer

These rules protect the aquifer from contamination.

8.1.2 Sealing between aquifers

When a borehole passes between two or more aquifers it is possible that water from one aquifer can pass into the other aquifer and cause either a higher aquifer to drain into a lower aquifer, or contamination if the water in one aquifer is more saline or contains chemical or biological contaminants. In order to prevent this, an impervious seal is placed between the aquifers to stop them from mixing.

8.1.3 Design of Headworks

In order to monitor the consumption of water, all bores must be constructed with a meter attached. This must be accessible so that authorised representatives can take meter readings.

8.1.4 ASR Wells

Because ASR wells have water that is injected into them there is the potential to clog the bore with other materials. The headworks need to be constructed so that if the bore becomes clogged, the headworks do not leak as this may cause contamination. The full length of the bore casing must be pressure cemented for similar reasons.

9 MONITORING, EVALUATION AND REPORTING

Monitoring, evaluation and reporting is part of the process of optimising performance. This is achieved by taking measurements against an agreed reference point. For the WAP the reference points relate to effectiveness of policies and health of the groundwater resource. There is therefore a need to monitor and evaluate, to make sure that the groundwater resource is used sustainably and to make sure that WAP policies are effective. For further details concerning monitoring, evaluation and reporting please refer to Section 10 of the WAP.

9.1 General monitoring, evaluation and reporting

As part of their licence conditions, all licensed wells are required to be sampled annually for salinity. A representative groundwater sample is to be collected by the licence holder from each licensed well and submitted for salinity analysis.

All licensed wells that are used for stock and domestic purposes will be required to install a meter by June 2008 as per the Department of Water, Land and Biodiversity Conservation metering policy. For further information please refer to Section 10 of the WAP

9.2 Monitoring, evaluation and reporting for operation of an ASR scheme

Users of an ASR scheme are required to submit to the Minister an annual monitoring and evaluation report within 30 days of the end of the recharge period. In addition, results from all water quality analyses must be submitted within 7 days of receipt of the analysis. The annual report must describe the water quality of the source water and recovered water, groundwater level monitoring and the volumes of water recharged and taken during the specified recharge and taking periods. This is to be conducted according to the schedule outlined in Section 10 of the WAP.

9.3 Monitoring, evaluation and reporting for the use of imported water or effluent

All licensed well users are required to submit a representative groundwater sample to be submitted for salinity analysis every year. Users of imported water or effluent are required to submit an annual monitoring and evaluation report, describing details of water quality, groundwater level monitoring, the volume of water recharged and the volume of water taken during the specified recharge and taking periods. These are then submitted to the licensing or permitting authority and must be submitted within 30 days of the end of the water-use year. Sampling must be in accordance with the schedule outlined in the WAP under Section 10.

9.4 Use of the data collected

The test results collected from irrigators and government authorities are collated by the DWLBC. These are then distributed to various government organisations with responsibility for administering natural resource management within the McLaren Vale PWA such as DWLBC and the Board. These organisations use the data to update their monitoring program that keeps track of the condition of the groundwater resource and the condition of groundwater dependent ecosystems throughout the region. In this way, if there are any indications of an adverse impact on the resource they are able to respond with an appropriate and timely reaction.

10 FUTURE INITITAIVES RELATING TO THE MANAGEMENT OF GROUNDWATER IN THE MCLAREN VALE PWA.

The aim of the McLaren Vale WAP is to enhance the long-term security of the groundwater resource for environmental and other users. To this end, a series of strategic investigations are planned by the Board. These involve targeted technical investigations, ongoing monitoring, evaluation and reporting, and policy development and communication.

Some specific areas of investigation are described below:

- There is currently insufficient information to adequately describe the biophysical environment of GDEs. Additional information will be collected through monitoring and further studies investigating the requirements of GDEs.

- Stressed parts of the aquifer system are currently identified from trends in groundwater levels (declining) and groundwater salinity (rising). These are lagging indicators of stress, that is, the stress has occurred before it is managed. Further consideration of the method of defining stressed areas will be undertaken, to identify leading indicators of stress such as the intensity of groundwater extraction.

- There is a need to review the estimated sustainable yield and the capacity of the resource to meet demands taking into account climate change and the results of groundwater monitoring. The Board will improve the accuracy of future estimates of sustainable yield through modelling, monitoring and targeted investigations.

The Board will communicate the outcomes of all its investigations to the wider community. This will be achieved through the publication of pamphlets and information regarding groundwater resources in the McLaren Vale PWA and through extensive community consultation with interested stakeholders and the broader community.

11 REFERENCES

Adelaide and Mount Lofty Ranges Natural Resource Management Board (2006). Water Allocation Plan for the McLaren Vale Prescribed Wells Area. Adelaide and Mount Lofty Ranges Natural Resource Management Board.

Martin, R.R., (1998). Willunga Basin – status of groundwater resources 1998. *South Australian Department of Mines and Energy* RB 98/28

REM (Resource & Environmental Management) (2003) A review of the administration and implementation of the McLaren Vale Prescribed Wells Area Water Allocation Plan Nov 2000-Nov 2003. Prepared by the McLaren Vale Water Allocation Working Group for the Onkaparinga Catchment Water Management Board.

REM (2004a) Investigation of the use of roll-over credits within the McLaren Vale Prescribed Wells Area Water Allocation Plan: Technical Report. Report to the Onkaparinga Catchment Water Management Board

REM (2004b) McLaren Vale Water Allocation Plan amendments: Draft Discussion Papers

- Policy for provision of environmental buffer zones
- Policy options for the use of reclaimed water
- Policy for transfer and stressed areas
- Policy for roll-over credits
- Policy for notification of transfers
- Policy options for use of saved water
- Policy options for aquifer storage and recovery

Appendix A: Glossary

Allocation
An approved allocation of water expressed on a water licence as a number of kilolitres (volume) for a specified period of time, usually for a water-use year.

Aquifer
A formation, group of formations or part of a formation that contains sufficient saturated permeable material to yield economical quantities of water to wells and springs.

Aquifer Storage and Recovery (ASR)
The process of injecting water into a suitable underground aquifer for storage and later use.

Aquitard
A saturated but poorly permeable bed, formation, or group of formations that does not yield water freely to a well or a spring. An aquitard may transmit appreciable water to or from adjacent aquifers.

Attenuation Zone
A zone around an ASR recharge well at a radius of 300 m within which there may not be any groundwater dependent ecosystems, any adjacent bores or other properties

Biodiversity
The variety of life forms: the different plants animals and micro-organisms, the genes they contain and the ecosystems they form. Biodiversity is usually considered at three levels – genetic, species and ecosystem diversity.

Bore
See **Well**.

Catchment
The land area contributing surface water to the flow in a watercourse at a specific location. The catchments of major rivers are commonly defined to the point where the river flows into another larger river or the sea (or terminal lake) and will usually include a number of sub-catchments for the tributary streams to that river.

CWMB
Catchment Water Management Board

Confined Aquifer
An aquifer that lies below a low permeability material. The piezometric surface in confined aquifers is above the base of the confining material eg. artesian aquifers.

Drawdown
The distance between static water level and the surface of the cone of depression.

Ecosystem
A community of organisms, that may include humans, interacting with one another and including the physical, chemical and biological processes inherent in their interaction and the environment in which they live.

Groundwater
Water occurring naturally below ground level or water pumped, diverted or released into a well for storage underground.

Groundwater Dependent Ecosystems (GDEs)
Those parts of the environment, the species composition and natural ecological processes that are determined by the permanent or temporary presence of groundwater. This may include riparian vegetation, springs, wetlands, floodplains, estuaries and in-stream areas of watercourses.

Hydraulic Conductivity
A coefficient of proportionality describing the rate at which water can move through a permeable medium. Horizontal hydraulic conductivity (K_h) refers to the coefficient of proportionality in the horizontal direction, whereas vertical hydraulic conductivity (K_v) refers to the coefficient of proportionality in the vertical direction.

Hydraulic Gradient
The rate of change in total head per unit distance in a given direction. The direction of gradient is that yielding the maximum rate of decrease in head.

Hydrogeologic
Those factors that deal with subsurface waters and related geologic aspects of surface waters.

Irrigation
The watering of land by any means for the purpose of growing any kind of plant(s), excluding domestic use.

Licensee
A person who holds a water licence.

Model-Conceptual
Identifies hydrostratigraphic units and boundary conditions for a particular study.

Model-Mathematical/Numerical
Simulates groundwater flow indirectly by means of a governing equation considered representative of the physical process occurring in the system, in addition to equations describing heads or flow along the model boundaries. Mathematical models can be solved analytically or numerically.

NRM
Natural Resources Management

NWI
National Water Initiative

Permeability
The property or capacity of a porous rock, sediment or soil for transmitting a fluid; it is a measure of the relative ease of fluid flow under unequal pressure.

Porosity
The percentage of the bulk volume in a rock or soil that is occupied by interstices, whether isolated or connected.

Recharge

Artificial Recharge
The artificial diversion of surface or other water (whether prescribed or not) to recharge underground aquifers. A permit is required to divert water down a well, and a licence is required to take water from a prescribed well**.**

Natural Recharge
The natural infiltration of water from the surface to underground that has fallen on land as a result of precipitation**.**

Saturated Zone
The zone in which the voids in the rock or soil are filled with water. Sometimes referred to as the "phreatic" zone.

Semi-confined, or Leaky Confined Aquifer
An aquifer that lies below a relatively low permeability material. The semi-confining material allows small quantities of water to pass between aquifers. The piezometric surface is often above the base of the semi-confining material.

Surface Water
Water flowing over land after having fallen as rain or hail or having precipitated in any other manner, or after arising to the surface naturally from underground. This term also refers to surface water stored in a dam or reservoir.

To Take Water
To take water by pumping or syphoning the water; to stop or impede the flow of water over land for the purpose of collecting the water; to divert the flow of water in a watercourse away from the watercourse; to release water from a lake; to permit water to flow under natural pressure from a well; to permit stock to drink from a watercourse, a natural or artificial lake, dam or reservoir.

Transfer
A transfer of a licence (including its water allocation) to another person, or the whole or part of the water allocation of a licence to another licence. The transfer may be permanent or temporary.

Unconfined Aquifer
The water table aquifer

Unsaturated Zone
The zone between the land surface and the water table. Sometimes referred to as the "vadose" zone.

WAPAC
The Water Allocation Plan Advisory Committee which reviewed the exisiting McLaren Vale PWA WAP and assisted with the preperation of this WAP.

Water Table
The surface between the unsaturated and saturated zones of the subsurface at which the hydrostatic pressure is equal to that of the atmosphere.

Water-use Year
The period between 1 July in any given calender year and 30 June the following calender year.

Well
A borehole that has been cased with pipe, usually steepl pr PVC plastic, in order to keep theborehole open in unconsolidated sediments or unstable rock. Often used interchangebly with the term bore.

WMLR
Wester Mount Lofty Ranges

Appendix B: How to find water levels or salinities in the Obswell Database

All of the groundwater monitoring data collected from observation networks throughout the State are stored in OBSWELL, a database maintained by the Department of Water, Land and Biodiversity Conservation. Within the McLaren Vale PWA there are four aquifers that are monitored by the DWLBC. Locations of the monitoring wells are shown in Figures B.1-B.3.

Log onto the internet site for the State observation well database at the following address:

http://info.pir.sa.gov.au/obswell/new/obsWell/MainMenu/menu

Say “Yes” to all the dialogue boxes concerning Security Alert

Click on “View Obs Wells by Network”

Under the heading Search for Well, in the Network Name box at the top, type in

“WILLUNGA”

For Query, click “SWL” for water levels or “Salinity” for salinity readings (Groundwater level wells and salinity wells may not always be coincident).

For Well Status, click “Current”

For Order by, select “Obswell Number”

Click on “search”

All the bores are then listed. The aquifer monitored is listed in the table.

Qp/Qpa: Shallow Quaternary aquifers

Tow: Port Willunga Formation

Te2: Maslin Sands

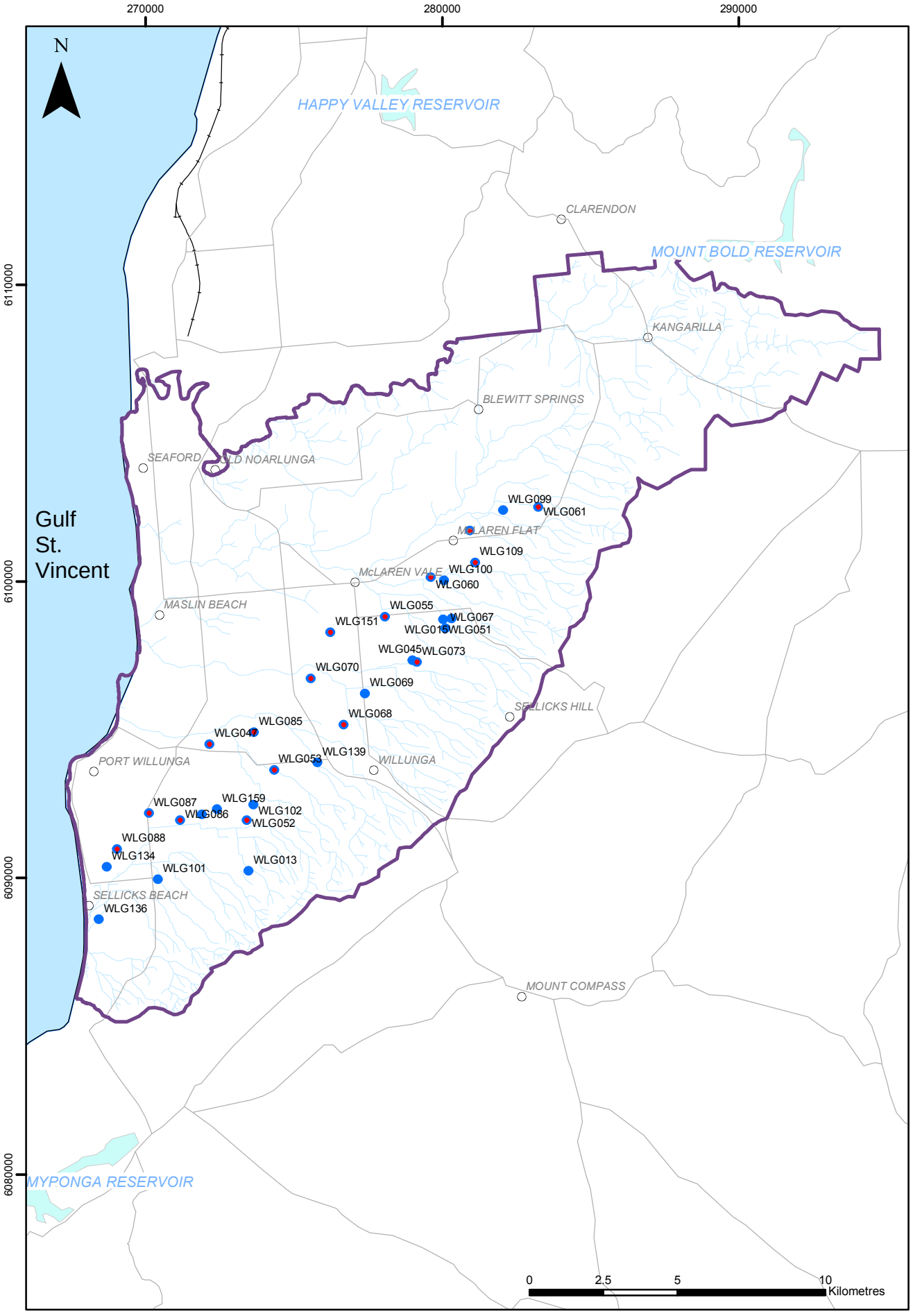
NE: Fractured Rock Aquifer

Use the attached maps to select bores you would like to inspect.

Click on “Time Series Data “to see actual readings which can be downloaded

Click on “Graph data “to see a graph of the readings which can be printed. Be sure to examine the scale on the left hand side to obtain an idea of the magnitude of the fluctuations (this can be adjusted). The left axis labelled SWL gives the depth below ground level. Remember it may take several years before any trends become evident.

In future, if you want to see an individual bore, under the heading “Search for Well”, just type in the obs bore number in Enter Obs No.” instead of using the Network Name Box.



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LOCATION OF CURRENT MONITORING WELLS
PORT WILLUNGA FORMATION

FIGURE B1

McLaren Vale PWA
SWL Monitoring Well
Salinity Monitoring Wells

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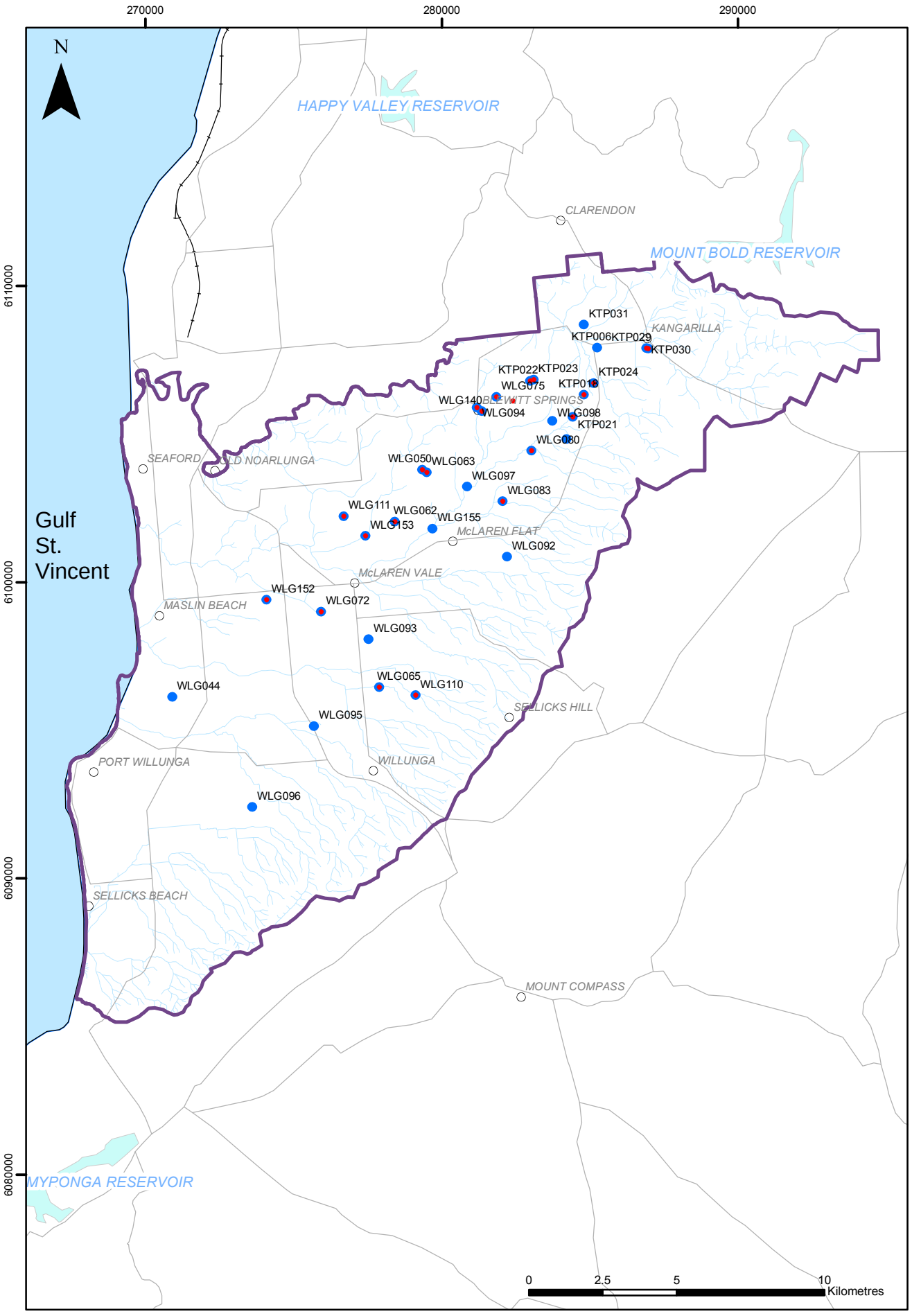
January 2007



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LOCATION OF CURRENT MONITORING WELLS
MASLIN SANDS FORMATION

FIGURE B2

McLaren Vale PWA
SWL Monitoring Well
Salinity Monitoring Well

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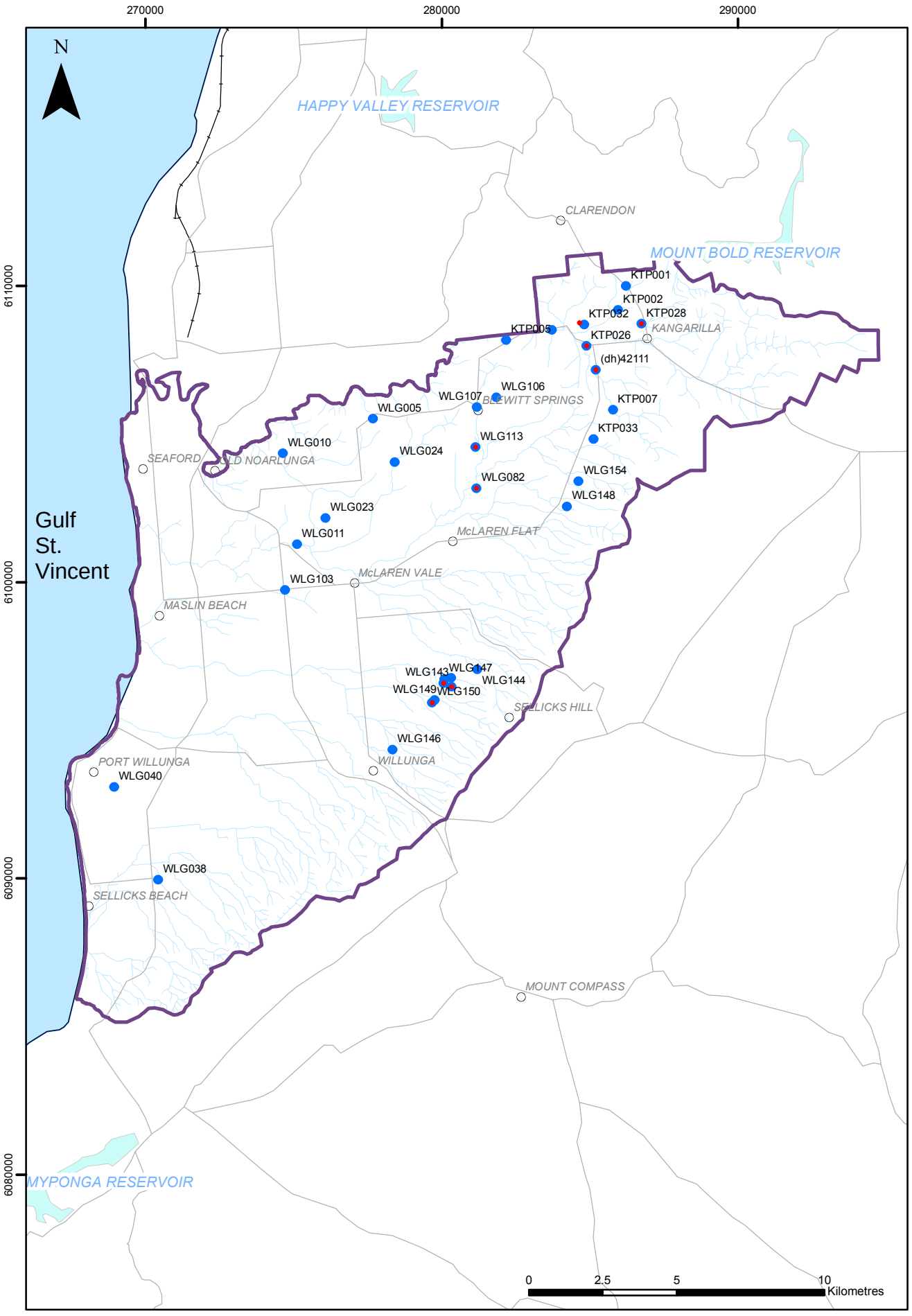

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January 2007

Salinity Monitoring Well
SWL Monitoring Well
McLaren Vale PWA

McLaren Vale WAP Explanatory Guide

LOCATION OF CURRENT MONITORING WELLS
FRACTURED ROCK AQUIFER

FIGURE B3