



# **Presentation to City of Canning**

## **CONVERTING STORMWATER INTO POTABLE WATER**



**Colin Pitman, Director City Projects, City of Salisbury**

**17 September 2010**

# THE PARADIGM OF NEW WATER



## TO DRINK OR NOT TO DRINK?



## **WORLD FOCUS**

- § **The Stormwater Recycling Programme came to world significance with the World Water Association Award in Beijing in 2006.**

- Water is a fundamental element to the sustainability of Life
- Water is intrinsically one of those elements of our spiritual being which was part of the original componentry of the Universe “Hydrogen” and “Oxygen” and through the burning of these elements others were created
- Water is referred to as the basis of connectability of the mind and the body by the electro magnitude transmission of messages
- Water is referred to in all religious doctrines



# **WATER**

§ The research focus has been supported by the “Managed Aquifer & Recovery” (MAR) Programme sponsored by:

§ **Violta**

§ **CSIRO**

§ **Berliner University**

§ **The European Economic Community in particular UMESCO**

§ **Italian Water**

§ **Slovinian Water**

§ **The Republic of Syria**

§ **Barcelona Water**

§ **Phoenix Water**



# DRIVERS

- § **Flood Protection**
- § **Recreational Amenities**
- § **Environmental Management; Including:**
  - **Habitat creation & biodiversity enhancement**
  - **Protection of Barker Inlet**
- § **Development of Alternative Water Resources**
  - **Reduce dependence on River Murray**
  - **Make a profit**



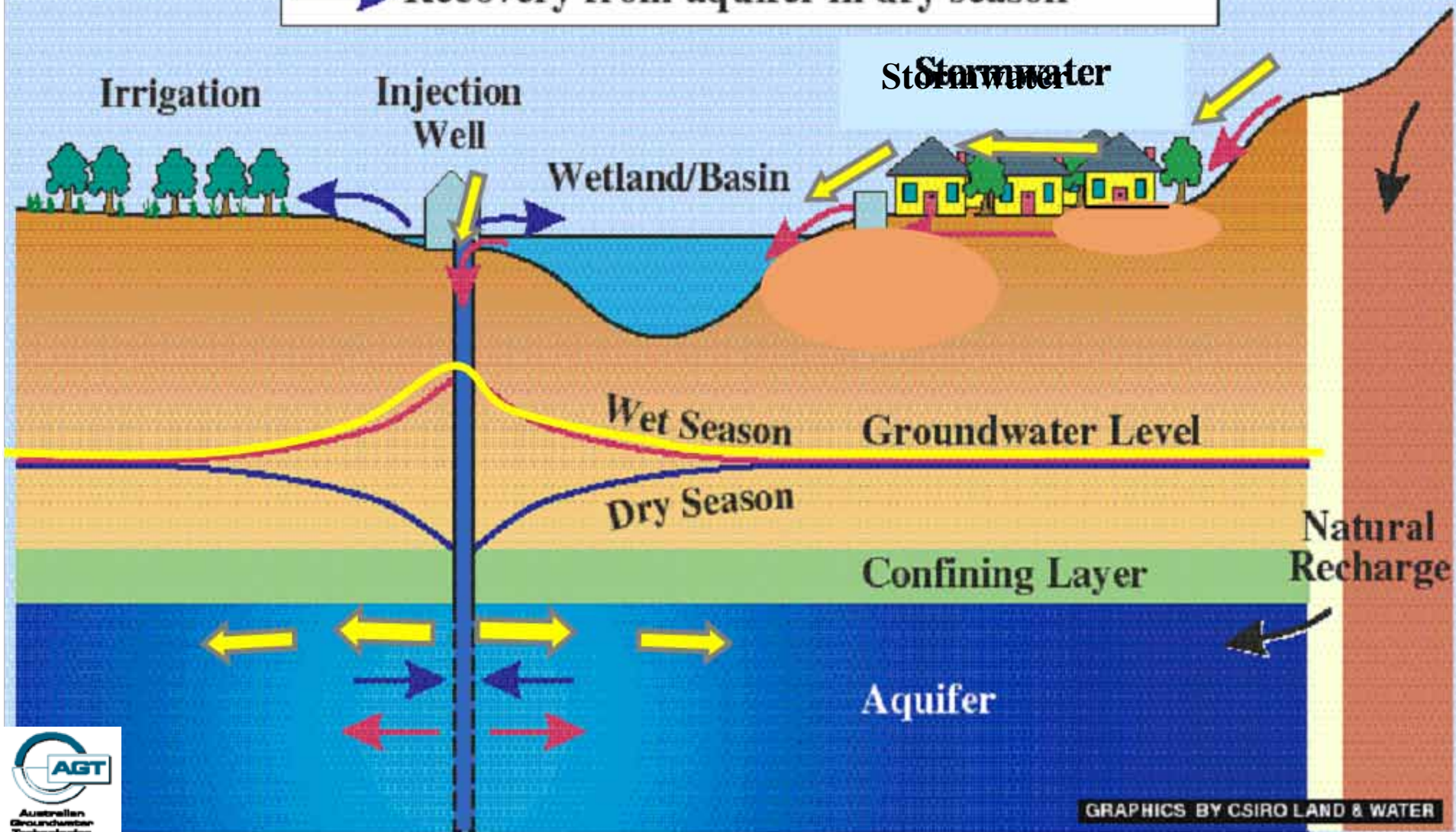
# **STORMWATER**

- § **Constant salinity**
- § **Pathogen levels low**
- § **Nutrient levels low**
- § **Heavy metals generally low**
- § **No endochromes**
- § **Cost low**
- § **Rainfall dependant**
- § **Embodied energy low**



# Aquifer Storage and Recovery (ASR)

- Storm/Waste-water to aquifer in wet season
- Recovery from aquifer in dry season



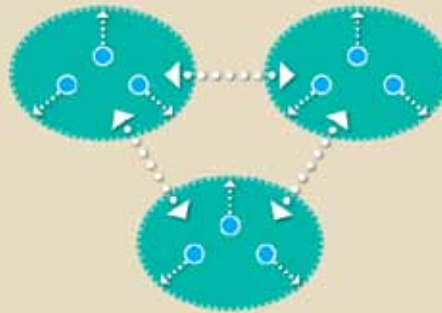


# Adelaide Water Distribution

Distribution within one council

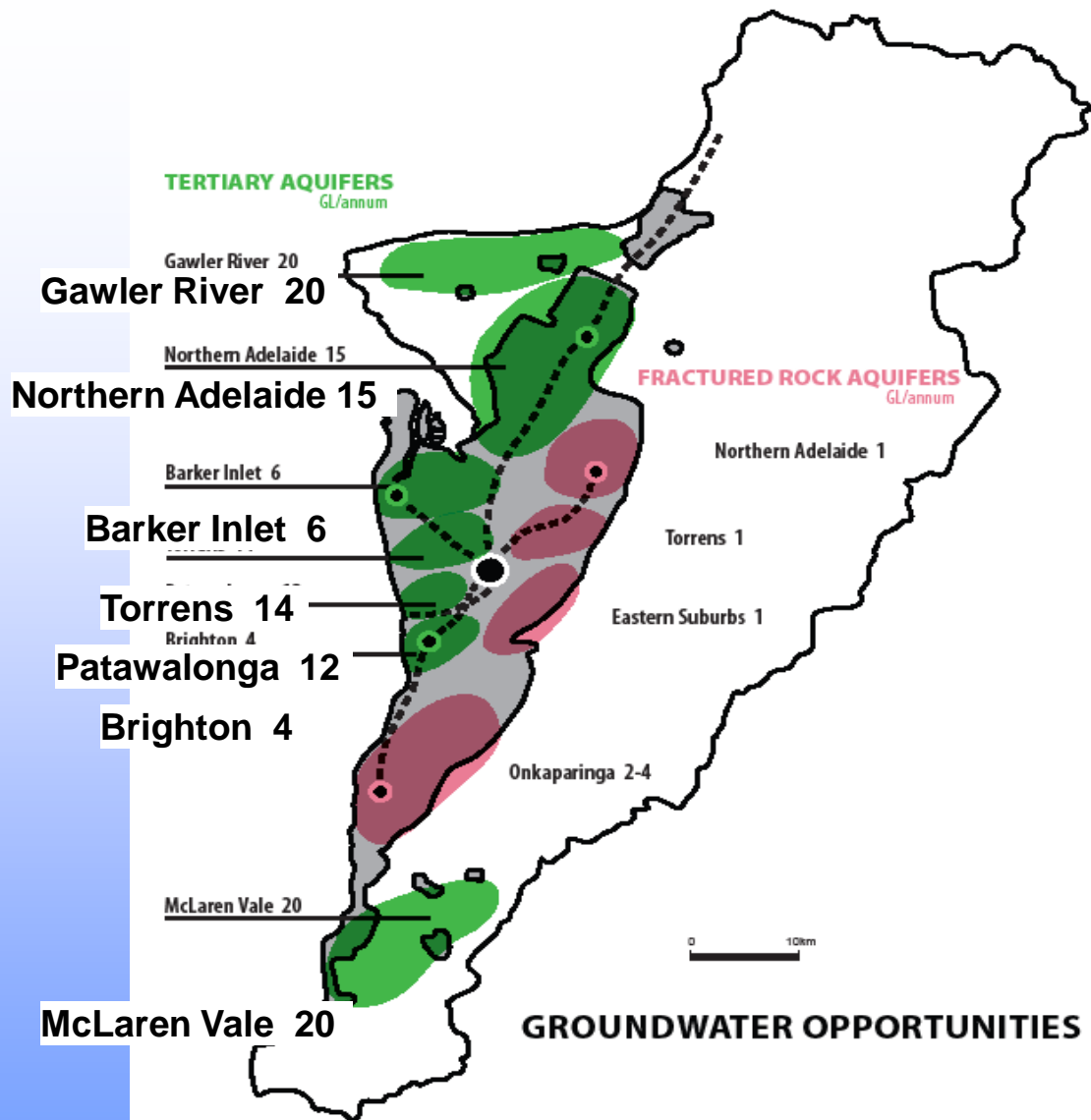


Distribution between councils

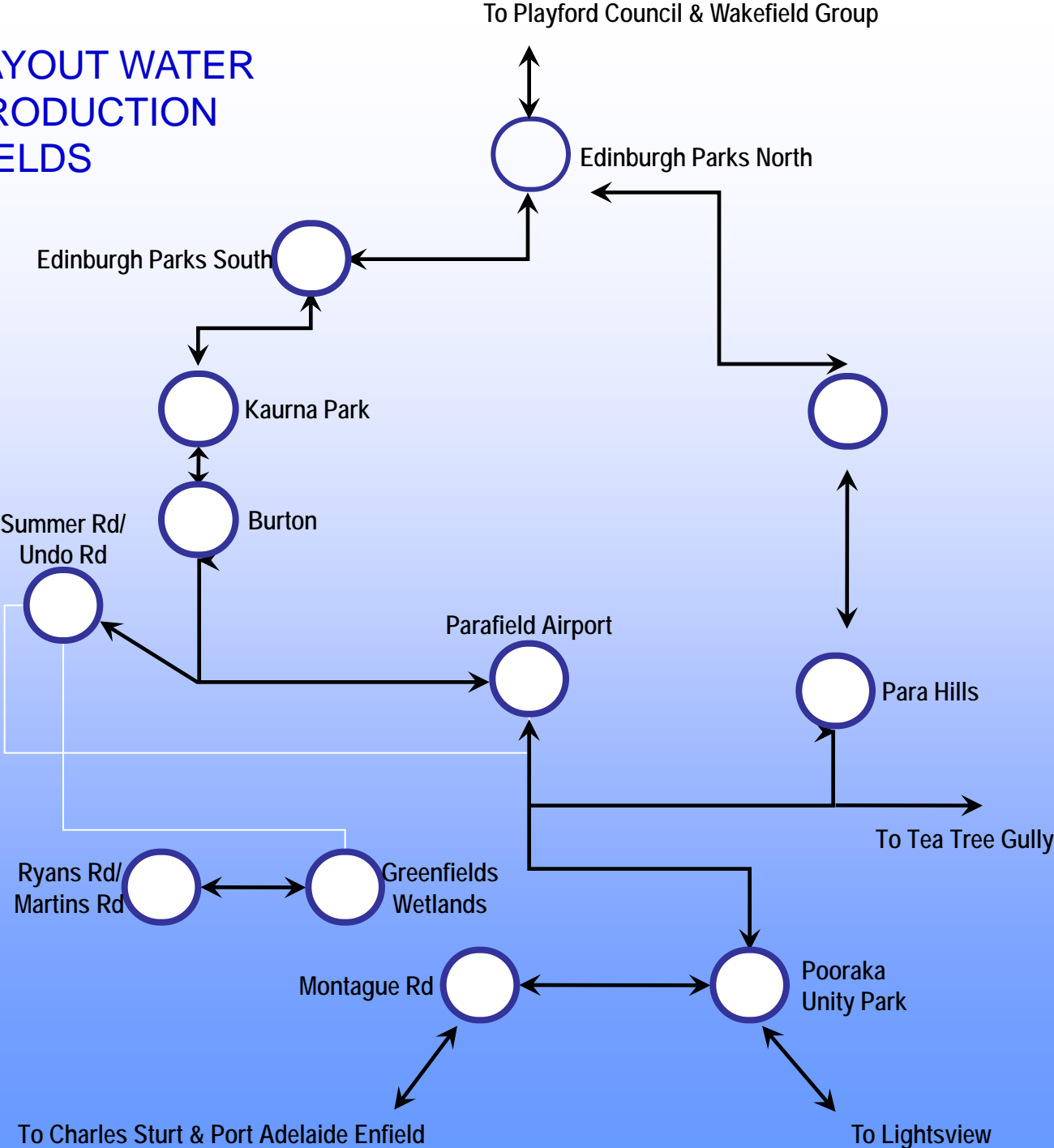


# Adelaide Water Distribution

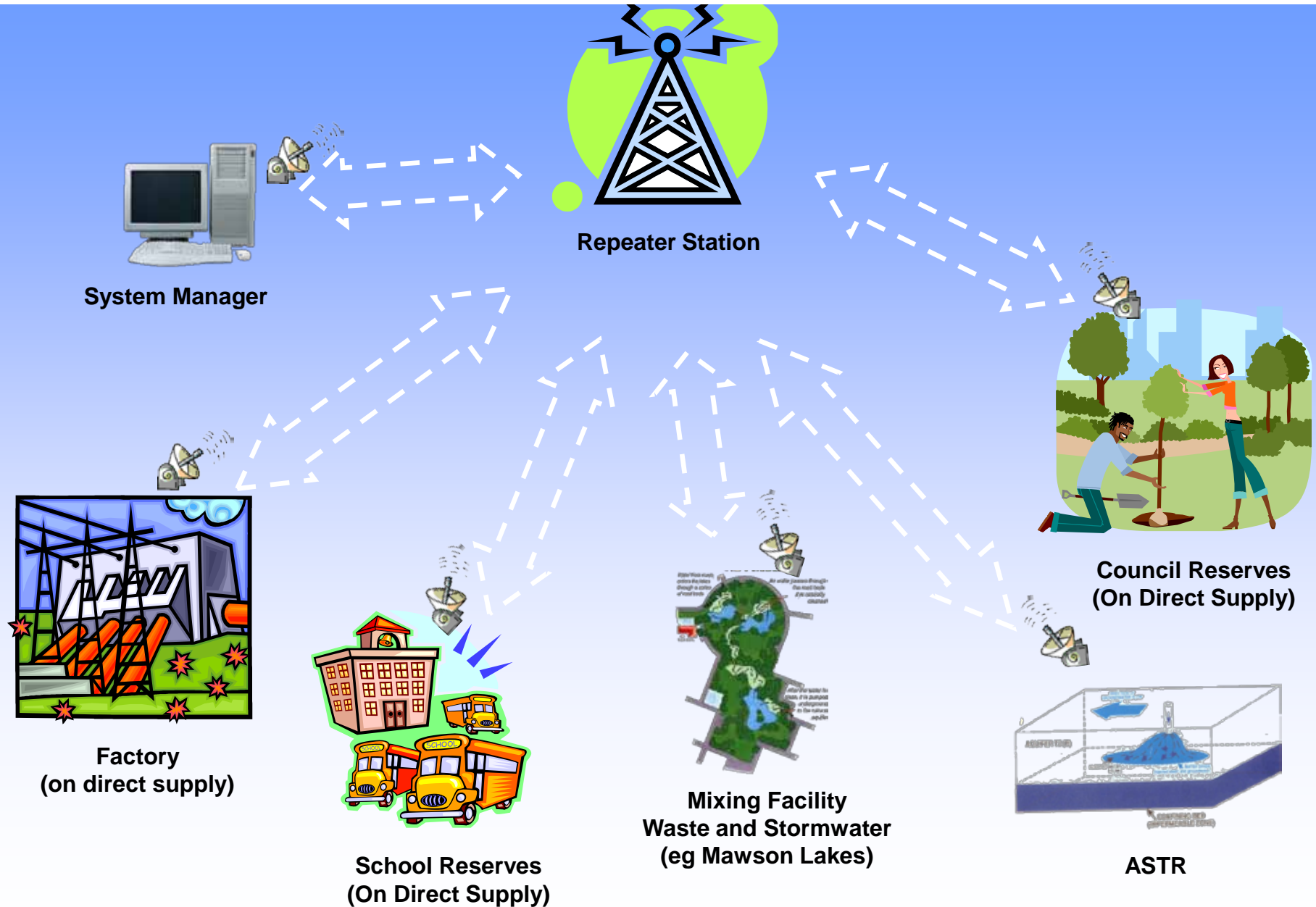




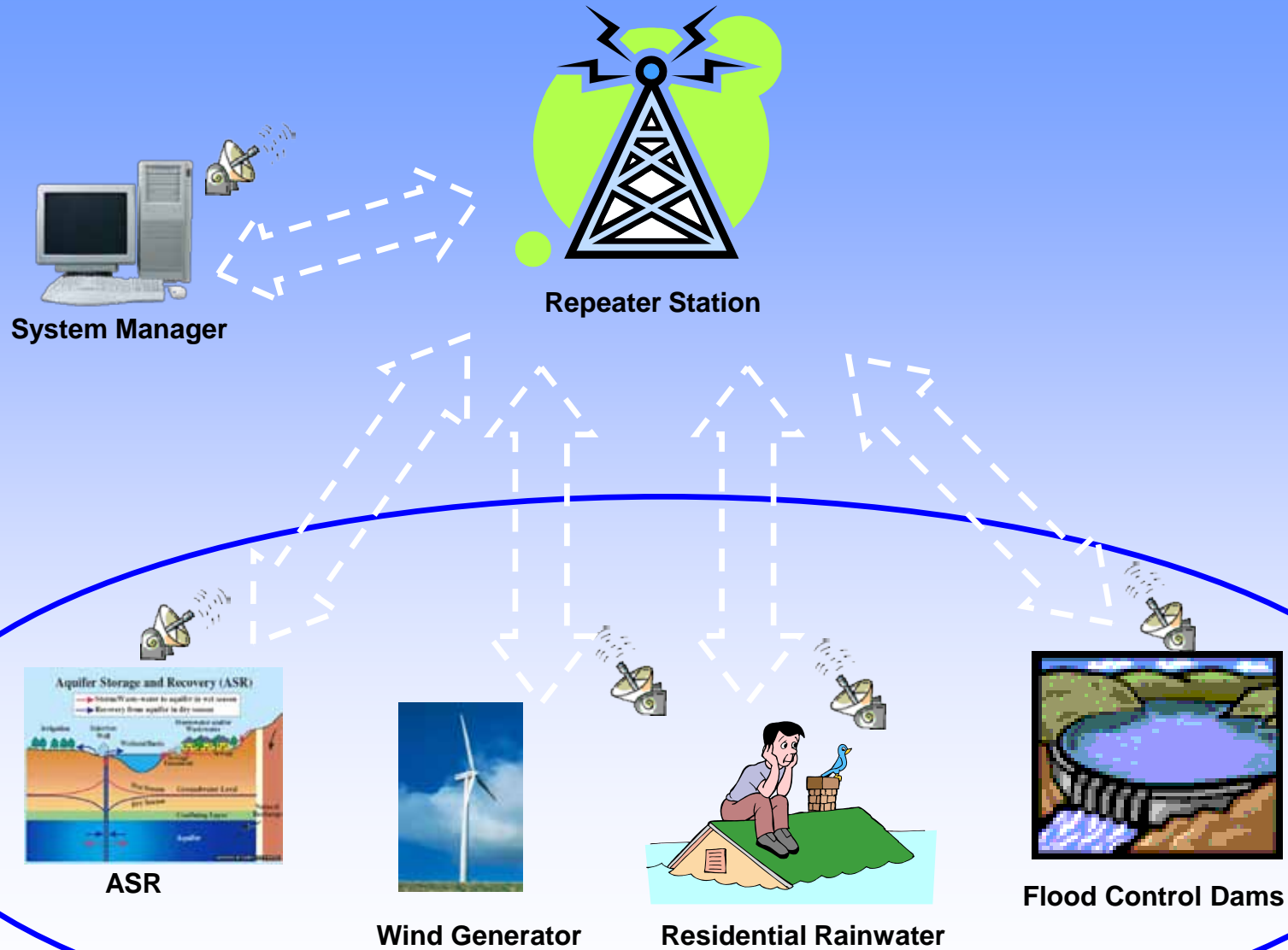
LAYOUT WATER  
PRODUCTION  
FIELDS



# WATER CONSUMPTION



# WATER PRODUCTION AND STORAGE







## RETICULATED Re-WATER CONCEPT

TYPICAL SECTION

SCALE 1:200 @ A4



# POTENTIAL YIELDS

- Little Para - 6 Gigalitres
- Dry Creek - 14 Gigalitres
- Helps Road - 5 Gigalitres

TOTAL - 25 Gigalitres

## Adelaide's Consumption

- From the River Murray - 80 Gigalitres

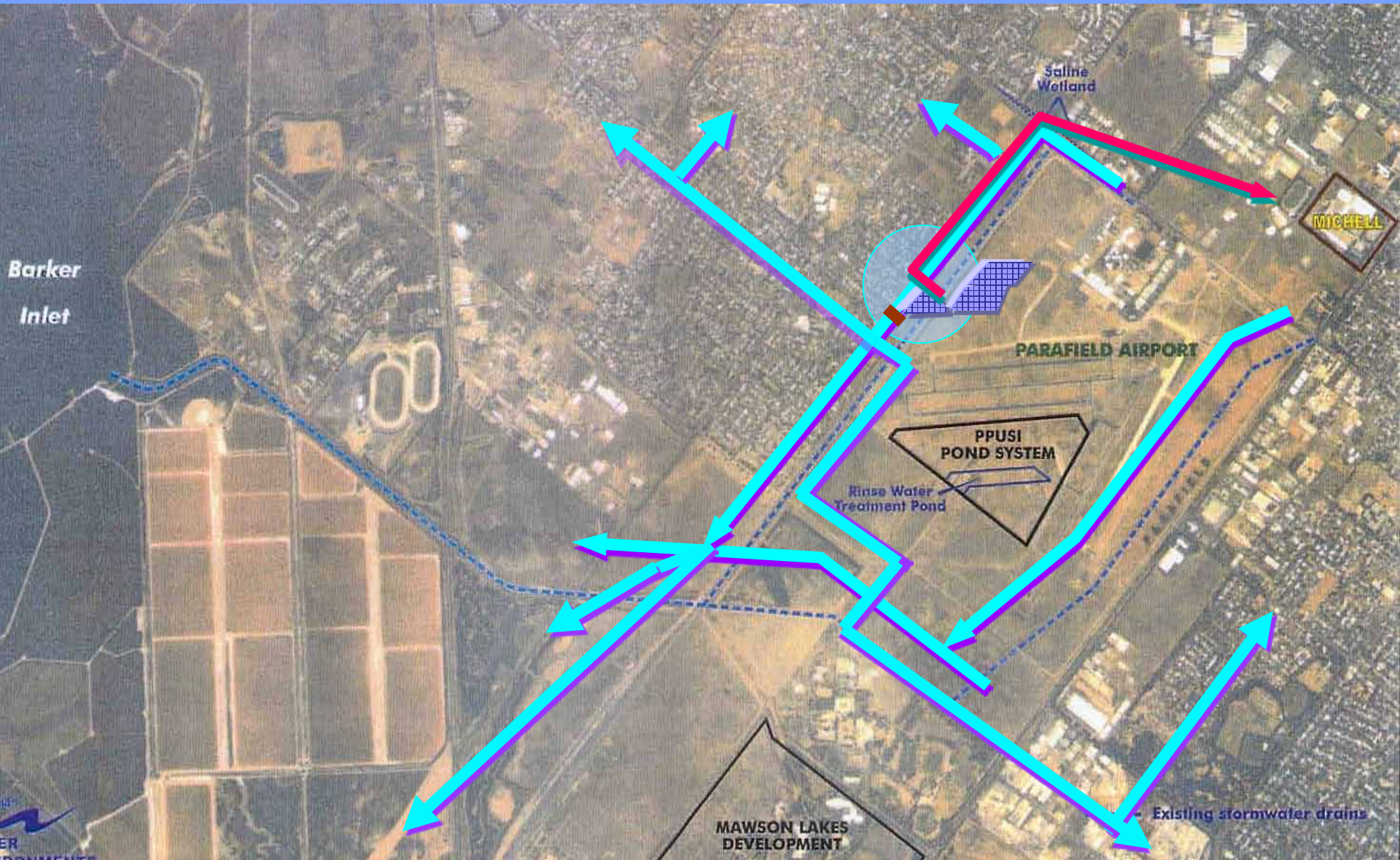


# PARAFIELD PROJECT

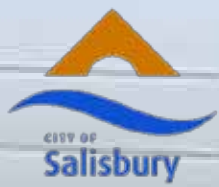
|                         |                            |
|-------------------------|----------------------------|
| § Catchment:            | 1600 hectares              |
| § Cost:                 | \$4.1 Million              |
| § Area:                 | 12 hectares                |
| § ASR Bores:            | 2+                         |
| § ASTR                  | 4 Injection – 2 Extraction |
| § Depth:                | 160 to 180 m               |
| § Max. Yield:           | 6,000 ML/yr                |
| § Detention time:       | 10 days                    |
| § Flood Protection:     | 1 in 10 years              |
| § Online Monitoring:    | pH, TDS, SS                |
| § Injection Rate:       | 40 litres/sec. per well    |
| § Supply Water Salinity | 100 to 250 ppm             |



# PARAFIELD STORMWATER REUSE SCHEME







# Reed Bed





# PRODUCTION WELL NO 1

## Wellhead, Manifold & Control Box







# ASR MIXING TANK

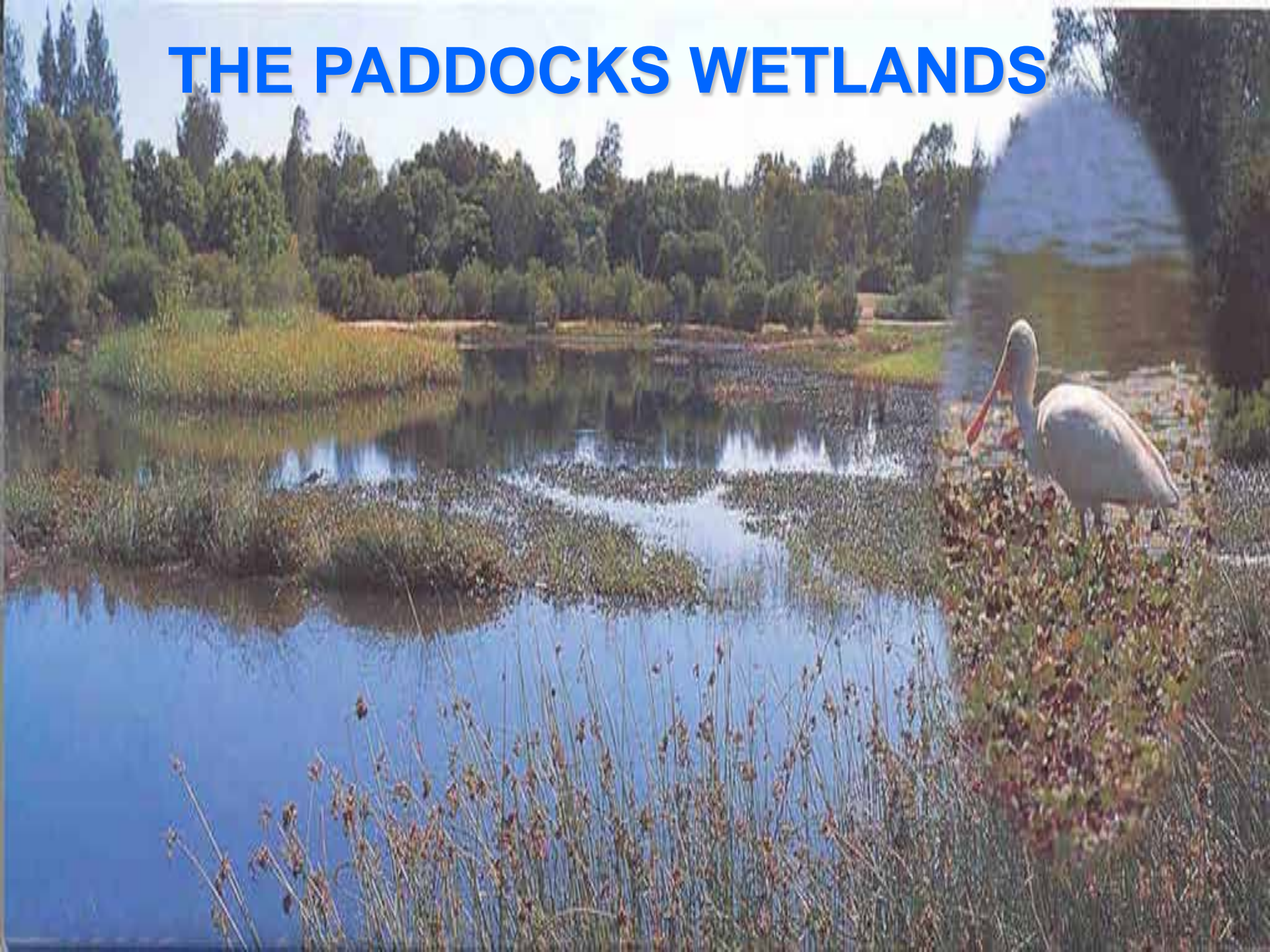


# MAWSON LAKES - SOUTH AUSTRALIA





# THE PADDOCKS WETLANDS







# KAURNA PARK







# KAURNA PARK





*South Australian grown plants for South Australian conditions*  
Established 1869

# Heyne's Wholesale Nursery

Ph (08) 8280 8088 Fax (08) 8280 6322

TRADING HOURS: 8am - 4.30pm  
Closed Weekends & Public Holidays

**STRICTLY NO RETAIL SALES**



**SMOKING  
IN DESIGNATED AREAS ONLY**

*Thank you*

Re-use of Stormwater to benefit Local Nursery



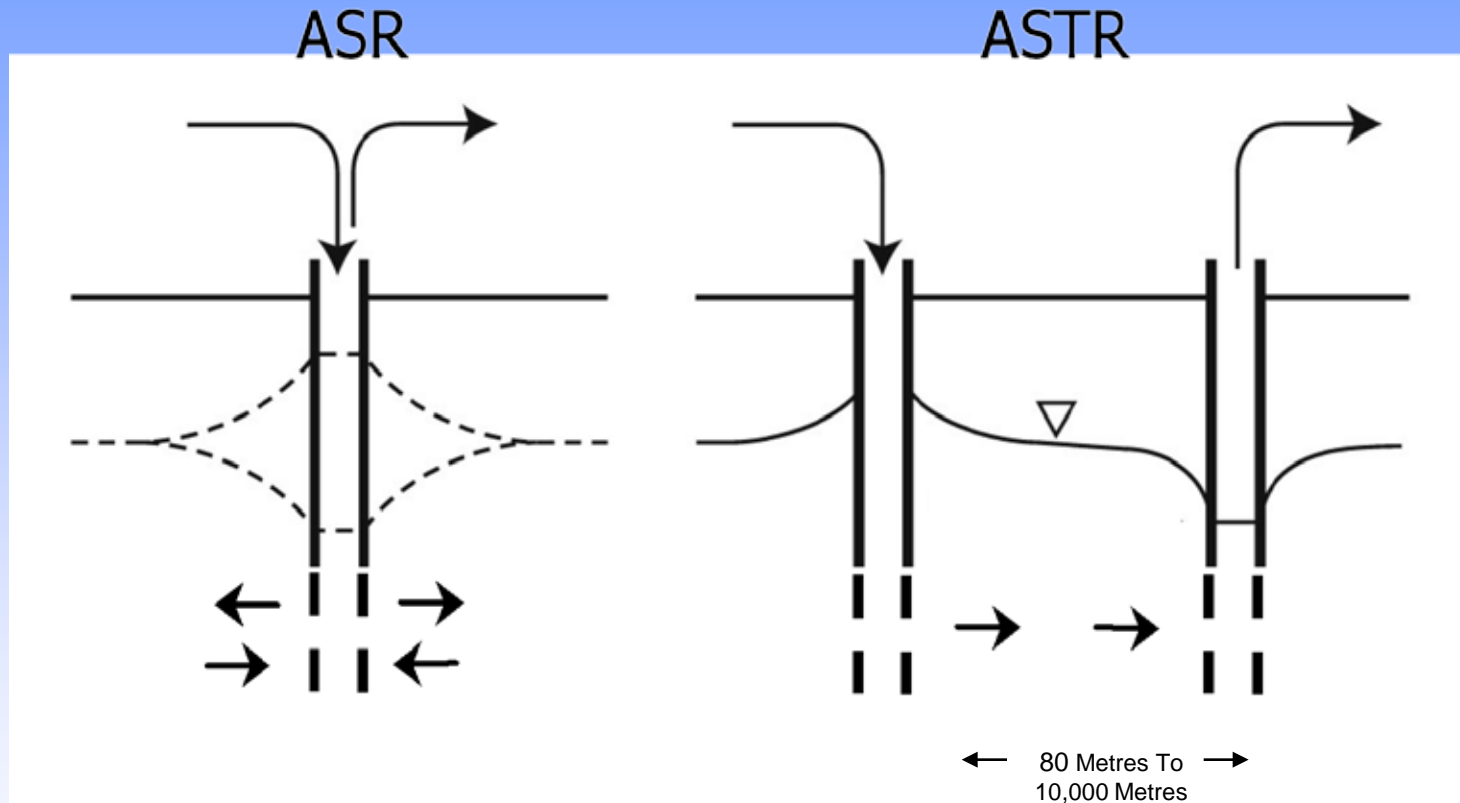
# HEYNE'S NURSERY - BURTON





# DEVELOPING FUTURE OPTIONS

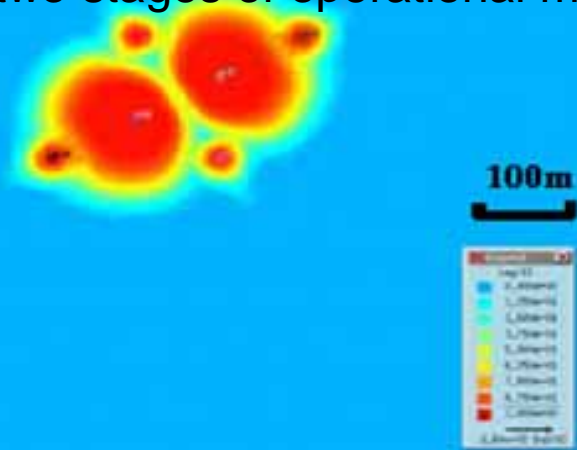
## Stormwater storage, treatment & reuse



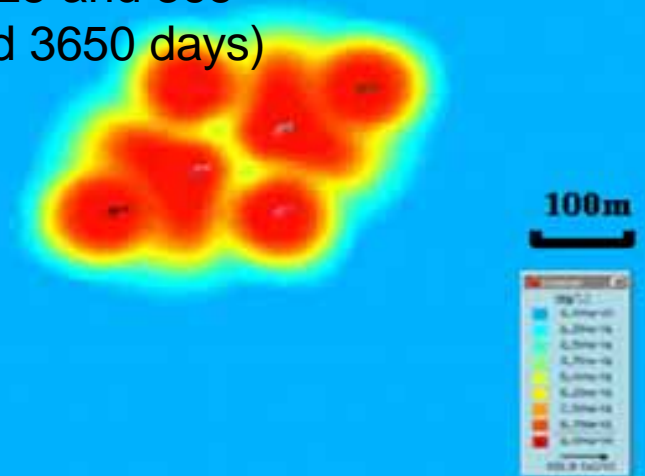
ASTR: controlled residence time and travel distance within the aquifer  
➤ more predictable levels of chemical and microbial contaminant attenuation, necessary for the provision of water of potable quality

Solute distribution at two stages of flushing mode (125 and 365 days) and two stages of operational mode (1095 and 3650 days)

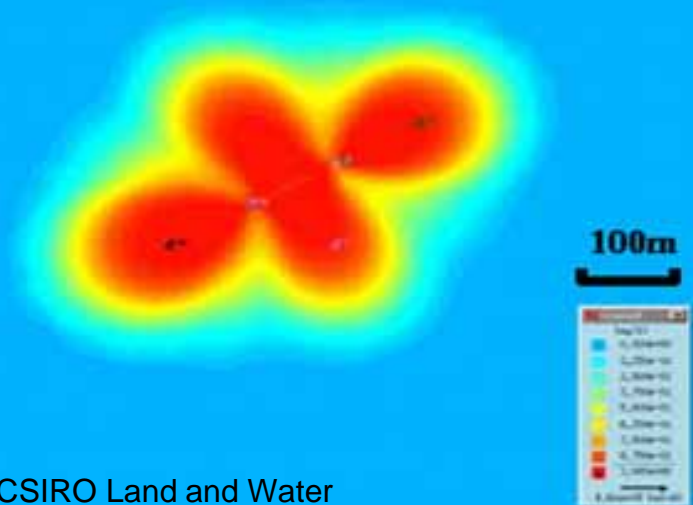
a) 125 days



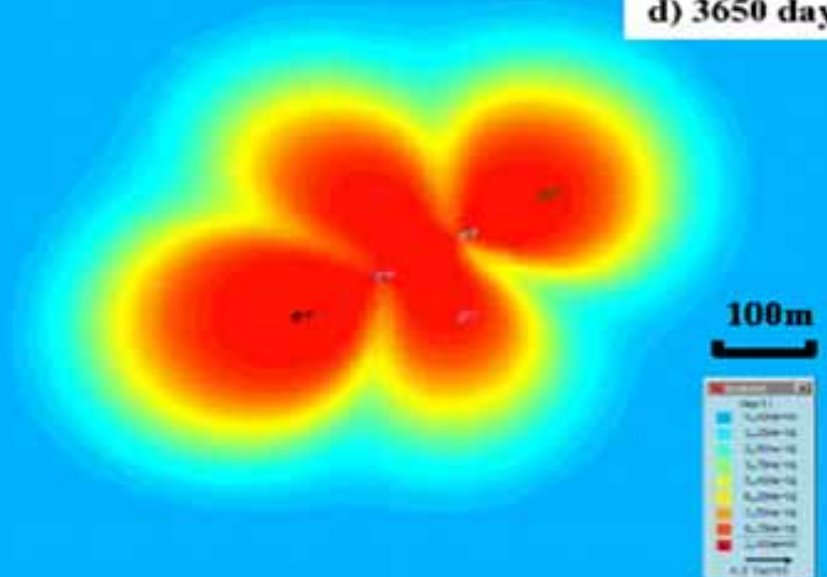
b) 365 days



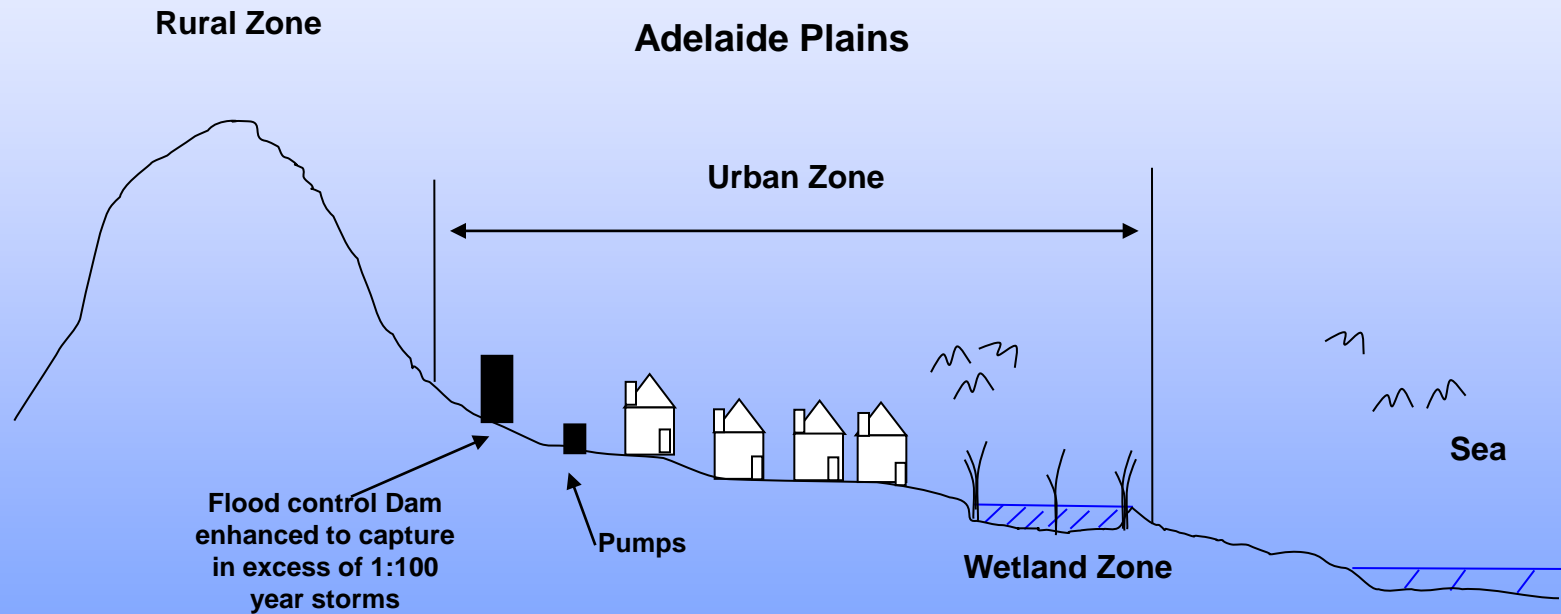
c) 1095 days



d) 3650 days



# Controlled Release Detention



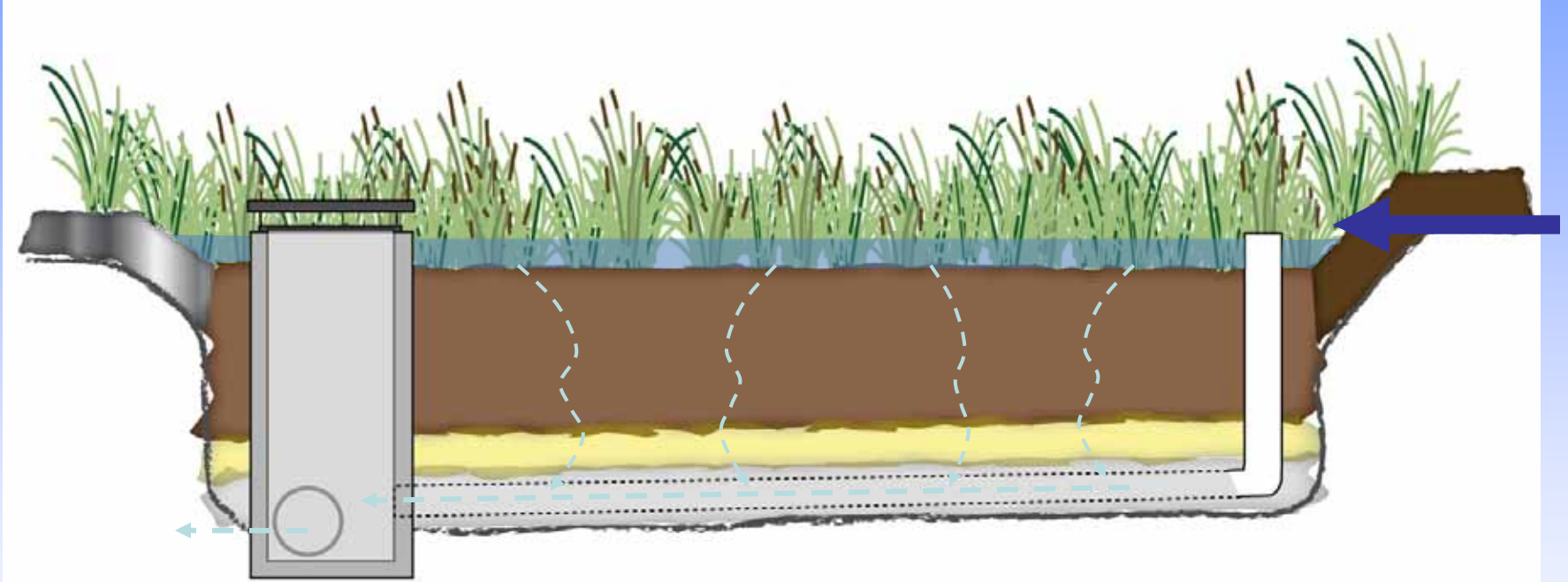
# Construction of Weir at Pooraka





# TREATMENT OPTION

## Bio-retention



- § Proven technology for stormwater treatment
- § Not used purely for stormwater harvesting (yet)







- § **The Cities of Playford, Tea Tree Gully and Salisbury's wetlands will have captured and recycled 20 Gigalitres per annum by 2010**
- § **If 60% of Adelaide's stormwater is recycled, then 102 Gigalitres of stormwater would be produced across Adelaide**
- § **The State Government proposes to produce 100 Gigalitres from its desalination plant for \$1,400 million (\$1.4 Billion)**

- § The energy consumption to produce potable water supplies are four times the energy consumption of the production of recycled stormwater
- § Adelaide Coastal Water Study has shown the two sources of pollutants causing seagrass die-back (6,000 hectares) are nitrogen and suspended solids in the form of mud. The principal source of the mud is from stormwater discharge from metropolitan drainage systems
- § Urban consolidation and an increase in density of housing developments is resulting in an increase runoff of between 20 – 30%. This will offset the anticipated rainfall reduction as a result of climate change which is predicted to reduce by 13% by the year 2050

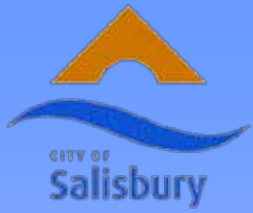
- § **The State Government holds a licence on the River Murray of 210 Gigalitres**
- § **This means the River Murray Commission holds approximately 1400 Gigalitres in the Hume Weir to ensure Adelaide has 210 Gigalitres for critical urban needs**
- § **If we were to isolate our requirements of the River Murray approximately 1400 Gigalitres could be released for environmental flows and irrigation**

# KEY ISSUES

What strategy is to be used to distribute Stormwater and Waste Water across communities such as Adelaide. Is it to be :

- By a separate pipe to homes and businesses?
- Can we put treated waste water and stormwater back into to the Hills Reservoirs e.g. City of Orange NSW
- Why are we using high embodied energy water (Desal Water) in lieu of recycled water?
- Why is the damage to our marine environment by Stormwater, Waste Water and Desal water not incorporated into the cost of sustainable water supplies?





# QUESTIONS

**Colin Pitman**  
**Director**  
**City Projects**

