

## TOOLERN – “A WATER NEUTRAL SUBURB WITH LOW RAINFALL”

Author One : Stephen Bock<sup>1</sup>, Author Two : Gary Walsh<sup>2</sup>

1. Western Water, Sunbury, Melbourne, VIC, Australia

2. Aecom, Melbourne, VIC, Australia

### INTRODUCTION

Toolern is approximately 45 kilometres to the West of Melbourne. It's in an area on the South eastern edge of Melton that is designated for urban development and will accommodate approximately 50,000 people by the year 2030. Water infrastructure in the area is managed by Western Water apart from rural irrigation supplied from stream flow or groundwater.

In the 10 years leading up to 2009, the average yearly rainfall was only 400-500mm. Between 2008 and 2009 the total rainfall was only 245mm (see Figure 1). One quarter of this rainfall fell in 24hrs. Rainfall in this part of Melbourne is not only low but can also be intense.

Stormwater harvesting helps manage the quantity and quality of stormwater plus providing local 'fit for purpose' water solutions. This vision is consistent with The Living Victoria Ministerial Advisory Council's vision for Living Melbourne, Living Victoria: *smart, secure water for a liveable, sustainable and productive Melbourne.*

### METHODOLOGY/PROCESS

There are significant costs associated with the increasing need to augment existing water supply infrastructure (both increase existing capacity and to extend pipelines into new urban areas). Growth in the area can be serviced in two ways; 1) extension of Melbourne Water's infrastructure or 2) provision of a 'locally' based infrastructure portfolio. Drivers for change that support a shift away from expanding Melbourne Water's metropolitan scale infrastructure to service the Toolern area include:

- **Policy:** This is the first time in Victoria that a suburb has a potable water reduction target included in the Precinct Structure Plan (Growth Areas Authority, 2011) Direction 4.5.6 'Integrated Water Management Objectives'. Amongst other targets and objectives is the target for potable water reduction which MUST be met: "Reduce potable water consumption to no less than 50% of personal consumption use as defined in the Central Region Sustainable Water Strategy or to a level nominated in any approved integrated water management strategy, whichever is greater".
- **Economic:** Existing Western Water infrastructure together with current planned precinct scale infrastructure makes the use of alternative water sources for Toolern economically appealing: The existence of this infrastructure reduces the additional capital cost associated with these alternate sources whilst minimising the capital cost associated with extending Melbourne's supply network to service the area. Initiatives such as these

broadly implemented, have the potential to offset the need for future investments such as desalination plants.

- **Social:** The social amenity created by additional green spaces aids in the promotion of a sense of health and well-being. Communities with green public space are more likely to be healthy communities. IWM provides the customer with choice as to water source and how they use water. The Department of Health (Vic) has recently identified the importance and use of reliable alternative water supplies to maintain open space infrastructure in order to sustain the activities that support the health and wellbeing of communities and the economy. The availability of alternate water sources will assist in ensuring green spaces are justified if scarcity and cost become challenges associated with conventional water supply in the future.

A framework for developing an IWM strategy within the context of Toolern was derived from the CSIRO principles. Primary principles shared with the CSIRO framework include: i) Use of a stakeholder group, ii) Agreed objectives, methods and measures, grounded in an understanding of the current system, iii) Selection of portfolios based on assessments of system performance, iv) Implementation planning. After an initial stakeholder consultation phase, the process towards assembling the components of the strategy involved iterations since many of the tasks within the process were interdependent. A general representation of these tasks as a process diagram is illustrated in Figure 2.

## RESULTS

Based on an annual rainfall of 380mm/yr, a demand of 155 litres per person per day and an 80% stormwater capture rate, we expect Toolern to be a water neutral suburb (See Table 1). In a 'Do Nothing' scenario, the development would require approximately 6,470 ML per year. Connecting to Recycled Water would account for approximately 2,780 ML per year in non-potable demand and 3,560 ML could be harvested from stormwater.

The stormwater can be stored in Melton Reservoir and used in the Werribee or Bacchus Marsh irrigation districts (See Figure 3). This use of treated stormwater will offset the requirement to pump an additional 3,000 ML from Melbourne to meet the irrigator's requirements. There are a number of other options available for the use of this stored stormwater; i) Bulk Entitlement transfer into potable supplies higher in the catchment, ii) Treat to Class A and reticulate or iii) Treat to potable standard in the future either locally or transfer to a potable catchment. The first step is common to future options or upgrades.

## CONCLUSION

Building flexibility and diversity in water supply infrastructure for Toolern will provide resilience against climate change whilst accommodating growth in population. The work completed in Toolern will be used as a template for other new developments in Western Water's area. Work has already begun to investigate other opportunities in neighbouring precincts and how Toolern may be leveraged or linked to those other growth areas.

# The Rainfall Shadow

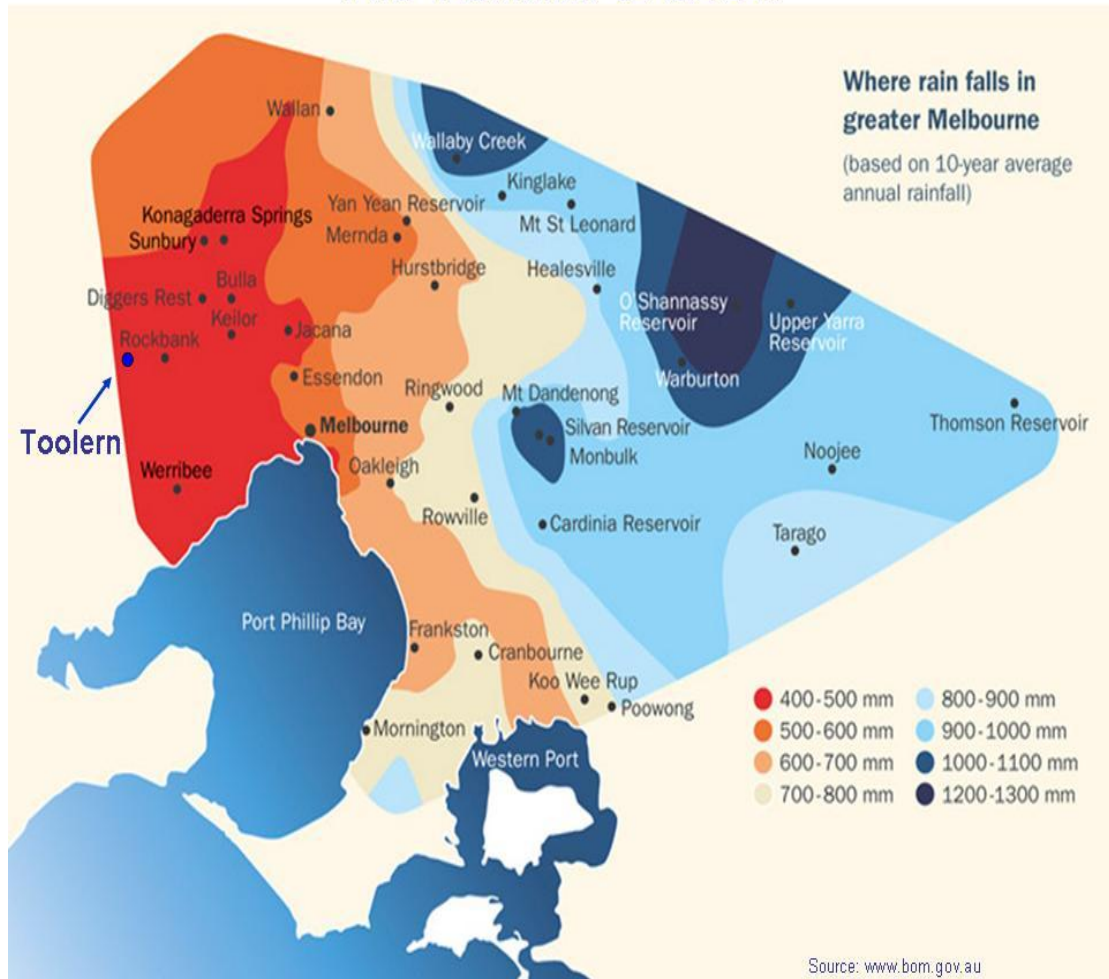


Figure 1 – Melbourne's average rainfall over a 10 year period (1999-2009)

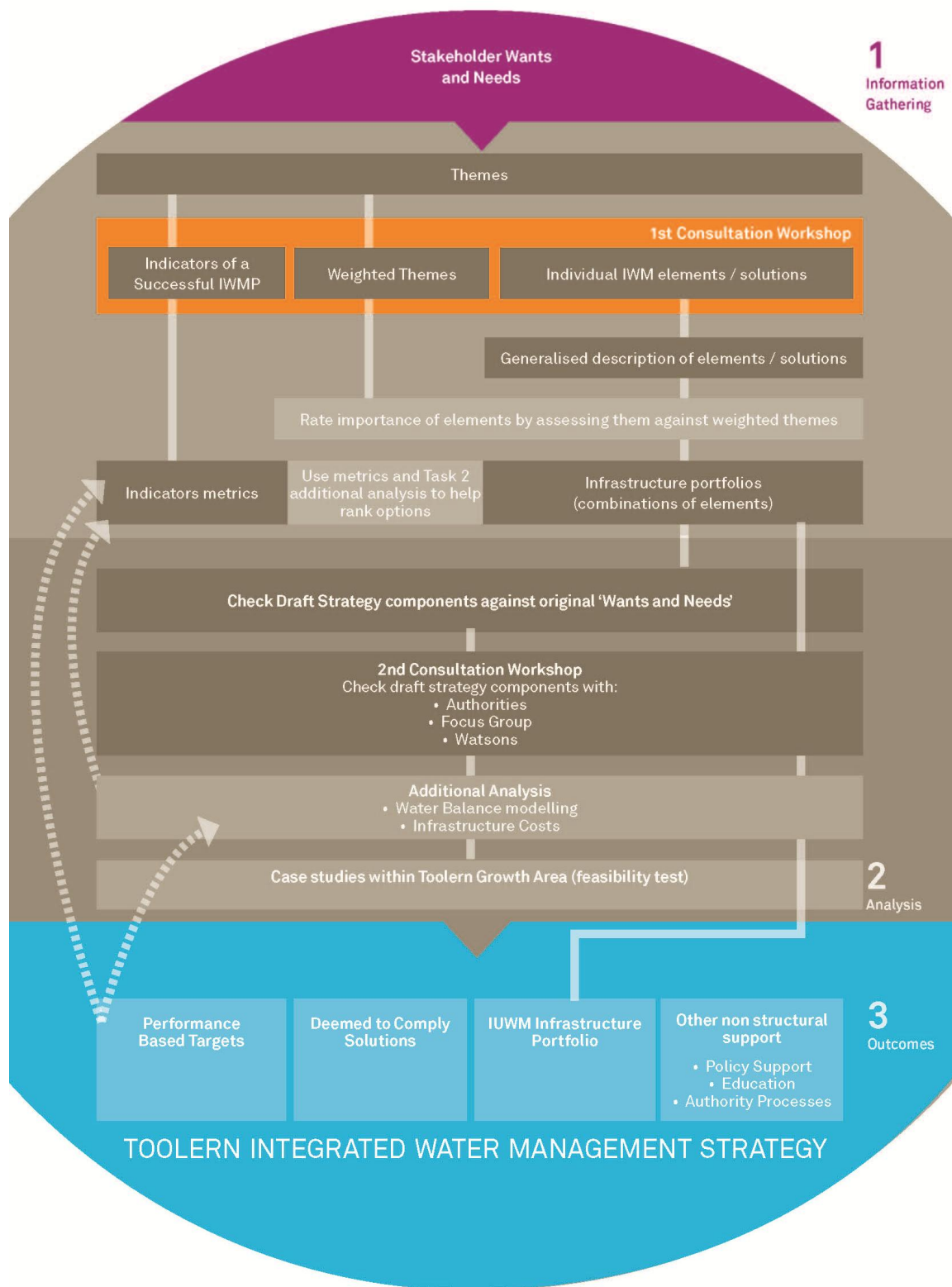


Figure 2- Summary of Framework for Developing and Assessing a IUWM strategy for Toolern

Options	Potable Water Consumption (ML)	Recycled (ML)	Stormwater (ML)	Total (ML)	Potential Reduction in potable water use
Do nothing	6,470			6,470	0%
Use Recycled Water	3,690	2,780		6,470	43%
Use Recycled & Stormwater	130	2,780	3,560	6,470	98%

Table 1 – Toolern Water Balance

Based on 155 l/p/d. In all scenarios the non potable supplied (through the 3rd pipe) is limited by demand and not what can be produced at the Surbiton Park Recycled Water Plant. Rainfall 380mm/yr. 80% stormwater capture rate.

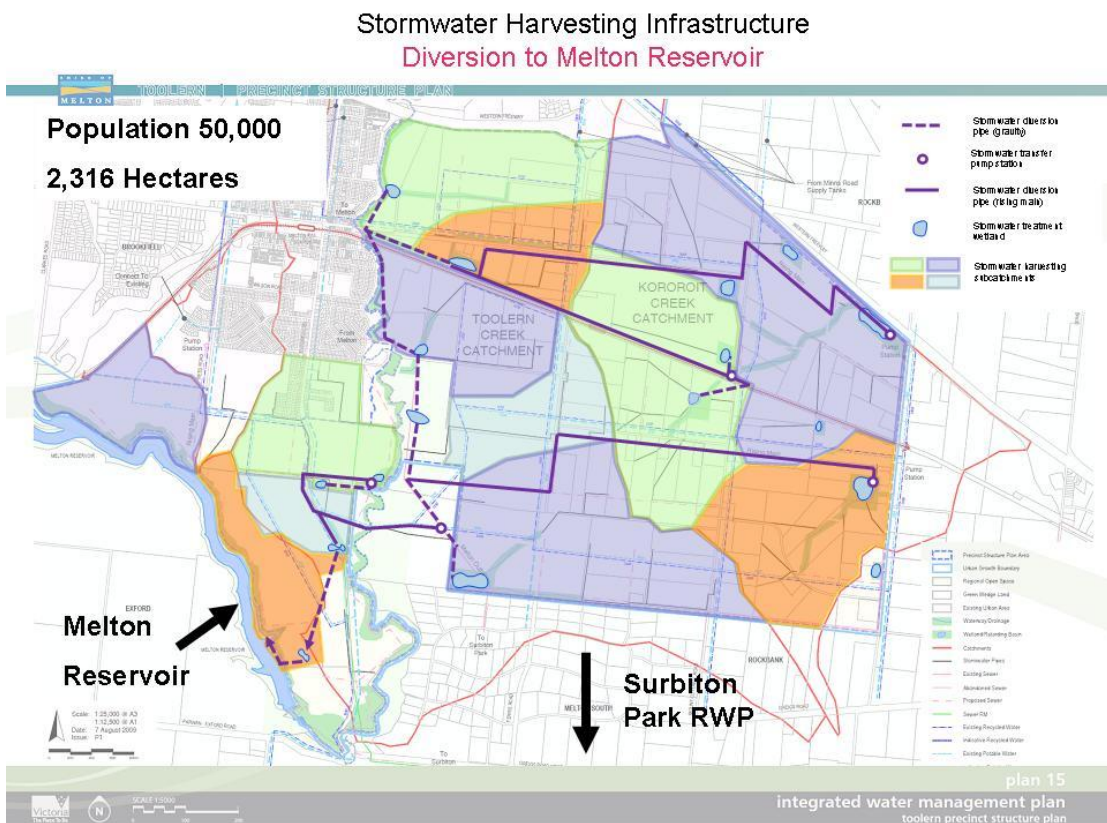


Figure 3 – Toolern stormwater harvesting infrastructure