

# This presentation premiered at WaterSmart Innovations

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# **City of Whitehorse Melbourne, Australia**



## **Bolton Park Stormwater Retention and Re-Use System**

**WaterSmart Innovations Conference  
Las Vegas**

**October 2008**



# Presenters



**City of Whitehorse**

**Angelo Da Campo  
Co-ordinator Design  
and Construction**



**Ian Goodes  
Manager Engineering  
and Environmental Services**



# Where are we?





# About the City of Whitehorse

- **Population - 150,000**
- **Area – 25 square miles**
- **Suburb of Melbourne, Victoria, Australia**
- **10 miles east of Melbourne central**





# Background

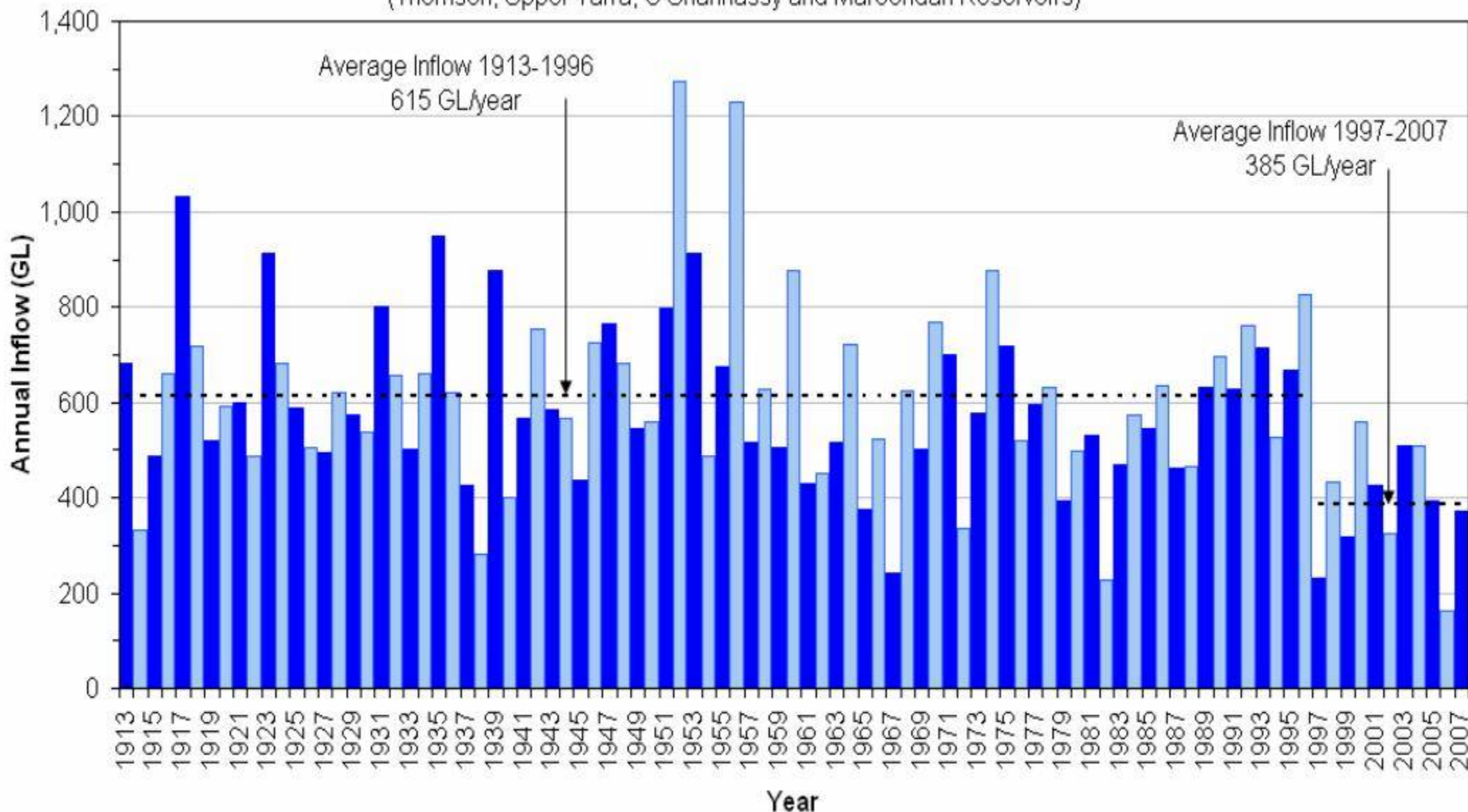
- **Melbourne is currently experiencing severe drought conditions (Water Restrictions).**
- **There is a need for innovative ways to address water shortages.**





# Total annual water flowing into Melbourne's main water supply storage reservoirs

(Thomson, Upper Yarra, O'Shannassy and Maroondah Reservoirs)



**Notes:**

1. Annual inflow is taken as calendar year inflow (January to December) and is calculated using hydrological methods and gauging records.
2. Inflow at the four main harvesting reservoir sites represents the main sources of streamflow from Melbourne's water supply catchments that are not impacted by upstream diversions, but may be impacted by changes to catchment and climate conditions.



# Background

- **Water Action Plan recently adopted**
- **Reduce Council's water consumption by**
  - 25% by 2012**
  - 35% by 2020**
  - 40% by 2030.**
- **Reduce community water consumption by**
  - 20% by 2012**
  - 25% by 2020**
  - 30% by 2030**





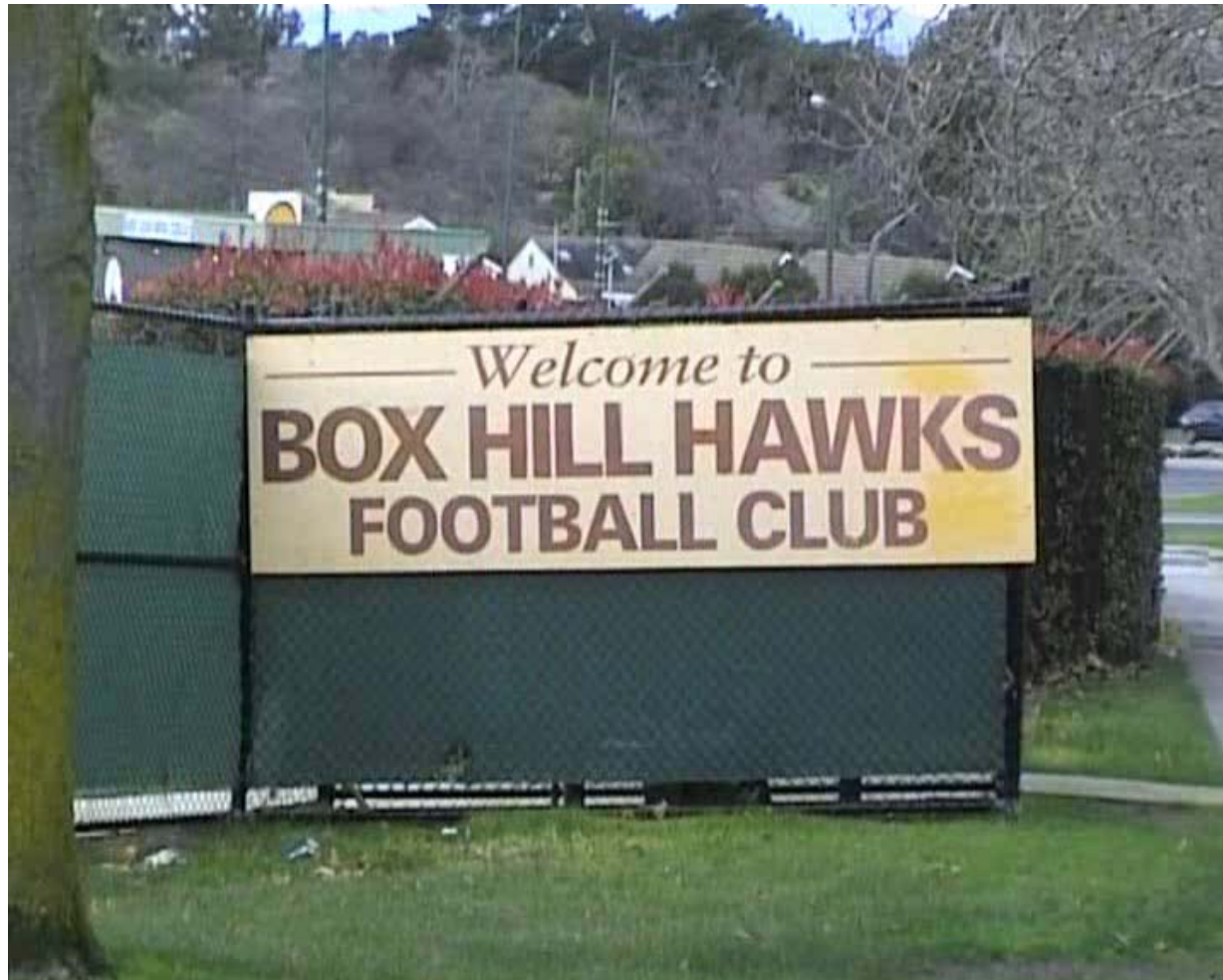


# Box Hill City Oval & Bolton Park





# Box Hill City Oval







# Box Hill City Oval

- **Box Hill City Oval is a major sporting facility**
- **Home ground for Box Hill Hawks Football team - State level football competition**





# The Problem

- **Large brick drain (3 foot diameter) under the Box Hill City Oval.**
- **Drain under capacity causing flooding.**
- **Difficult to replace drain under oval**





# Possibilities

- **Options**

- **Replace the existing drain**
- **New bypass drain**
- **Stormwater Retention system**

- **Innovative technology used to address capacity issues and to save water**







# Bolton Park





# The Solution

- **Stormwater harvesting system**
  - Save up to 1.9 million gallons (7 million litres) of drinking water every year
- **Stormwater diverted from drainage pipes, treated and stored in underground tanks (270,000 gallons)**
- **Use collected water for**
  - Flushing of toilets at the Box Hill City Oval
  - Irrigation of the Oval and surrounding reserve
  - Street cleansing, drain cleaning and plant watering
- **Existing pipe relined**
  - Trenchless technology

# Bolton Park

## Stormwater Retention and Re-use System

Whitehorse City Council has installed on this site an innovative underground water saving system to collect, store and re-use up to seven million litres of rainwater each year. The system was built in 2007 at a cost of \$740,000 and was jointly funded by the City of Whitehorse and a \$150,000 grant for the State Government's Stormwater and Urban Water Conservation Fund.

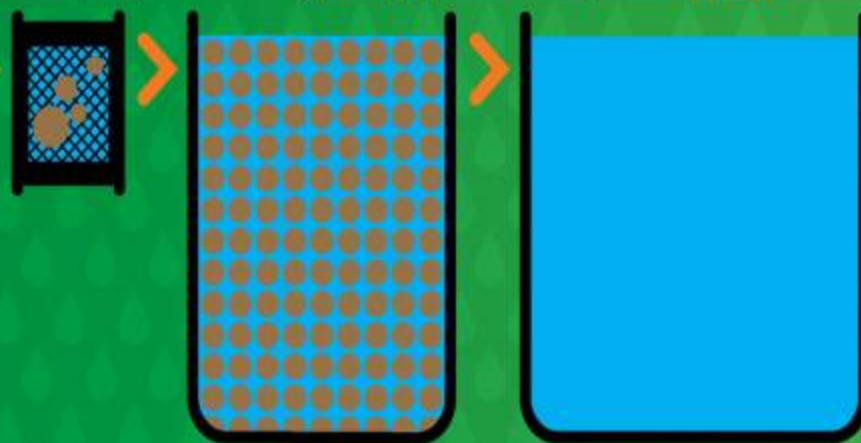
**1** After rainfall in the catchment above Bolton Park, stormwater flows into the underground drain located beneath the reserve.



**2** The stormwater is diverted from the drain into a litter trap to remove larger items of rubbish and then undergoes further treatment by passing through a sand filter.

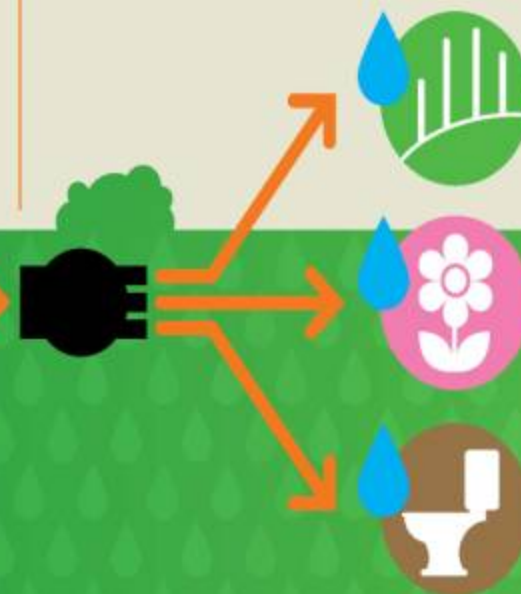


**3** The treated water is then collected in four interconnected underground storage tanks with a total capacity of one million litres. The storage tanks are filled with small scoria stones that help to support the tanks and also provide further purification of the stored water.



**4** The treated water is pumped out of the storage tanks for irrigation of Box Hill City Oval (subject to water quality), flushing the pavilion toilets, street cleaning and watering the City's plants and garden beds.

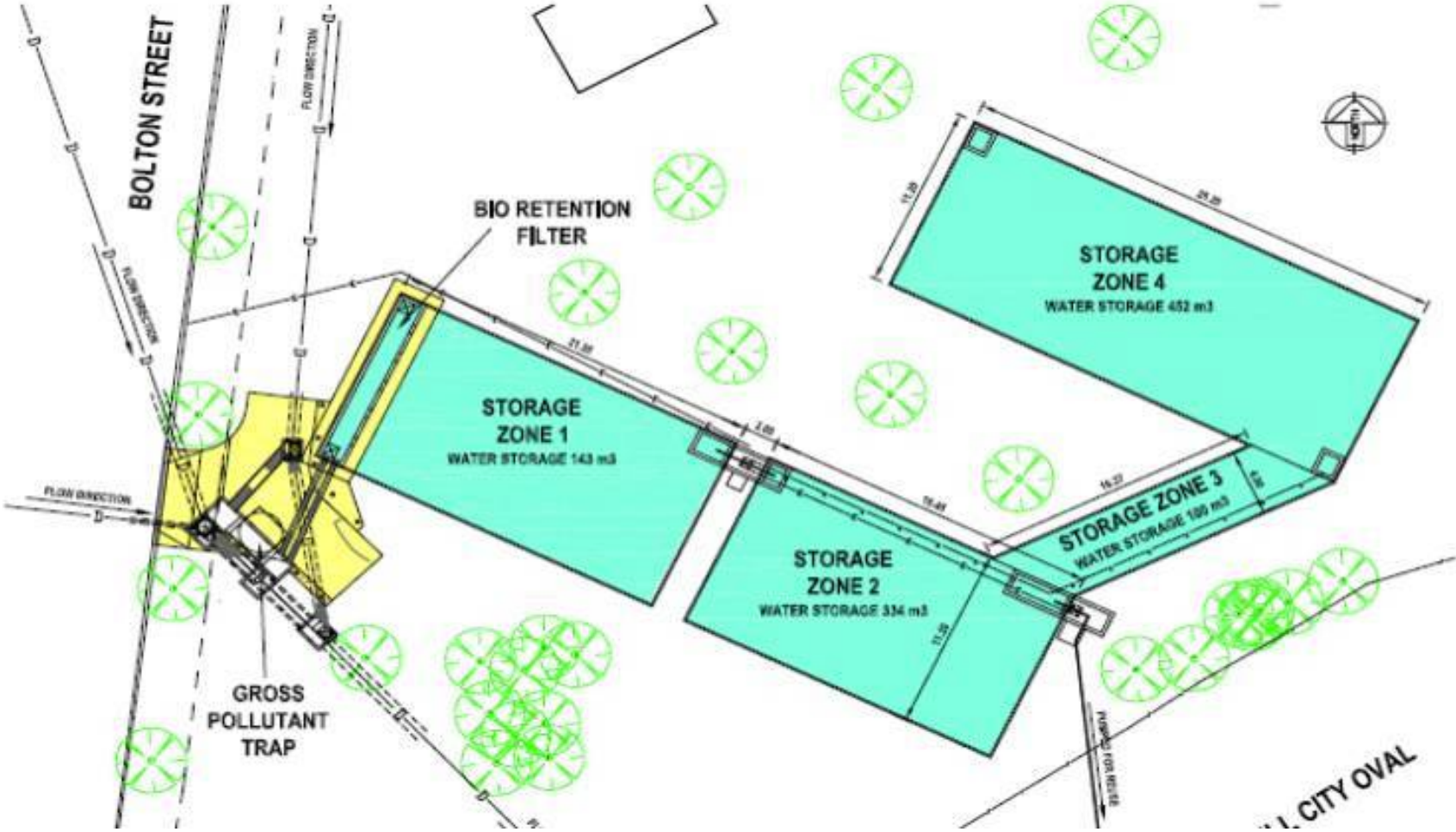
Contact the City of Whitehorse Engineering and Environmental Services Department on 9262 6333 if further information is required.







# Overall Concept





# Bolton Park



**Bolton Park before  
works commenced**





# Stage 1- Excavation





# Stage 2 – Storage Tank Lining



**Bentofix thermal lock geosynthetic clay liner overlaid with geofabric and sand on the base**



# Stage 3 – Scoria Stones



**Storage media - 1 inch scoria aggregate**





# Stage 4 – Pit & Litter Trap



**Pump pits**



**Bio retention filter**



**Gross Pollutant  
(Litter) Trap**



# Stage 5 – Reinstatement



**Scoria covered with geofabric, sand, fill material and then top soil and grass**





# Stage 6 – Toilet Blocks Connections





# Completed





# Operational Issues

- **Water quality testing**
- **Training staff in use of system**
- **Safety issues**
- **Risk Management**
- **Operational Manual**
- **Possible Future additional treatment (UV)**

# Captured Water Use

**The treated stormwater is used to:**

- **Irrigate the adjacent sporting fields**
- **Flush the toilets in adjacent sport pavilions**
- **Street cleaning,**
- **Drain cleaning**
- **Watering plants.**





# Costs

## Cost

<b>Retention System</b>	<b>\$750,000</b>
<b>Reline Brick Drain</b>	<b><u>\$200,000</u></b>
<b>Total</b>	<b><u>\$950,000</u> (\$ AUS)</b>

## Funding

<b>State Government</b>	<b>\$150,000</b>
<b>City of Whitehorse</b>	<b>\$800,000</b>



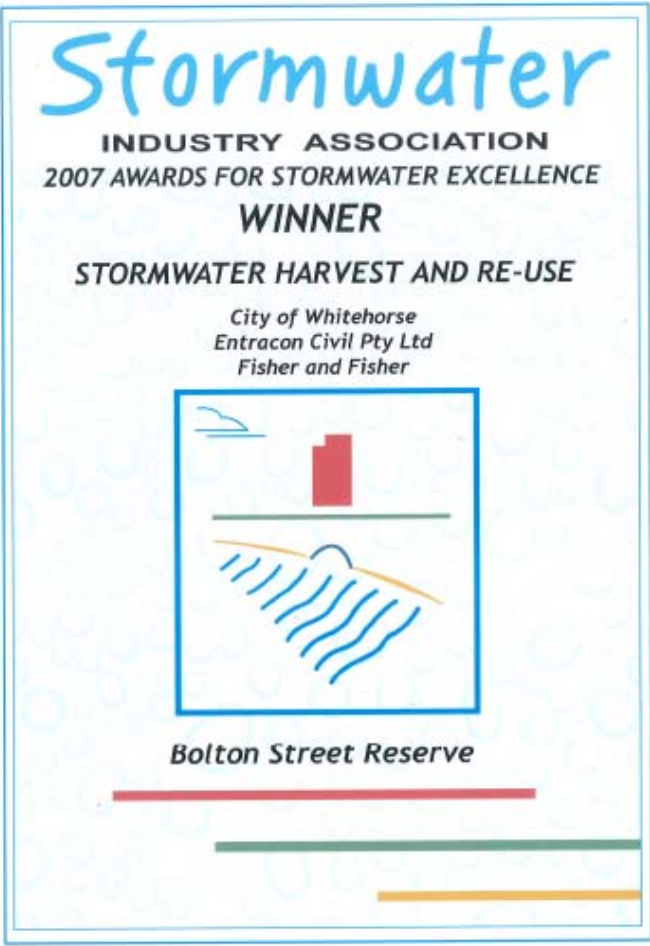


# Final Comments

## What did we learn?

- **Complex issues involved**
- **Water Economics**
- **Water Quality**
- **Constructability**
- **Stakeholder involvement**
- **Application to other sites**
- **Large Capital Cost**
- **Ongoing maintenance costs**

# Awards





# THANKYOU

## QUESTIONS ?

