“Roof to Tap”
Urban and Industrial Initiatives in Warrnambool

Ian Barnes – Asset Planning Engineer
Service Area: 23,500 km²
Total Customers (water): 42,200
Total Population: 83,000
Towns Serviced (Water): 33
Towns Serviced (Sewer): 18
Number of Employees: 214

www.wannonwater.com.au
Otway Water Supply System
Urban Growth

2003

2012

www.wannonwater.com.au
Urban Development

Warrnambool Water Equation

• Average household consumption <150 kL/annum

• 750 mm per year average rainfall ~ 150 kL/annum harvested

• 100% of current demand

• Runoff still dramatically exceeds pre development runoff.
Warrnambool Roof Water Harvesting
Regional Roof Water Harvesting
Key Differences

- Tank Size – 1 kL per 100 m² of roof area (upward of 20 kL)
- Limit outflow of tank – Minimise infrastructure costs – 150 mm diameter pipes, smaller pumps and rising main - 1 in 1 year storm flows
- Developers where open to larger tanks being onsite
- Shut flow off if required
Roof Connection

Household with Water Tank

- Tank Overflow
- Connection Point
- Let Boundary
- Below Ground Roof Water Pipework on Grade (SN6) - marker taps above
- Overflow Relief of Gutter as required by Clause 3.5.3 of Plumbing Regulations
- Screw Cap Riser (within property finished 300mm below ground)
- Collection Pipe

Smith St
Key Differences

- Bigger Roofs - Higher peak flows – Buffer tanks
- Pumped to storage vs gravity fed
- Expected annual collection – 25 ML per year Stage 1 (~170 houses)
- Expected water use from industry – less than 3 ML per year
- Estate developing in stages – Total expected collection 125 ML (~850 houses)
Quantity Results

Maycarn Estate

Roof Water Collected 2015

Volume harvested – 12.5 ML (570 mm rain). Enough to supply 84 houses for a year!
Quality Results

Colour, turbidity, iron, aluminium and TDS significantly better than the raw water.

www.wannonwater.com.au
Microbiological worse than the raw water – held in underground sump and pipework
# Water Augmentation Options Summary

<table>
<thead>
<tr>
<th>Criteria (Over 34 Years)</th>
<th>Curdie Vale Bore</th>
<th>Individual 5kl tank to toilet, laundry &amp; garden</th>
<th>Roofwater Harvesting Project</th>
<th>Industrial Estate RWH Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPITAL COST</td>
<td>$7,806,920</td>
<td>$8,528,000</td>
<td>$11,025,053</td>
<td>$558,000</td>
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<tr>
<td>RECURRENT COSTS</td>
<td>$6,868,039</td>
<td>$10,108,280</td>
<td>$336,000</td>
<td>$122,250</td>
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<tr>
<td>NPC</td>
<td>$11,173,908</td>
<td>$6,351,906</td>
<td>$4,771,921</td>
<td>$468,988</td>
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<tr>
<td>Total ML (discounted)</td>
<td>6,620</td>
<td>1,158.61</td>
<td>2,571</td>
<td>323</td>
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<tr>
<td>NPC / ML</td>
<td>$1,688</td>
<td>$5,482</td>
<td>$1,856</td>
<td>$1,452</td>
</tr>
</tbody>
</table>

**Financially Stacks Up**
System Benefits

- Minimises contaminants by separating roof water at the source
- Diverts roof water to a beneficial use instead of running to waste – supply / demand balance
- Able to be implemented progressively
- Reduces operational costs of transporting water over long distances & GHG emissions
- Reduces stormwater management cost – reduced volume means less flooding
- Satisfies the current 6 star rating requirement - rainwater tank or solar hot water
Social Benefits

☑ Reduces public health risks – tank water quality uncontrolled

☑ Landowners will not be burdened with on-going maintenance

☑ Is an innovative approach to sustainable use of water resources

☑ Promotes community awareness of water sustainability
Toolkit To Aid Assessment

What is the Toolkit?

- Preliminary assessment tool - $/ML
- Spatial data of rainfall and temporal rainfall patterns
- Assess specific supply systems
- Explore “What if’s”

Not a detailed assessment
>700mm Rainfall Areas
Lessons Learnt

• Partnership with Council – technical and planning departments.

• Developers are supportive of new ideas – But have cost concerns.

• If developers not supportive, need mechanism to require the infrastructure to be installed and or financially assistance
Lessons Learnt

• Great feedback from customers

• Keep the relevant agencies ‘in the loop’ of anything new.

• New initiatives are challenging.

• There will be setbacks – must be driven to succeed.
Conclusions

• Using the urban and industrial roof catchments is a viable augmentation option.

• Simple and adaptable to any scale

• Utilising a centralised and decentralised approach has proven to be successful

• Toolkit – Quick and Easy Assessment tool

• Good quality and quantity result
• The Commonwealth Water Smart Australia Fund
• State Government Stormwater and Urban Recycling Fund
• Industrial Estate Developers
• Russell’s Creek Estate Developers
• Marrakai Estate Developers