

**ENVIRONMENT, COMMUNITY AND  
CULTURAL DEVELOPMENT COMMITTEE  
REPORT COVER SHEET**

**Agenda Item 5.7**

**16 June 2003**

**SUSTAINABLE WATER MANAGEMENT STRATEGY – PART 1**

**Division** Sustainable Development & Strategy

**Presenter** John Tunney, Acting Manager Environmentally Sustainable Development Branch

**Purpose**

To report back to Committee on the results of community consultation on the *Draft Sustainable Water Management Strategy*, to seek approval of water reduction targets (by 2020) and to seek approval for publication of the final version of the *Sustainable Water Management Strategy – Part 1*. A costed action plan for the next four years is also tabled.

**Time Frame**

The Draft Strategy was released for consultation on 12 November 2002 and was open for feedback until 18 December 2002. Consultation sessions have been conducted with the public, external stakeholders and internal stakeholders. The Strategy has been reworked in response to feedback with a full revision of water consumption data and targets undertaken. An Action Plan with associated budget has been developed in consultation with internal stakeholders.

The final *Sustainable Water Management Strategy – Part 1* is presented for Council's consideration. *Part 1* deals with the water consumption management. *Part 2* will deal with water quality management and has been deferred until September to enable it to be written in conjunction with the updated version of the *Stormwater Management Plan* currently being revised by the Engineering Services Branch.

**Finance**

The proposed Action Plan identifies 7 Key Actions which are estimated to cost a total of \$10,901,125 over the next 4 financial years (see table below).

<b>2003/04</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>Total</b>
<b>\$</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
3,001,450	3,011,900	2,991,775	1,896,000	10,901,125

Approximately 50% of the above costs will be met by partners in the water program, including the \$5,000,000 state funding for the Royal Park Wetlands. The major expense for Council will be the \$1,000,000 pa. budget allocation for upgrading irrigation systems in parks and gardens. The implementation of the Strategy will result in a 12% reduction in water consumption across the municipality by 2020 (based on 1999 figures) despite population increase. The Strategy will therefore deliver some cost savings to Council and the community, as well as conserve resources.

The Strategy advocates a reduction in water consumption by Council facilities of 28% by 2020, constituting a saving of \$337,337.00 in 2020 (based on current water costs) and a good proportion of this saving every year up to 2020 as the water consumption gradually meets its target. The saving is likely to be considerably higher due to an increase in the cost of water expected over the next 20 years.

## **Legal**

No direct legal issues arise from the recommendation in the report.

## **Sustainability**

The City of Melbourne is committed to decision-making based on consideration of ecological, social and economic factors.

### **Connected And Accessible City**

The Sustainable Water Management Strategy is unlikely to impact on either the connectedness or accessibility of the municipality generally or its transport and communications infrastructure specifically.

### **Innovative And Vital Business City**

Council's Strategy and the State government's water management measures are likely to have a significant positive influence on the development of the City's environmental management sector particularly those businesses dealing in water efficient technologies or sustainable water management systems. Implementation of the Strategy may lead to the development of expertise or technologies that could be exported internationally. Additionally, the Strategy and the State's water plans may result in increased investment in sustainable water management technologies and related product research and development. However, the direct impacts are not quantifiable at this stage.

Addressing the issue of sustainable water management to is likely assist Melbourne to grow its reputation as a "knowledge city" and may well lead to the creation of jobs in the environmental management sector.

The implementation of cost effective water saving measures, as outlined in the Strategy, will assist business to reduce operating costs thereby assisting businesses maintain their financial sustainability.

### **Inclusive And Engaging City**

The sustainable management of water will ensure Melbourne's heritage trees, tree lined streets and parks and gardens in general will have access to a consistent water supply thereby maintaining quality open spaces for community use.

### **Environmentally Responsible City**

The successful implementation of the Strategy will result in an approximately 12 per cent reduction in current water consumption levels across the municipality by 2020. Total water savings are forecast as 2,900 megalitres.

While the strategy will produce environmental benefits in terms of water management, care will need to be taken to ensure that this does not happen at the expense of Council's greenhouse abatement programs. Certain water efficient technologies and conservation measures will require the use of energy consuming plant and machinery to enable them to operate (eg pumps for rainwater or greywater reuse systems). In these circumstances it is recommended that most energy efficient products be used.

The Strategy is not likely to impact negatively on the City's biodiversity. However, a reduction in water demands from the City is likely to have a positive impact on the biodiversity of Melbourne's water catchments. Additionally, the successful achievement of the Strategy's targets should mitigate the need for the construction of an additional dam.

## **Recommendation**

That the Environment, Community and Cultural Development Committee:

- approve the revised data analysis and recommended water reduction targets for inclusion in the revised *Sustainable Water Management Strategy*;
- approve the attached Action Plan in principle;
- approve the revised *Sustainable Water Management Strategy – Part 1* for publication (subject to reformatting and editing changes);
- note the revised *Sustainable Water Management Strategy – Part 2* will be presented to Council in September; and
- note that this decision is being made by the Committee under delegation from the Council and is subject to the referral notice process.

### **Attachments:**

1. Setting Targets for Residential Water Saving
2. Financial Feasibility of Water Savings
3. Sustainable Water Management Strategy - Action Plan 2003/2004
4. Sustainable Water Management Strategy

16 June 2003

## SUSTAINABLE WATER MANAGEMENT STRATEGY – PART 1

**Division** Sustainable Development & Strategy

**Presenter** John Tunney, Acting Manager Environmentally Sustainable Development Branch

### Purpose

1. To report back to Committee on the results of community consultation on the *Draft Sustainable Water Management Strategy*, to seek approval for the water reduction targets (by 2020) and to seek approval for publication of the final version of the *Sustainable Water Management Strategy – Part 1*. A costed action plan for the next four years is also tabled.

### Background

2. Melbourne has been in drought since 1998 and at the time of writing Melbourne's reservoir capacity was 40.5 per cent. Results of a recent National Land and Water Resource Audit concluded that Victoria's water resources are heavily committed. This means that throughout Victoria, water will become an increasingly precious commodity requiring more careful and efficient use by all consumers. The City of Melbourne, along with other municipalities, needs to consider its long-term water use, particularly in light of the forecast increase in population.
3. In November 2001, Council endorsed participation in the International Council for Local Environmental Initiatives (ICLEI) Water Campaign and agreed to develop a *Sustainable Water Management Strategy* for the City of Melbourne in partnership with Melbourne Water and ICLEI. The City of Melbourne is considered to be an international leader in the program.
4. The *Draft Sustainable Water Management Strategy* was prepared and released for public comment in November 2002.
5. The revised *Sustainable Water Management Strategy* will be published in two parts. Part 1 deals with water consumption (refer to Attachment 4), and Part 2 will deal with water quality. Part 2 will be presented to Council in September in conjunction with the revised *Stormwater Management Plan*.
6. This report presents a summary of the public comments received about the *Sustainable Water Management Strategy*. The report then outlines key revisions that will be recommended for inclusion in the water saving component of the final Strategy. This is followed by a recommended Water Action Plan for implementation of the Strategy.

### Issues

#### Public Feedback

7. Council received ten written submissions in response to the *Draft Sustainable Water Management Strategy*. Feedback was also received from discussions at a small public forum and at workshops with internal and external stakeholders. Public consultation took place from 12 November to 18 December 2002.

8. All feedback supported Council's water saving initiative. A range of working partnerships were offered in support of the Strategy from organisations such as the Australian Water Association, the Royal Australian Institute of Architects, RMIT University, and the Property Council of Australia (Victoria).
9. A summary of the issues raised, and the City of Melbourne response is set out below:
  - 9.1. **Targets:** Comments on the draft targets for water reduction consistently expressed that they were too low. This was based on comparison to targets set in other cities around the world, and in recognition that the forecasted population growth for the City of Melbourne will place additional demand on water supply. It was also suggested that targets should be based on catchment requirements for maintaining water flow.

*Response:* Recommended water saving targets were fully revised to achieve a forecast absolute reduction in municipal wide water consumption.
  - 9.2. **Water Supply:** The draft water reduction targets will not be sufficient enough to result in reduced absolute demand (due to forecast population growth). Council should specify a position on where it will source its extra water supply.

*Response:* The recommended Strategy has been revised to provide for the City of Melbourne's growth over the next 20 years and at the same time use less water in total than the amount used in 1999. There will be no need to source additional water.
  - 9.3. **Data:** Concern that the data is not of the necessary quality.

*Response:* The data has been fully updated and analysed more comprehensively. The baseline data is now from the year 1999, and the lesser quality data from 1998 has been removed. Data will be continuously improved each year.
  - 9.4. **Regulation:** More regulation, planning enforcement and guidelines are sought to require water efficient design and practices.

*Response:* An associated Action Plan has been recommended that sets out a program for policy and regulatory initiatives including a *Rainwater Tank Policy*, *Water Sensitive Urban Design Policy*, and planning scheme amendments.
  - 9.5. **Water Re-use:** Greater emphasis on water re-use, rainwater harvesting, and greywater should be given in the Strategy. Water re-use for Council parks should be required.

*Response:* An additional chapter supporting water harvesting and re-use has been recommended for inclusion in the final Strategy.
  - 9.6. **Protect Heritage Trees:** Supply sufficient water for parks, avenues etc.

*Response:* The Strategy emphasises the need to maintain the cultural, heritage and horticultural values of the City of Melbourne parks and trees.
  - 9.7. **Education:** Communicate and educate about water conservation and water quality.

*Response:* The Strategy's recommended 'measures' identify the importance of education and community engagement as a means of water management.

## **Strategy Objective**

10. The objective of the Strategy is:

- 'For the City of Melbourne to reduce the consumption of potable water across its residential, commercial, industrial and corporate sectors to a level that provides long term:*
- *environmental benefits for the catchment area, and*
  - *financial and social benefits for the water users in the municipality'*

## **Water Consumption Data**

11. The water consumption data has been completely revised in response to concerns about data quality. Council water use data is now comprehensive instead of sample based. Community wide data is now based on data from 1999-2001, and is no longer reliant on lesser quality 1998-1999 data.
12. The revised data for community water use has shown an increase in water use per household – increasing from 185 kilolitres per year to 228 kilolitres per year per household. It is noted that the water retailers, City West Water and South East Water are only able to provide community data in two categories; residential and non-residential. It has been necessary for assumptions to be made to breakdown non-residential water use into commercial and industrial for the purposes of the Strategy. Refer to page 17 of the Strategy.
13. The revised data has resulted in quite significant changes to Council's own water use analysis. This includes a reduction in water consumption attributed to corporate buildings from 9.3% to 1.3%, and markets down from 10.1% to 8.7%. Water consumption levels for parks and gardens have increased from 69.4% to 81.8% of corporate water use. Refer to Appendix G of the Strategy.
14. A data protocol is needed to ensure future annual data collection is consistent and prompt. Application of spatial data management will need to be applied through GIS to ensure the data is most effectively managed and communicated.

## **Principles**

15. The Strategy is based around the following principles (Refer to page 14 of the Strategy):
- 15.1. Global Context;
  - 15.2. No Absolute Increase in Water Use;
  - 15.3. Catchment Management;
  - 15.4. Ecological Impact;
  - 15.5. Community Engagement;
  - 15.6. Resource Efficiencies for Council; and
  - 15.7. Partnerships.

## **Water Saving Targets**

16. A revision of the targets is recommended in response to:
- 16.1. the above data modifications;
  - 16.2. public submissions requesting increases in water reduction targets; and

16.3. feedback from ICLEI that our draft targets are low, and should be significantly increased in order for the City of Melbourne to be a world leader in water conservation.

17. The Strategy is up-front in explaining the ecological importance of water conservation. The water saving targets in the Strategy are primarily driven by the future water 'needs' of the environment, not driven by the need to set targets that are 'agreeable'.
18. Detailed quantification of possible water savings has been undertaken where possible to ensure that water consumption targets are realistic. It is noted that further research and knowledge in the water industry is likely to evolve in the coming years making target setting an increasingly clearer task. See Attachment 1 for a breakdown of residential water savings.
19. In modelling water saving targets it became clear that the significant residential population increase that is forecast for the City of Melbourne makes it very difficult to achieve an absolute water reduction. This was revealed when a 40% per capita reduction in household water use will not translate into an absolute water saving for the City of Melbourne. Given that a 60% per capita reduction in household water use is not considered feasible, it was acknowledged that the savings need to be 'made up' in the industry, commercial and corporate sectors in order to achieve an absolute water saving. This modelling is set out in the table below.
20. In line with the key principles of the Strategy, two target setting options have been developed for Council to consider:

Land Use	Model A Target Reduction	Model B Target Reduction	Comments on the forecast absolute water savings
Buildings	35%	35%	It is assumed that savings in corporate water use will be absolute. This is because growth in population, industry etc will not generally result in growth in corporate water demand. There is some growth due to likely future management of Docklands etc
Markets	45%	50%	
Parks & Gardens	26%	40%	
Depot	30%	30%	
Toilets	30%	30%	
Recreation	30%	30%	
Miscellaneous	30%	30%	
<b>Total</b>	<b>28% (absolute)</b>	<b>40% (absolute)</b>	

Land Use	Model A Target reduction	Model B Target Reduction	Comments on the forecast absolute water savings
Industry	40% (per employee)	50% (per employee)	Targets have been set on a per employee basis as this was the means of forecasting future non-residential water demand. It is necessary to 'convert' this to an absolute saving.
Commercial	40% (per employee)	50% (per employee)	
<b>Total</b>	<b>27% (absolute)</b>	<b>39% (absolute)</b>	

Land Use	Model A Target reduction	Model B Target reduction	Comments on the forecast absolute water savings
Residential	40% (per resident)	56% (per resident)	Targets have been set on a per resident basis to avoid showing a 'negative target'. A 'negative target' is unavoidable in the residential sector due to very large residential population increase that is forecast.
<b>Total</b>	<b>-45% (absolute)</b>	<b>-5% (absolute)</b>	

TOTAL ABSOLUTE SAVINGS – Using Above Calculations			
Land Use	Model A Target reduction (absolute)	Model B Target reduction (absolute)	Comments on the forecast absolute water savings
Corporate	28%	40%	It is noted that climate change and logging in catchment areas will reduce future water supplies therefore a target falling below zero will provide best outcome for future water supplies and the environment.
Non-Residential	27%	39%	
Residential	-45%	-5%	
<b>Total</b>	<b>12%</b>	<b>30%</b>	

21. It is recommended that Council adopt the water saving targets set out in Model A. Although Model B would have the benefit of achieving greater absolute water savings, there are concerns that the targets set in this model are too high to be feasible.
22. As shown above, the corporate target is lower than the target set for the community's water use. The majority of Council's water use is in parks and gardens. These parks and gardens are a State tourist resource and need to be maintained to a very high standard. This makes water reduction particularly challenging, especially given the impact of varying climatic conditions.
23. The proposed water saving targets will result in a significant per capita reduction in water consumption. Currently the water consumption per person in the City of Melbourne is 108 kilolitres per year. This will be reduced to approximately 65 kilolitres per year for each resident. The very large increase in population that is forecast for the City of Melbourne will mean that extra water supplies will be needed, however this extra demand will be significantly reduced by the commitment by Council to reduce water consumption.
24. The City of Melbourne is committed to achieving ecological improvements through water saving initiatives. The successful implementation of this strategy will result in Council and the community consuming significantly less water in 2020 than it would have otherwise under 'business as usual' conditions. The water saved will be retained in Melbourne's metropolitan water reservoirs helping the planning for long term sustainable water management in accordance with the Victorian Government's Water Resources Strategy.
25. In addition to the water savings achieved by moving beyond 'business as usual' practices, the City of Melbourne is planning to achieve a further 12% absolute savings. The City of Melbourne would like to see these savings committed to environmental flows. It is hoped that Melbourne Water would consider this proposal once these savings have been realised.

### **Water Demand Management**

26. The Strategy outlines a range of actions that can be undertaken to reduce domestic, commercial, industrial and corporate water consumption. These firstly relate to better water practices, and efficient appliances. A range of rainwater harvesting and greywater re-use options also exists.
27. The Strategy encourages water harvesting and re-use subject to appropriate maintenance and installation. More detailed policies will be developed on these matters in the coming two years. It should be noted that the Strategy has not indicated that rainwater should only be used for gardening and toilets. By leaving this unsaid, the Strategy is enabling people to use rainwater for potable purposes if they so choose, following the national health requirements. This 'position' has been taken because at this stage it is considered detrimental to the rainwater tank industry to restrict rainwater to non-potable water uses when there is not necessarily the evidence to suggest negative health implications.

### **Strategy Direction**

28. The Strategy will use the following measures to achieve its water saving targets. It is this framework that will form the basis for annual Action Plans.

<b>Measure</b>	<b>Purpose</b>	<b>Potential Partners</b>
Leadership	Lead by example in reducing corporate demands on potable water. Share experience and knowledge with local business, industry and residents.	Melbourne Water, City West Water, South East Water, CSIRO, Queen Victoria Markets.
Strategy and Regulation	Implement policies and guidelines that influence corporate and community use of potable water.	Melbourne Water, City West Water, South East Water, development and construction industry,
Education and Communication	Promote sustainable water management, raise the awareness of impacts, training for staff and industry, community engagement	Melbourne Water, City West Water, South East Water, community groups, industry groups (Property Council of Australia, Green Plumbers, Green Gardeners, Royal Australian Institute of

Measure	Purpose	Potential Partners
Communication	industry, community engagement	(Property Council of Australia, Green Plumbers, Green Gardeners, Royal Australian Institute of Architects, Australian Water Association), manufacturers, businesses, universities.
Implementation and Monitoring	Data management, annual water consumption reviews, action planning, incentives, geographic information systems.	Melbourne Water, City West Water, South East Water, financial institutions, water industry, manufacturers.

### Communication Strategy

29. A community education program to help people use water more efficiently will be an integral component of water demand management. Residents and businesses can be made aware of how they can help to achieve water savings. It will be important for the City of Melbourne to lead by example in our water activities.
30. A range of communication activities have been instigated, or are running already, that aim to educate residents and professionals about water consumption and water quality. These include:
- 30.1. *Sustainability Street* – a community development program encouraging residents to come together with their neighbours to work on an environmental action;
  - 30.2. *Green Plumbers Forums* – hosting training sessions aimed at providing skills to plumbers regarding water conservation practices, appliances and systems;
  - 30.3. *GreenGardeners Forums* – hosting training sessions aimed at providing skills to nursery operators and landscape designers regarding water conservation. An associated community forum will also be hosted;
  - 30.4. *Waterwatch* – program involving school children being involved in monitoring the water quality of local waterways. This program has been supported by Council since 1999; and
  - 30.5. Information sessions in partnership with Property Council, Royal Australian Institute of Architects, RMIT University, Australian Water Association.
31. Sustainability Street is a particularly exciting community initiative. A partnership has been formed with Vox Bandicoot and Environs Australia to deliver this program. City West Water is funding the program, enabling all western metropolitan Councils to work together to promote community activities in our municipalities. Cr Kate Redwood was presented with a plaque recognising the City of Melbourne's involvement in the program. This was presented by the Hon John Thwaites, Minister for Water, Environment and Victorian Communities on 15 May 2003.

### Financial Feasibility

32. Financial analyses undertaken by the City of Melbourne have shown that applying water efficient appliances, technology and design to houses and apartments will have an up-front cost that can be repaid within years. For example, a house with all water efficient appliances (such as AAA rated showerheads, AAAA washing machines, dual flush toilets, mulch, sink nozzle etc) is calculated to have a payback period of six years.
33. Installing rainwater tanks and greywater systems in dwellings has a longer payback period, but it too will likely see twofold return on investment in twenty years. Further details are provided in Attachment 2.

34. A recent case study has shown that the Peter Lalor Secondary College has achieved a 36.7% saving in water consumption by installing water efficient appliances, reducing water flow rates, and installing a more appropriate hot water system. The measures have resulted in total annual cost savings of \$3,574 made up of savings from water costs, sewerage discharge costs and energy costs. Based on installation costs, the payback period for the school is identified to be 12.7 months (ref: SaveWater Efficiency Service).
35. At this stage costing for water efficient practices in commercial and industrial premises have not been developed due to lack of data. This further financial analysis will be research by the City of Melbourne.
36. By supporting water efficiency, the Sustainable Water Management Strategy plays an important role in promoting long term affordability for its residents and businesses. This is an important social objective for the City Of Melbourne.

### **Monitoring and Review**

37. Monitoring and review mechanisms are an integral part of the *Sustainable Water Management Strategy*. This will ensure on-going improvements and allow for the Strategy to keep up with advancements in technology, research, methodologies, design and practice.

### **Water Action Plan**

38. The key actions respond to public feedback that Council needs to:
  - 38.1. lead by example in applying sustainable water practices and policy;
  - 38.2. action a small number of sustainable water projects, and concentrate on achieving effective results; and
  - 38.3. communicate its key sustainable water actions widely to the industry and community.
39. The eight recommended key actions are outlined in the attached Water Action Plan (Attachment 3). They address leadership, regulatory processes, communication and data management. Projects are:
  - 39.1. *New Council House*: best practice sustainable water design;
  - 39.2. *Open Space and Recreational Facilities Water Management Guidelines*: for Council assets;
  - 39.3. *Queen Victoria Markets*: vendor training, and rainwater harvesting scheme;
  - 39.4. *Royal Park Wetlands*: stormwater harvesting from Zoo for water re-use;
  - 39.5. *Property Council Partnership*: partnership to encourage development industry to apply sustainable water design and construction to commercial buildings;
  - 39.6. *Strategic and Regulatory Systems*: policies and procedures including Stormwater Management Guidelines, Rainwater Tank Policy, Soft Paving Materials Strategy;
  - 39.7. *Education and Communication*: promotion, consultation and community engagement; and
  - 39.8. *Implementation and Monitoring*: on-going data collection and GIS implementation.
40. The key actions have been developed in consultation with internal stakeholders and budget bids have been put in for implementation of sustainable water initiatives.

41. Key water saving actions will have impacts on greenhouse gas emissions. Some impacts will be positive such as the installation of water saving showerheads, which will substantially cut water use and at the same time cut greenhouse gas emissions due to the reduced heating of water. Some projects such as sewer mining will generate greenhouse emissions. It is acknowledged that consideration and management of greenhouse implications will need to be undertaken for water saving decisions.
42. Actions will be revised and renewed to ensure projects and progress is maintained over the next three years.

### **Water Budget**

43. The proposed budget for the Strategy incorporates a range of Council initiatives that deal with both water consumption and water quality.

### **Water Pricing**

44. It is internationally recognised that water conservation can be directly influenced by the price of water. It is also noted that water prices for Melbourne residents do not reflect the true cost of water supply. Water pricing is a State Government matter and is set by the water industry economic regulator.
45. The Victorian Government is aware that pricing options include:
  - 45.1. increasing water prices to discourage discretionary use of water; and
  - 45.2. apply a seasonal tariff applied to reduce water use in summer.
46. However, studies show that price increases will add financial pressure to vulnerable customers including large households, tenants and pensioners. This makes the water pricing issue very difficult to determine. In light of this, the Government has been advised by the Water Resources Committee to apply guidelines to the economic regulator that ensure:
  - 46.1. water prices encourage water conservation and influence consumer behaviour;
  - 46.2. water is affordable to maintain public health and ensure reasonable access for all;
  - 46.3. water revenue should provide funding for water conservation;
  - 46.4. customer impact assessments should be undertaken to target any concessions; and
  - 46.5. water pricing should influence demand to save 5,000-10,000ML per year by 2050 for metropolitan Melbourne.
47. Water pricing has not been addressed in the *Sustainable Water Management Strategy – Part 1* as it is not a local government matter. However, Council will keep abreast of the issues and advocate supporting water pricing initiatives where appropriate.

### **Relation to Council Policy**

48. The projects outlined in this report relate to a number of council policies including *City Plan* and *Growing Green*.

## **Government Relations**

49. The effective and sustainable management of water resources is a priority for both the Commonwealth and State governments. The partnership outlined will help to strengthen working relationships with agencies such as the Melbourne Water Corporation and the water retailers in the municipality.
50. The Strategy is consistent with the recently released State Government Water Resources Strategy, which also sets targets for reducing water consumption in metropolitan Melbourne.

## **Recommendation**

51. That the Environment, Community and Cultural Development Committee:
  - 51.1. approve the revised data analysis and recommended water reduction targets for inclusion in the revised *Sustainable Water Management Strategy*;
  - 51.2. approve the attached Action Plan in principle;
  - 51.3. approve the revised *Sustainable Water Management Strategy – Part 1* for publication (subject to reformatting and editing changes);
  - 51.4. note the revised *Sustainable Water Management Strategy – Part 2* will be presented to Council in September; and
  - 51.5. note that this decision is being made by the Committee under delegation from the Council and is subject to the referral notice process.

## Setting Targets for Residential Water Saving

Calculations Of Residential Target Setting		
Appliance	Calculations	% Saved
<p><b>Showers</b></p> <p>Showers use 24% of household water.</p>	<p>It is estimated that 70% of households (17, 024 homes in CoM) do not use water efficient showerheads (Water Resources Strategy).</p> <p>City of Melbourne has 24,320 households each with 2.1 persons on average.</p> <p>Showerheads use: A: 12 to 15 litres per minute, AA: 9-12 litres per minute AAA: 7.5 – 9 litres per minute</p> <p>An average shower is 7 minutes long (Water Resources Strategy).</p> <p>---</p> <p>12L x 7 min x 2.1 persons x 365 days x 17,024 dwellings = 1096ML used if households retain old 'A' showerheads</p> <p>7.5L x 7min x 2.1 persons x 365 days x 17,024 dwellings = 685ML used if all households had 'AAA' showerheads.</p> <p>1096ML – 685ML = 411 megalitres saved</p>	<p>411ML is equal to 7% reduction in water use.</p>
<p><b>Toilets</b></p> <p>Toilets use an estimated 25% of average household water consumption.</p>	<p>Totals 1108 megalitres of water per year for toilet flushing for CoM residents.</p> <p>It is estimated that 50% of households do not have dual flush toilets (Water Res. Stgy). For the City of Melbourne, this totals 12,160 households.</p> <p>11 litres – single flush.</p> <p>6/3 litres - dual flushes (averaged at 5 litres per flush 6 flushes per day)</p> <p>Toilet is 54,000 litres per household</p> <p>---</p> <p>11L x 6 flushes x 2.1 persons x 365 days x 12,160 dwellings = 615ML used by the 50% of h/h not on a single flush system.</p> <p>5L x 6 flushes x 2.1 persons x 365 days x 12,160 dwellings = 280ML used if above mentioned 50% of households switched to dual flush.</p> <p>615 – 280 = 335ML saved by installing dual flush toilets</p>	<p>335ML is equivalent to 6% reduction in total water used.</p>
<p><b>Washing Machines</b></p> <p>It is estimated that washing machines use 19% of residential water consumption.</p>	<p>Top loader washing machines (AA rated) make up 85% of the current Australian market. (Water Resources Strategy).</p> <p>A: 26-34 litres/kg dry clothes, AA: 18-26 litres/kg dry clothes AAA: 12-18 litres/kg dry clothes, AAAA: 8-12 litres/kg dry clothes</p> <p>Top loader washing machine uses 130 litres per load. AAAA washing machines use 40 litres per load.</p> <p>AAAA washing machines are recommended for regulation by 2010 (Water Res. Stgy).</p> <p>---</p> <p>130L/load x 4 loads x 52 weeks x 20,672 dwellings = 560ML used if 85% of households washing machines were AA</p> <p>40L/load x 4 loads x 52 weeks x 10,336 dwellings = 86ML used if 43% of household's washing machines were converted to AAAA</p> <p>560ml – 86ml = 474megalitres 474ML saved / 5541 total residential water use x 100 = 9% saved by installing AAAA washing machines</p>	<p>474ML is equivalent to 9% reduction in water used.</p>
<p><b>Garden Practices</b></p> <p>Outdoor water use is expected to be around 20% for the City of Melbourne (GHD).</p>	<p>Based on the residential consumption figures analysed in this study, and assuming higher density living on average, outdoor water use is expected to be around 20% for the City of Melbourne (GHD).</p> <p>At 20%, external residential water use makes up 1108ML</p> <p>Water savings possible by drip watering, tap timers, mulching and water efficient plants.</p> <p>It would be conservative to estimate that a 5% reduction in external water use can be achieved by 2020. This will result in savings of 277ML of water.</p>	<p>5% reduction is 277ML water saving.</p>
<p><b>Kitchens</b></p> <p>Estimated to be 12% of household water use.</p>	<p>Savings achieved through water efficient tap fittings and dishwashers, and future reductions in water pressure.</p> <p>These have not been calculated, however will be additional water saving sources.</p>	<p>N/A</p>
<p><b>Technical Improvements</b></p>	<p>Water savings can be achieved through the application of greywater systems, flow diverters, and rainwater tanks. It is considered that a 15% saving can be made through technical improvements, however for the purpose of this analysis, a conservative 10% saving is assumed (to be revised in coming years as further research comes to hand).</p> <p>This will result in a saving of 554 megalitres.</p>	<p>554ML is equivalent to 10% reduction in water used.</p>
<p><b>Education &amp; Communication</b></p>	<p>All of the above means of saving water are dependent on education (with some regulation). Opportunities such as 'Sustainability Street', can be pursued. The water savings from education are expected to result in at least a 5% water saving (Vox Bandicoot). The City of Melbourne will provide leadership by committing to showcase projects that encourage and raise awareness of water efficiency.</p> <p>This will result in a saving of 277ML</p>	<p>277ML is equivalent to 5% water savings.</p>
<p><b>TOTAL</b></p>		<p>37% stretched to 40% Saved 2216mL</p>

### Financial Feasibility of Water Savings

<b>House Scenario 1 – Demand Management</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	By 2020, cost saving using water efficient appliances is \$2460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
Garden Practices	Watering tube - \$21..95      Gardening water timer -\$33.00 Garden trigger nozzle - \$25.00      Mulch (6 x 50L Bag) - \$41.70 Lawn seed - \$21.50		
<b>Total</b>	<b>\$743.65</b>	<b>\$123</b>	<b>\$2,460</b>

<b>House Scenario 2 – Demand management + Rainwater Harvesting</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	\$2,460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
Garden Practices	Watering tube - \$21..95      Gardening water timer -\$33.00 Garden trigger nozzle - \$25.00      Mulch (6 x 50L Bag) - \$41.70 Lawn seed - \$21.50		
Rainwater Tank + Installation	\$1,128.00 (4,500L)	\$33 saving using rainwater	\$660
<b>Total</b>	<b>\$1,871.65</b>	<b>\$156</b>	<b>\$3,120</b>

<b>House Scenario 3 – Demand Management, Rainwater Harvesting + Grey Water System</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	\$2,460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
Garden Practices	Watering tube - \$21..95      Gardening water timer -\$33.00 Garden trigger nozzle - \$25.00      Mulch (6 x 50L Bag) - \$41.70 Lawn seed - \$21.50		
Rainwater Tank + Installation	\$1,128.00 (4,500L)	\$33 saving using rainwater	\$660
Greywater System	\$750	Using grey water saves \$33	\$660
<b>Total</b>	<b>\$2,621.65</b>	<b>\$189</b>	<b>\$3,780</b>

<b>Apartment Scenario 1 – Demand Management Refit</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	\$2,460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
<b>Total</b>	<b>\$729.75</b>		

<b>Apartment Scenario 2 – Built in</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
AAA Shower Heads	----	\$123 using water efficient appliance and education	\$2,460
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	----		
Garden Practices	----		
<b>Total</b>	<b>\$400</b>		

# Sustainable Water Management Strategy – Action Plan 2003/2004

## Strategy 1: LEADERSHIP

The City of Melbourne council makes up six percent of the total water consumption in the municipality. This provides an important opportunity for Council to modify its own water use to both conserve water and to be a leader in sustainable water practices. Feedback from community and stakeholders has indicated that it is of paramount importance that Council apply best practice sustainable water management. This will not only indicate Council's commitment to water management, but it will also provide an important educational program for the community.

Based on 1999 population levels, Council aims to achieve a total water reduction of 28% by 2020. This includes a 18% reduction in water use for its parks and gardens. Other targets for Council's water use include: 35% reduction for buildings, 40% reduction for markets, 30% reduction for depots, 30% reduction for toilets, 30% reduction for recreation and 30% for miscellaneous by 2020.

<b>Key Action 1</b>	<p><b>Create a showcase out of Council's administration building by 2005</b></p> <p><b>Responsibility:</b> City Projects, Arts and Culture, City Assets and Services</p> <p><b>Background:</b> The administration building is an opportunity to demonstrate best practice in both the building design process and water conservation.</p> <p><b>Opportunities/Challenges:</b> Council has specified best practice requirements in relation to water design and practices in the proposed new building.</p> <p>City Projects is currently project managing the development, in close liaison with Facilities Management. Development and maintenance costs of the building will be borne by these sections of Council and are not specified in the budget below.</p> <p>Tasks to be undertaken specific to achieving and promoting sustainable water management are:</p> <ul style="list-style-type: none"> <li>• applying appropriate performance targets and design principles in contracts and agreements</li> <li>• investigating significant obstacles to sustainable water design in buildings by applying where necessary, studies, technologies and/or partnerships. These projects will provide benefit to the wider development industry.</li> <li>• developing case study reports, and communication strategies to describe best practice sustainable building design processes.</li> </ul> <p><b>Possible Partners:</b> SEAV, CSIRO, GBCA, CWW, PCA, AGO</p> <p><b>Targets:</b> This project will address Strategy targets relating to:</p> <ul style="list-style-type: none"> <li>• reducing building water consumption by 35%. In 2001/2002 Council House used 2,909 kilolitres of water totalling 12.5% of water consumed by all Council buildings. It is intended that the new building will capture all of its water for reuse, and will actually capture more water than it can use. This excess water could be used for garden watering or other such options, further reducing water consumption.</li> <li>• improving stormwater quality. The proposed Council House will capture nearly all rainwater landing on site and will reduce stormwater volumes and velocities as a result.</li> </ul>					<p><b>Status:</b></p> <p>In principle design and environmental concepts are approved.</p> <p>Design details are still being developed.</p>	
	<b>Budget Notes:</b>						
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$	Budget for ESD branch to liaise with design team (1 hr/week until 2005) [ESD Branch]
		625	1625	1625			Budget for specific follow-up research relating to water provisions in the new building [CP Branch and seek sponsorship from water retailer]
		5,000	10,000	10,000	10,000		Budget for educational sessions and promotion of best practice building features [CP Branch and seek sponsorship from Green Building Council Australia, BCC, etc]
	160	875	875	875		Budget for case studies (1 hr/month until 2005 plus publication costs) [ESD Branch]	

<b>Key Action 2</b>	<p><b>Open Space and Recreational Facilities Water Management Strategy</b></p> <p><b>Responsibility:</b> City Assets and Services</p> <p><b>Background:</b> Council is committed to improving the environmental management of its parks, open spaces and recreational facilities. Water is currently used in the parks and gardens for irrigation, water features, cleaning and in public toilets. High quality water is currently being used for all purposes, and the opportunity to use recycled or lower quality water for some activities is not being taken. Some water features recycle water, but most of the older ones do not.</p> <p><b>Opportunities/Challenges:</b> Council has adopted Growing Green Environmental Sustainability Plan, and has also prepared a Drought Response Plan in response to water restrictions. Growing Green provides strategic and action based opportunities for long-term water saving practices, Water Management Plans, water audits and identification of opportunities for new technology.</p> <p>Water re-use technology is currently being investigated and developed and provides rapidly improving opportunities to re-use water for irrigation purposes.</p> <p>It is noted that the contracts for open space maintenance are due for renewal by the beginning of 2004. Opportunity is provided for the contracts to be renewed in a manner that ensures water conservation issues are considered</p> <p><b>Possible Partners:</b> Melbourne Water, CWW, SEW, manufacturers.</p> <p><b>Targets:</b> The water saving target for Council's parks and gardens has been set at 26%, however the ability to achieve this target may be influenced by climatic conditions, and the amount of funds available to undertake improvement works.</p>						<p><b>Status:</b></p> <p>Short term water reductions have been implemented through the current Drought Response Plan.</p> <p>Parks maintenance contracts are currently in the process of being reviewed</p>
		<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$	<b>Budget Notes:</b>
		5,000	25,000				Budget required for development and printing of Open Space and Recreational facilities Water Management Strategy [Parks and Rec Branch]
		1,950	750				Budget required to assist with Open Space and Recreational facilities Water Management Strategy (3 hrs/week) [ESD Branch]
	<b>Timeline &amp; Budget</b>			35,000	70,000	35,000	Implementation of Open Space and Recreational facilities Water Management Strategy including monitoring – 1 full time employee [Parks & Rec Branch]
		5,000	10,000				Detailed water audits of large parks [seek sponsorship from City West Water and South East Water]
			1,000,000	1,000,000	1,000,000	1,000,000	Continued implementation of water efficient irrigation technology [Parks & Rec Branch]
		5,000	20,000	20,000	60,000	60,000	Continued research and application of water re-use technology such as sewer mining [Parks & Rec Branch and seek sponsorship from Melbourne Water and water retailers]
			10,000	10,000	10,000		Program for water recycling in fountains [Cultural Development and Parks & Rec Branch and possible sponsorship from water industry]
			15,000	15,000	45,000	45,000	Budget required to fix lake and pond leakages [Parks & Rec Branch].
		15,000	15,000	15,000	15,000	Capital investment in water efficient features at swimming pools, depots and pavillions. (Seek Payment by Savings Option – Water Retailers)	

<b>Key Action 3</b>	<p><b>Queen Victoria Markets</b></p> <p><b>Responsibility:</b> Financial and Business Services</p> <p><b>Background:</b></p> <p>Analysis has shown that Queen Victoria Market and Footscray Wholesale Fish Markets are significant users of water in the municipality (8.7%). It is a priority to reduce this water consumption, primarily through an intensive program of working with the Queen Victoria Market.</p> <p>A Draft Masterplan has been prepared for the Queen Victoria Markets and a draft Environmental Management Plan is currently being prepared. Water use is mentioned briefly in this over-arching report. It is considered that most water used at QVM is for food preparation (fruit and vegetable traders and fishmongers being the two heavy users groups). Cleaning and toilet flushing are the other two heavy uses.</p> <p><b>Opportunities/Challenges:</b></p> <p>QVM operational staff are welcoming guidance in improving their water management practices.</p> <p>The project will address behavioural changes of vendors. This will involve training, and increased information through the development of an Environmental Management Plan. Water management will be integrated with other environmental factors including energy and waste.</p> <p>The project will address stormwater re-use opportunities including plans to collect rainwater from the market roof and store on site for market requirements. Alternatively it may be possible to source water from Elizabeth Street stormwater pipes for re-use on site. This is an extensive infrastructure commitment that would need to be assessed for its triple bottom line viability. Initial scoping and funding activities will be undertaken in the immediate term.</p> <p>The Queen Victoria Market attracts large numbers of tourists and provides an optimum educational opportunity.</p> <p><b>Possible Partners:</b> Queen Vic Markets, CWW, Melbourne Water, Heritage Office, PCA, Sustainable Energy Authority, architects/energy/water consultants, development industry. Community groups.</p> <p><b>Targets:</b> The Markets (QVM and Melbourne Wholesale Fish Market) use approximately 8.7% of the Council's corporate water use. It is targeted to reduce this by 45%, which will total 66.2 megalitres savings per year. As QV M uses 147 megalitres of water each year, a comprehensive greywater reuse system could achieve this total.</p> <p>This project will deliver outcomes to address stormwater targets relating to gross litter management and nutrient management.</p>					<p><b>Status:</b></p> <p>Masterplan and EMP are in preparation.</p> <p>Partnership agreement between ESD Branch and QVM to develop extensive water management program at QVM.</p>
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$
	2300	9900	9900			Project scoping, funding applications, consultation (6 hrs/wk) [ESD Branch]
		8,900	8,900	8,900		Project management – infrastructure (8 hrs/wk) [Eng. Branch]
		3,000				Consultation [QVM]
		12,000	4,000	4,000		Training and materials for vendors [QVM]
		10,000	10,000	10,000		Flow rates, technology, auditing, monitoring for MWFM [MWFM]
		40,000	50,000	30,000	30,000	Greywater infrastructure [QVM with possible grants and sponsorship]
			10,000	12,000	10,000	Education for general public on greywater system [ESD Branch]

<b>Key Action 4</b>	<p><b>Royal Park Wetlands</b></p> <p><b>Responsibility:</b> Vince Haining</p> <p><b>Background:</b> The 1986 and 1997 Royal Park Masterplans recommend the establishment of wetlands in the western sector of Royal Park to provide a water re-use system that provides irrigation water for park uses, the golf course and zoo.</p> <p><b>Opportunities/Challenges:</b></p> <p>This is an exciting large-scale habitat creation and water re-use project with a total cost of at least \$5,000,000. Funding needs to be secured to enable the project to proceed. The project will include a communication and education component that will help inform the public about the water re-use practices.</p> <p><b>Possible Partners:</b> State Government, MW, State Government</p> <p><b>Targets:</b> Royal Park wetlands on current plans should be able to provide about 120 megalitres/year of water for re-use for park maintenance or similar type uses. It will also have significant positive effects on the quality of water leaving the Park St drain resulting in benefits to both Melbourne Water and the Moonee Ponds Creek. This water is planned to become available to City of Melbourne from 2006. This is 9.2% (rounded down to 8%) of 99/00 figures of the total water used in parks and gardens, and will contribute to the 26% reduction target.</p>						<p><b>Status:</b></p> <p>The project has commenced. Consultation and design work to be undertaken.</p> <p>The State Government has contributed \$ 5 million for the project.</p>
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$	<b>Budget Notes:</b>
		40,000	1,500,000	1,500,000	1,500,000	500,000	State Government contribution up to \$5 million

<b>Key Action 5</b>	<p><b>Property Council of Australia to facilitate water management in the development industry</b></p> <p><b>Responsibility:</b> Sustainable Development and Strategy</p> <p><b>Background:</b> The Property Council has a Memorandum of Understanding with the City of Melbourne to work together on promoting environmental building design and construction issues to the development industry. PCA has been involved in the greenhouse campaign and will be able to promote sustainable water practices.</p> <p><b>Opportunities/Challenges:</b> PCA has expressed difficulties in achieving developer support for environmental programs due to difficulty in auditing and measuring resource use etc. The current establishment of the Green Building Council of Australia and promotion of a nation wide building rating tool are current opportunities that will help to encourage developers to change their environmental practices.</p> <p><b>Possible Partners:</b> PCA, FMAA, and other regulating agencies.</p> <p><b>Targets:</b> Commercial buildings and offices use 23megaliters of water per annum, which is 1.3% of City of Melbourne's overall consumption. The Property Council can encourage developers to apply water efficient design. The take up rate is not expected to be high, however it will be important to continually educate the industry in anticipation of possible regulation and building rating requirements.</p>						<p><b>Status:</b></p> <p>Existing Memorandum of Understanding.</p>
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$	<b>Budget Notes:</b>
		200	800				Liaison with PCA on promoting commercial building design (0.5 hrs/wk) [ESD Branch]
	<b>Budget</b>	5,000	15,000	5,000			For seminar/s with development industry [PCA to fund with possible sponsorship from GBCA,, water retailers etc]
		5,000				Presentation Material (information pack)	

## Strategy 2: STRATEGIC AND REGULATORY SYSTEMS

The rapid advance in knowledge and technology for sustainable water practices provides opportunities for innovative building, urban and landscape design. Often existing regulations and procedures can inadvertently obstruct such new innovations. It is necessary for the regulatory systems to enable improved sustainable design to be easily implemented, and to provide incentives where possible.

<b>Key Action 6</b>	<p><b>Strategic and Regulatory Systems</b>  <b>Responsibility:</b> Sustainable Development and Strategy  <b>Background:</b>            A range of small ad-hoc provisions for sustainable water management have been developed over the years in Council policies and procedures in areas such as planning, building, local laws, engineering, and general Council procedures. This ad-hoc policy development will continue in the short term to address pressing obstacles and provide incentives for sustainable water management. A holistic approach is a long term goal.  <b>Opportunities/Challenges:</b>            Council is currently exhibiting a draft <i>Ecologically Sustainable Building</i> policy that encourages water efficiency. This policy provides a basis for further sustainable water provisions to be added over time.            The EPA has provided a \$20,000 grant that has been matched by Council for the development of <i>Stormwater Management Guidelines for Construction</i>. Council has prepared its <i>Stormwater Management Plan</i>, which it will revise in 2003, by providing more analytical data and linking with the <i>Drainage Strategy</i>. The <i>Soft Paving Material Policy</i> has been drafted that reviews the appropriateness of paving materials such as grass, gravel, mulches, native grasses etc. The adoption of the <i>Sustainable Water Management Strategy</i> will provide the strategic basis for a range of relevant policies for example, rainwater tanks, soft paving materials and Water Sensitive Urban Design.  <b>Possible Partnerships:</b> EPA, ABM, PCA, FMAA  <b>Targets:</b> Guidelines for environmental building design and construction will help educate the development and planning industry about water efficient design. These guidelines will achieve reductions in water use in new buildings and associated landscaping where applied. These reductions will not be substantial until such guidelines and rating tools are regulated. Preparing guidelines now is the necessary preliminary work for possible future regulation. In particular, these provisions will affect targets for the residential (40%), commercial (40%) and industrial (40%) land uses.            This project will deliver outcomes to address stormwater targets relating to erosion and sediment control, gross litter management and nutrient management.</p>						<p><b>Status:</b>            The Stormwater Guidelines for Construction are currently underway,            The Soft Paving Materials Strategy is underway.</p>
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$	<b>Budget Notes:</b>
		30,000					Revise <i>Sustainable Water Management Strategy</i> [ESD Branch]
		2,000	6,600	6,600			Staff time to instigate and develop project plans for regulatory guidelines (4 hrs/wk) [ESD Branch]
		40,000					<i>Stormwater Management Guidelines for Construction</i> (EPA, ESD Branch, Eng Branch, Development Planning Branch)
			20,000				Update <i>Ecologically Sustainable Buildings Policy</i> to include water provisions [Strategic Planning]
		15,000					Develop <i>Soft Paving Materials Policy</i> [City Projects, Engineering, Building Branch]
			20,000				<i>Rainwater Tank Policy</i> [Development Planning]
			20,000	30,000	50,000	30,000	Additional policies relating to stormwater, water consumption, urban design, greywater etc [Development Planning Branch and ESD Branch]

### Strategy 3: COMMUNICATION

Improved sustainable water practices are dependent on behavioural change. This behavioural change will need to be driven by visible gains and efficiencies, and by education. It is important that the projects forming part of the sustainable water program be based in an educational framework. Technology and innovation need to be communicated in the context of limited water resources.

<b>Key Action 7</b>	<p><b>Education and Communication</b></p> <p><b>Responsibility:</b> Marketing and Corporate Affairs, Sustainable Development and Strategy</p> <p><b>Background:</b> The City of Melbourne has a well established communication program involving community, business, and staff that can be used to promote water savings and water quality.</p> <p><b>Opportunities/Challenges:</b> The City of Melbourne needs to promote its policies relating to water, and to have an ongoing program of promoting projects, innovations, technology and relevant statistics to different groups.</p> <p>The Corporate marketing program will cover special events that can incorporate messages about sustainable water management. This includes events such as Sustainability Month and Melbourne Moomba Waterfest.</p> <p>Liaison with the community is the basis for good sustainability policy. Consultation will be included in all policy development, however additional connections with the community will be sought to achieve on-going engagement about sustainable water management. This may include participatory events, interactive water displays, and sessions with local precincts.</p> <p>A Communication Plan will be developed to link with the development industry on ways to improve design and practices for sustainable water management. This will be targeted and will be done in partnerships with Royal Australian Institute of Architects, RMIT and other partners.</p> <p>Training for staff will need to be provided to explain each new policy and how it can be applied.</p> <p>The water program is an ICLEI Campaign and as such Council will need to host an ICLEI Water Conference to develop the program and bring key players together.</p> <p><b>Possible Partnerships:</b> MW, SEW, CWW, ICLEI</p> <p><b>Targets:</b> Education and communication are important in achieving long term behavioural change. The effects of communication on water consumption rates and stormwater quality cannot be seen directly, however they still have an important part to play regardless. It can be noted that litter campaigns of previous decades have created significant behavioural change, however these have been extensive and expensive campaigns.</p>						<p><i>Status:</i></p> <p>The release of the draft <i>Sustainable Water Management Strategy</i> and associated publicity has been the beginning of the campaign.</p>
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	<b>2006/07</b> \$	<b>Budget Notes:</b>
		5,000	5,000	10,000	10,000	15,000	Corporate marketing campaign for Sustainability Month etc [Marketing Branch]
		5000	6,000	6,000	6,000	6,000	Community engagement on water issues [ESD Branch]
			20,000	10,000	20,000	30,000	Participatory community events, interactive water display [sponsorship from water industry]
			10,000	15,000	15,000	5,000	Industry education sessions [ESD Branch with sponsorship from RAIA, RMIT, AWA]
			6,000	12,000	15,000	15,000	Training for CoM planning staff [Development Planning Branch]
			6,000	6,000	10,000	10,000	Training for CoM building staff [Building Branch]
			6,000	6,000	10,000	10,000	Training for CoM engineering staff [Engineering Branch]
			6,000	6,000	10,000	10,000	Training for City Projects staff [City Projects]
				20,000			ICLEI Water Campaign conference [ESD Branch]
				10,000			General publication on water audits and programs [Corporate Communications]
	20,000	20,000	20,000	20,000	Industry Support Program [Water Retailers and ESD Branch]		
8,000	8,000	10,000	10,000	10,000	Sustainable Gardeners, Green Plumbers, Water Watch programs (ESD and ESG Branches)		

## STRATEGY 4: IMPLEMENTATION AND MONITORING

It is important to develop base audits and key indicators to have a full understanding of resource use. Such audits will enable the success of different strategies and actions to be assessed and programs to be modified accordingly. Developing data management protocols is the first important step in the monitoring process.

<b>Key Action 8</b>	<b>Implementation and Monitoring</b>					<i>Status:</i> Data has been collected as the basis for the <i>Sustainable Water Management Strategy</i> using 99/00 as the base year.
	<b>Responsibility:</b> Sustainable Development and Strategy					
	<b>Background:</b> The Draft <i>Sustainable Water Management Strategy</i> has identified that the availability and accuracy of technical water consumption data is critical for the assessment, monitoring and refinement of this Strategy.					
	<b>Opportunities/Challenges:</b> Generate an agreed data management protocol for water consumption and monitoring for the City of Melbourne. Having regards to customer privacy rights, aggregated data is required in a consistent manner that includes as a minimum:					
	<ul style="list-style-type: none"> <li>• Total water consumption by property type particularly for 'non-residential uses' such as industry, office, retail and entertainment/hospitality;</li> <li>• Clarification of residential and non-residential data sources (eg: investment property)</li> <li>• Confirmation and improvement of City of Melbourne internal data collection and knowledge management processes of utility costs, responsibilities and utility outgoings.</li> <li>• Input of data into customised ICLEI database.</li> <li>• Consideration of long term GIS implementation of data</li> <li>• Assessment of indicators relating to stormwater management</li> </ul>					
	<b>Possible Partnerships:</b> CWW, SEW, MW, ICLEI					
	<b>Targets:</b> Data management will allow water consumption to be monitored and responded to accordingly. This will ensure actions are measured and revised to best address the target requirements.					
	<b>Timeline &amp; Budget</b>	<b>2002/03</b> \$	<b>2003/04</b> \$	<b>2004/05</b> \$	<b>2005/06</b> \$	
	1000					Project management of data protocol [ESD Branch]
	8,000					Staff to undertake project [ESD Branch]
	-	-	-	-	-	Updating of CWW and SEW data systems [CWW and SEW to fund]
		3000	3000	3000	3000	Annual reporting [ESD Branch]
		6000	6000	12,000	12,000	Annual publishing of audits and associated initiatives in Action Plan update [ESD Branch]
		10,000	10,000	10,000	10,000	Development of GIS application of data [ESD Branch]
		50,000	50,000	50,000	50,000	Incentives – research [ESD Branch]

# Water Strategy Action Plan 2003/2004

## Leadership

The City of Melbourne corporation uses 6% of the total water consumed in the municipality. The City of Melbourne will lead by example in reducing its own demands on potable water. This will encourage local businesses, industries and residents to make water saving efforts. The experiences and knowledge gained from Council projects will be shared with the community as a means of raising awareness, knowledge and interest.

Initial actions are:  
**Queen Victoria Markets.**  
 Water management, re-use, recycling and substitution.  
 Education and marketing angle.  
**'Council House' Redevelopment.**  
 Best practice water management and procurement on a commercial budget. Communicate features of the building to wide audience.

**Royal Park Wetlands**  
 Create wetland to treat stormwater from Melbourne Zoo and recycle it for a range of uses.

## Strategy and Regulation

The City of Melbourne is able to implement policies and guidelines that influence internal and external practices.

This includes policy, planning controls, regulations, local laws, building and street activity permits to apply sustainable water management provisions.

Identify impediments and possible incentives.

Initial actions are:  
 Rainwater Tank Policy  
 Guidelines for Water Sensitive Urban Design  
 Grey Water Use Policy  
 Soft Paving Materials Policy

Open Space and Recreational Facilities Water Management Guidelines

Principles of design, new irrigation technology, sewer mining, new planting or management techniques, water audits, EMP's.

## Education and Communication

Education is an important on-going component of any program that seeks to achieve a cultural change. This applies to water conservation.

The City of Melbourne will promote its own water saving initiatives as an educational opportunity.

Training for staff will be on-going to keep up with the continuous improvement associated with 'sustainability'.

Initial actions are:  
 Property Council program regarding water conservation in the development industry.  
 Green Gardeners Industry Forums  
 Green Plumbers Industry Forum  
 Council House sessions  
 Staff training.

Communication is vital for the Sustainable Water Program.

Will develop a Communication Strategy to reach range of target audiences – residents, businesses and industry.

Initial actions are:  
 Sustainability Street – a community development program with sustainability objectives  
 Incorporate water message into existing special events eg: Moomba.  
 Cross promotion where relevant with water retailers, neighbouring councils etc  
 Advocate for water conservation that is beyond the control of local government.

On-going promotion of technology, design ideas, community initiatives.

## Implementation and Monitoring

**Data Management**  
 Generate an agreed and efficient data management protocol for water consumption and monitoring for the City of Melbourne.

**Annual Review**  
 An annual review of water consumption will be undertaken, recorded and reported.

**Action Plans**  
 Short term Action Plans will be developed to achieve progressive gains in water savings. These will be reviewed annually subject to project evaluation, and annual data analysis.

**Incentives**  
 Incentives will be provided to aid implementation. The incentives will be linked to regulatory development, communication and on-going monitoring to ensure effectiveness. Partnerships will be a vital element of incentives.

**Geographic Information Systems**  
 GIS is a tool that will be applied to the on-going monitoring and management of the water management program.

**City Of Melbourne**

# SUSTAINABLE WATER MANAGEMENT STRATEGY – PART ONE

May 2003

---

Attachment 4  
Agenda Item 5.7  
Environment, Community and Cultural Development Committee  
16 June 2003

Prepared by Melbourne Water with the assistance of GHD in collaboration with  
Melbourne Water and the International Council for Local Environment Initiatives



(ICLEI)



# Contents

<b>1.</b>	<b>Background</b>	<b>5</b>
1.1	A Sustainable Water Management Strategy for the City of Melbourne	5
1.2	Purpose of the Strategy	5
1.3	Structure of the Strategy	5
1.4	Study Area	6
1.5	Strategy Objective	8
1.6	Ecological Context	8
1.7	Policy Context	9
1.8	Significance	11
<b>2.</b>	<b>Strategic Direction</b>	<b>12</b>
2.1	Introduction	12
2.2	Strategy Methodology	12
2.3	Values of the Community	12
2.4	Strategy Principles	14
2.5	Key Strategy Opportunities and Measures	15
2.6	Project Partners	15
2.7	Significance	15
<b>3.</b>	<b>Water Consumption in the City of Melbourne</b>	<b>16</b>
3.1	Introduction	16
3.2	City of Melbourne's Corporate Water Consumption	16
3.3	Community Water Consumption	21
3.4	Significance	24
<b>4.</b>	<b>Consumption Predictions and Targets 2002-2020</b>	<b>25</b>
4.1	Introduction	25
4.2	Methodology for Setting Targets	25
4.3	Rainfall Trends	25
4.4	Water Consumption Trends	26
4.5	Water Saving Targets	27
4.6	Significance	29

<b>5.</b>	<b>Ways to Save Potable Water</b>	<b>30</b>
5.1	Introduction	30
5.2	Demand Reduction Measures for Potable Water	30
5.3	Water Harvesting as an Alternative Water Source	33
5.4	Water Re-use as an Alternative Water Source	35
5.5	Incentives	36
5.6	Financial Feasibility of Applying Water Saving Changes	38
5.7	Significance	39
<b>6.</b>	<b>Strategy Implementation</b>	<b>40</b>
6.1	Introduction	40
6.2	Key Strategic Measures	40
6.3	Annual Action Plan	42
6.4	Coordination of the Strategy	43
6.5	Strategy Fund	43
<b>7.</b>	<b>Water Saving Action Plan 2003/2004</b>	<b>44</b>
7.1	First Action Plan - 2003/2004	44
7.2	Reducing Water Consumption	44
7.3	Monitoring and Review	45
7.4	Significance	47
<b>8.</b>	<b>Water Strategy Action Plan 2003/2004</b>	<b>48</b>
<b>9.</b>	<b>Glossary</b>	<b>49</b>
<b>10.</b>	<b>Bibliography</b>	<b>50</b>
<b>Appendices</b>		
	Appendix A: Strategy Methodology	52
	Appendix B: Project Partners	56
	Appendix C: Breakdown of City of Melbourne water consumption	58
	Appendix D: 8 Step Methodology for Target Setting	59
	Appendix E: End Use Modelling for Setting Residential Water Saving Target	60
	Appendix F: End Use Data for Setting Target	61
	Appendix G: Calculating Absolute Water Savings	63
	Appendix H: Financial Feasibility	65

# 1. BACKGROUND

## 1.1 A SUSTAINABLE WATER MANAGEMENT STRATEGY FOR THE CITY OF MELBOURNE

Melbourne's water supply has been safe, reliable and inexpensive to date; however, the volume of supply has been undermined during drought events. The last severe drought, in 1982-1983, saw a considerable decline in Melbourne's water supply that threatened the survival of the municipality's street tree avenues and strict water restrictions for the entire community. Since 1998, Melbourne has again been in drought and at the time of writing, the main reservoir supplying the metropolitan area is at just 40.3% capacity<sup>1</sup>. Results of a recent National Land and Water Resource Audit<sup>2</sup> concluded that Victoria's water resources are heavily committed. This means that throughout Victoria, water will become an increasingly precious commodity that will require more careful and efficient use by all consumers.

With this water scenario facing Victoria, the City of Melbourne has developed the *Sustainable Water Management Strategy – Part 1* to strategically minimise demand for water from Melbourne's supply catchments. The City of Melbourne expects substantial growth in residential population, and while catering for this, it must work in partnership with major water users and related authorities to ensure long-term sustainable management practices are implemented. The City of Melbourne aims to lead the community by example in their own work and raise community awareness to ultimately inspire change.

## 1.2 PURPOSE OF THIS STRATEGY

This *Sustainable Water Management Strategy – Part 1* investigates:

- a. potable water consumption between 1999 and 2002 by the City of Melbourne and its local community;
- b. opportunities for harvesting rainwater and re-using greywater to meet local water supply needs; and
- c. water saving targets for Council and the community to achieve through water demand management, water harvesting, and water re-use opportunities.

An associated study, *Sustainable Water Management Strategy – Part 2* will subsequently be released to investigate:

- d. stormwater quality in relation to the activities of the City of Melbourne and the local community. Stormwater quality will be addressed in a separate report to enable it to best integrate with the City of Melbourne's revised *Stormwater Management Plan*.

## 1.3 STRUCTURE OF THE STRATEGY

The Strategy provides a water demand management framework that moves from providing general information to providing a detailed action plan by the conclusion of the document.

---

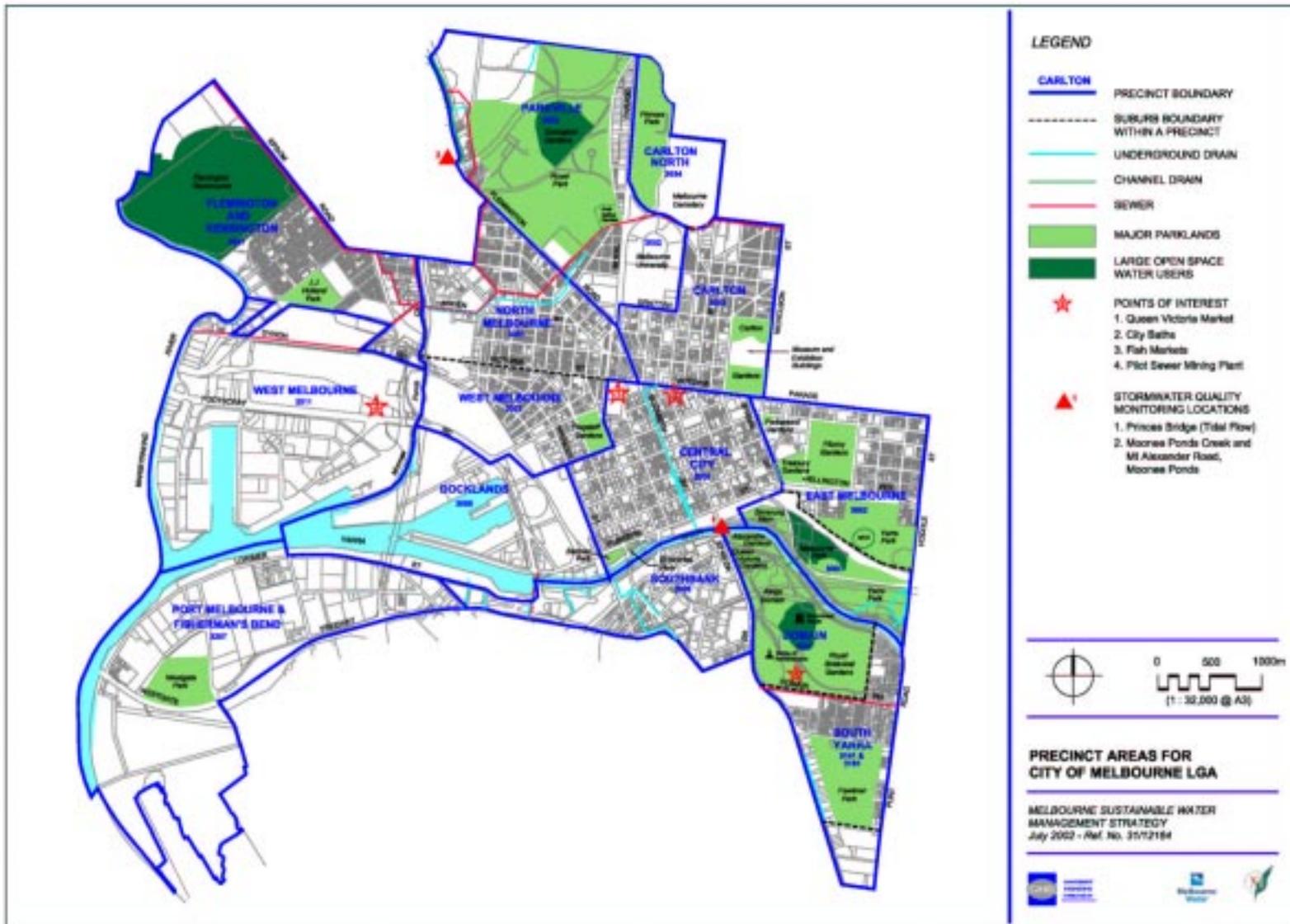
<sup>1</sup> Melbourne Water website, May 2003

<sup>2</sup> Commonwealth of Australia (2001) *National Land and Water Resource Audit. A Program of the Natural Heritage Trust*, Commonwealth of Australia, Canberra.

Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7
Background	Strategic Direction	Water Consumption Data	Setting Water Saving Targets	Options for Reducing Water Use	Strategic Framework for Action Plans	First Action Plan

## 1.4 STUDY AREA

The strategy is geographically confined to the City of Melbourne municipality (refer to Map 1 on the next page). For the purposes of completeness and as a means of understanding the full development implications for the central city, Docklands has been included. This does not reflect the political or legislative responsibility of the City of Melbourne.



## 1.5 STRATEGY OBJECTIVE

For the City of Melbourne to reduce the consumption of potable water across its residential, commercial, industrial and corporate sectors to a level that provides long term:

- environmental benefits for the municipality and beyond, and
- financial and social benefits for the water users in the municipality.

## 1.6 ECOLOGICAL CONTEXT

The City of Melbourne is committed to using drinking water wisely and conservatively. Ecologically, the best way City of Melbourne can manage its water is to plan for no additional demands on water supply.

In a worldwide context, freshwater is scarce however it has traditionally been one of the most poorly managed resources on earth facing significant amounts of waste and pollution.

For the City of Melbourne residents, the benefits of conserving, and reducing, our overall water consumption are:

- to avoid new infrastructure such as storage facilities by making the most efficient use of the potable water that is available for metropolitan Melbourne. New storage facilities are known to cause social, economic and environmental damage. By using water wisely, we can provide for metropolitan Melbourne's growing population using existing water infrastructure. The Victorian Government advises that as metropolitan Melbourne's population continues to grow, extra supply is predicted before 2050 which will be met by the reconnection of the existing Tarago Reservoir (*21<sup>st</sup> Century Melbourne: A WaterSmart City. Strategy Directions Report 2002*). The City of Melbourne does not wish to contribute to the need for additional water supplies.
- to prepare for the effects of climate change. Whilst the effect of climate change is uncertain, it is likely to result in reduced rainfall and hence water supply – a factor that needs to be considered in the resource management for metropolitan Melbourne.<sup>3</sup>
- to counteract water loss resulting from timber harvesting activities in metropolitan Melbourne's catchment areas. Logging affects the amount of water availability, as young trees growing in logged areas consume greater water than older trees.
- to enhance the flow regime for rivers and creeks thereby maintaining natural habitats (including in lakes fed by rivers), maintaining native fish and fauna, and providing linkages with floodplains to maintain ecological processes. Through good management, the amount of water that needs to be diverted from rivers can be reduced thereby retaining environmental flows to support healthy waterways.

It is estimated that climate change could reduce rainfall in Victoria by up to 25% by 2030.<sup>4</sup> It is also estimated that forest management in catchment areas can reduce the water yield (one report, based on studies in the Otways, suggests that the ceasing of logging in catchment areas will increase water yield by

---

<sup>3</sup> Victorian Greenhouse Strategy, Department of Natural Resource Management, 2002

<sup>4</sup> Victorian Greenhouse Strategy, Department of Natural Resource Management, 2002

between 7% and 28%<sup>5</sup>). It is for reasons of climate change and timber harvesting that the City of Melbourne's water demand management needs to account for a reduction in rainfall supply when seeking to achieve some improvement in environmental flows.

## **1.7 POLICY CONTEXT**

Water management is becoming an increasingly important part of resource management in urban and rural areas. This is reflected in a range of recent policies related to water conservation and water quality. At both an international and national level, there are a range of organisations and policies that promote sustainable resource use for urban areas. The following State and Local Government policies have formed the strategic framework for the *Sustainable Water Management Strategy*.

### **1.7.1 Victorian Government - 21<sup>st</sup> Century Melbourne: A WaterSmart City – The Final Report**

The Victorian State Government released *21<sup>st</sup> Century Melbourne: A WaterSmart City – The Final Report* in 2002 to set out a blueprint for the sustainable management of greater Melbourne's water resources over the next 50 years.

This Report recommends reducing metropolitan water consumption by 12% per annum by 2050 thereby maintaining average annual water use to slightly more than is currently available from existing catchments. This is to be achieved through demand management, efficient appliances, water harvesting and water re-use. To obtain additional water supplies, one option includes reconnecting Tarago Reservoir and constructing a new water treatment plant.

Some of the key demand management measures recommended in the *21<sup>st</sup> Century Melbourne: A WaterSmart City – The Final Report (2002)* are listed below.

#### *Local / individual level*

- The compulsory use of AAA shower roses (from 2005) and AAAA washing machines (from 2010)
- Improved landscape management practices and voluntary sprinkler bans during total fire bans
- Promotion of water efficient practices around the home (for example, sweeping instead of hosing paths and driveways and shorter showers).

#### *Regional level*

- Increased pricing to reduce total and summer use with additional revenue reserved to provide incentives for water efficient schemes
- Water audits and water management plans for the industrial sector with assistance from the retail water companies<sup>6</sup>
- Promotion of water sensitive design in development, including individual preferences for rainwater tanks and treated greywater recycling systems.

### **1.7.2 Victorian Government - Metropolitan Strategy 2030**

---

<sup>5</sup> Impact of Logging Practices on Water Yield and Quality in the Otway Forests (Jan 2001), Sinclair Knight Merz

<sup>6</sup> An example of an audit already undertaken by a retailer is the Kraft Factory in Port Melbourne. This audit included a prescriptive set of guidelines for directing change to factory practices to improve water consumption efficiency.

The State Government has also released the draft *Metropolitan Strategy 2030*. Its objective for water management is to ensure 'water use efficiency will be managed so that existing storages can reliably meet water demand beyond 2030'. It sets out broad objectives to achieve this including the promotion of water efficiency practices, and adopting guidelines to encourage the use of alternative water sources such as rainwater tanks and stormwater.<sup>7</sup>

### **1.7.3 Local Government — City Of Melbourne**

The City of Melbourne has published several strategic documents that adopt a triple bottom line (TBL) approach to decision making and that will shape the City's future. TBL is a framework that underpins and reviews environmental, economic and social performance. The TBL approach has been used for *City Plan 2010*, the corporate and annual plans, the *Growing Green Environmental Management Plan (2003)* and a number of specific conservation and landscape management policies.

#### **a) City Plan 2010 (2001)**

*City Plan 2010* (2001) outlines the City of Melbourne's overall strategic direction at a regional and local level. Water use and management are broadly addressed through objectives to reduce resource use and waste generation, as well as to promote environmentally and socially sustainable policies and practices.

#### **b) Corporate Plan 2002–2005 and Annual Plan 2002-2003**

The structure of the corporate and annual plans is in parallel to that of *City Plan*. The key environmental performance indicator for water sustainability is to reduce consumption of drinking quality water by the City of Melbourne community by 5 % in 2003 and 15 % by the year 2010<sup>8</sup>. Reporting on these targets will be informed by this Strategy.

#### **c) Growing Green (2003)**

The *Growing Green- Environmental Sustainability Plan for the City of Melbourne's Open Space and Recreational Facilities* has a vision for the City of Melbourne's parks and the life they support to be sustainably managed on behalf of the community and future users with a reduced ecological footprint by 2050.

This plan recognises the high environmental costs associated with achieving 'green' parks and gardens in an urban environment. The complexity of implementing water conservation measures without compromising the condition of the City of Melbourne's culturally significant landscapes is discussed. Key strategy objectives identified in the plan are to:

- develop a water conservation plan for open space, trees and recreational facilities

---

<sup>7</sup> Planning For The Future Of Our Water Resources – 21<sup>st</sup> Century Melbourne: a Water Smart City (May2002), Water Resource Strategy Committee for the Melbourne Area.

<sup>8</sup> Melbourne City Council (2002), *Draft Corporate Plan for the City of Melbourne 2002-2005*, Melbourne City Council, Melbourne, p33.

- reduce the intensity and frequency of irrigation in certain areas and to allow some browning of grass in summer periods;
- replace some existing turf with a more drought-tolerant species or substitute with alternative surface coverings;
- achieve an overall reduction in water use in the management of parks, street trees and recreational facilities through water sensitive monitoring equipment, appropriate horticultural plantings; and
- increase the use of water products from renewable and alternative sources in the development, refurbishment and management of parks and recreational facilities.

#### **d) Parks Policy and Tree Policy (1995—2001)**

The *Parks Policy* has a brief outline of a number of measures for more sustainable landscape management, including the need to investigate the quantity of water consumed in managing the City of Melbourne's parks and gardens. The *Tree Policy* recommends selecting plant species for their durability. Although the emphasis is not on 'championing' water sustainability, the policy indirectly implies the need for drought-resistant tree species that would have the benefit of requiring less water for their maintenance

### **1.8 SIGNIFICANCE**

The *Sustainable Water Management Strategy* has been developed with very clear environmental, social and economic objectives. It is the intention of the Strategy to give people in the City of Melbourne a better understanding of their water use and how this water use can be reduced to a level that will benefit the environment. At the same time, the Strategy is designed to achieve welcomed financial benefits for households and businesses.

## **2. STRATEGIC DIRECTION**

### **2.1 INTRODUCTION**

The *Sustainable Water Management Strategy – Part 1* has been developed by the City of Melbourne in response to current and foreseeable concerns about water supply availability. Limited water supplies will have detrimental ecological, social and economic impacts for the City. To avoid these impacts, there is a need to plan strategically for the future water supply and water quality.

This chapter outlines the strategic direction for sustainable water management in the City of Melbourne. It is this strategic framework that will form the basis for Action Plans that will be revised annually.

### **2.2 STRATEGY METHODOLOGY**

The goal for sustainable water management in the City of Melbourne is to reduce potable water consumption. How can this Strategy best provide for results on the ground to help achieve this goal?

The research principles for this Strategy set in place the parameters and emphasis for education, community involvement, research and action. Appendix A provides further details on the methodology, by addressing the following influences and factors that have shaped the Strategy:

- Demand for Water
- The Role of Education and Community Engagement
- The Role of Research
- The Role of Action
- Using a Triple Bottom Line Decision Making Approach, and
- Strategy Assumptions.

### **2.3 VALUES OF THE COMMUNITY**

A draft *Sustainable Water Management Strategy* was made available for discussion and public comment in November - December 2002. Feedback from the community and the water industry was supportive of the City of Melbourne's initiative to conserve water, however some concerns were raised. As described below, the revision of the Strategy has addressed all of these concerns.

In summary, the following range of issues were of importance:

- **Targets:** Consistent comments that water reduction targets in the draft Strategy were too low. This was based on comparison to targets set in other cities around the world, and in recognition that the forecasted population growth for the City of Melbourne will place additional demand on water supply. It was also suggested that targets should be based on catchment requirements for maintaining water flow;  
*Response:* Water saving targets have been fully revised to achieve a forecast absolute reduction in municipal wide water consumption.
- **Water Supply:** The draft water reduction targets will not be sufficient enough to result in reduced absolute demand for water (due to forecast population growth). Council should specify a position on where it will source its extra water supply;  
*Response:* The Strategy has been revised to provide for the City of Melbourne's growth over the next 20 years and at the same time use less water in total than the amount used in 1999. There will be no need to source additional water, unless the loss in future supply due to climate change and catchment forest management is greater than 12%. There may be an issue of determining the 'share' of water savings between City of Melbourne and other Councils in Melbourne.
- **Data:** Concern that the data is not of the necessary quality;  
*Response:* The data has been fully updated and undertaken with a more comprehensive approach. The baseline year is now 1999, and the lesser quality data from 1998 has been removed. There will be annual reviews of the data.
- **Regulation:** More regulation, planning enforcement and guidelines are sought to require water efficient design and practices;  
*Response:* An associated Action Plan has been developed that sets out a program for policy and regulatory initiatives including *Rainwater Tank Policy, Water Sensitive Urban Design Policies,* and Planning Scheme Amendments.
- **Water Re-use:** Greater emphasis on water re-use, rainwater harvesting, and greywater should be given in the Strategy.  
*Response:* An additional chapter supporting water harvesting and re-use has been included in the final Strategy.
- **Protect Heritage Trees:** Supply sufficient water for parks, avenues etc;  
*Response:* The Strategy emphasises the need to maintain the cultural, heritage and horticultural values of the City of Melbourne parks and trees.
- **Education:** Communicate and educate about water conservation and water quality.  
*Response:* The Strategy 'measures' identify the importance of education and community engagement as a means of water management.

It is the nature of this Strategy to be reviewed every three years. This provides an opportunity to input further public comments over time, along with updates of data, targets, technology and strategies as applicable. Due to the evolving nature of the Strategy, feedback from the community is requested at any time. We value your opinion, and certainly support any initiatives by the community to conserve water. Call the City of Melbourne hotline on 9658 9658.

## 2.4 STRATEGY PRINCIPLES

Principles for the *Sustainable Water Management Strategy – Part 1* have been developed in response to community feedback, water industry research, triple bottom line assessments and general strategic environmental policy principles.

The Strategy will be based around the following principles:

- **Global Context** - There are more than 1 billion people who lack access to a steady supply of clean water making it a priority for the international community. In today's world, much water is wasted or used inefficiently, and often demand is growing faster than the supply can be replenished by nature. Water across the world needs to be properly managed and used.
- **No Absolute Increase in Water Use** - water saving targets will ensure the City of Melbourne will not need extra water supplies by 2020 thereby providing catchment benefits due to the lessening demand on water as a natural resource. This 'absolute saving' will consider the expected population growth of the City of Melbourne, and will also account as much as possible for the reduction in supply that is likely to result from the effects of climate change and yield loss from timber harvesting in catchments.
- **Catchment Management** – catchment wide implications for water, land and biodiversity need to be considered for water management planning and auditing.
- **Ecological Impact** - long and short term ecological impacts of water management will be considered with a goal to minimise possible detrimental effects related to the catchment water cycle, stream form and function, aquatic ecology and water quality. Greenhouse gas emissions will also be minimised.
- **Community Engagement** - residents, employees, businesses, and industry will be increasingly aware, connected and involved in better water management processes as an individual and as a community member. The public must participate as an equal partner with government and the water industry to protect water.
- **Resource Efficiencies for Council** - reductions in water consumption bills and stormwater infrastructure maintenance will result in long term cost savings for Council. Council decisions are made with regard to the ecological, social and economic triple bottom line. Investment into infrastructure and institutional arrangement that facilitate these resource efficiencies will need to be made.
- **Partnerships** – working with Melbourne Water and retail water companies, the development sector, the business sector, and the community is the most important way of taking action to save water. The City of Melbourne welcomes and seeks such partnerships both as a means of reducing water consumption within the municipality, and as a means of promoting water conservation across the water industry as a whole.

## 2.5 KEY STRATEGIC OPPORTUNITIES AND MEASURES

Key strategic opportunities and measures are highlighted throughout this Strategy as a means of reducing the local demand for drinking quality water. The opportunities fall under the following categories.

<b>Measure</b>	<b>Purpose</b>	<b>Potential Partners</b>
Leadership	Lead by example in reducing corporate demands on potable water. Develop partnerships. Share experience and knowledge with local business, industry and residents.	Melbourne Water, City West Water, South East Water, CSIRO, Queen Victoria Markets.
Strategy and Regulation	Implement policies and guidelines that influence corporate and community use of potable water.	Melbourne Water, City West Water, South East Water, development and construction industry,
Education and Communication	Promote sustainable water management, raise the awareness of impacts, training for staff and industry, community engagement	Melbourne Water, City West Water, South East Water, community groups, industry groups (Property Council of Australia, Green Plumbers, Green Gardeners, Royal Australian Institute of Architects, Australian Water Association), manufacturers, businesses, universities.
Implementation and Monitoring	Data management, annual water consumption reviews, action planning, incentives, geographic information systems.	Melbourne Water, City West Water, South East Water, financial institutions, water industry, manufacturers,

**Table 1**

Summary of measures to reduce potable water consumption in the City of Melbourne

The key measures outlined in the Table 1 will be applied in annual Action Plans that implement the *Sustainable Water Management Strategy*.

## 2.7 PROJECT PARTNERS

This study has been undertaken by the City of Melbourne in collaboration with Melbourne Water and the International Council for Local Environmental Initiatives (ICLEI). City West Water and South East Water have supplied water consumption data and advice.

Appendix B provides details about project partners including those from the water industry, the property industry, the development industry, educational establishments, State Government, non-government organisations, businesses, industries and community groups.

## 2.8 SIGNIFICANCE

This chapter has outlined the principles, processes, assumptions, partners and measures that form the basis for the *Sustainable Water Management Strategy*.

The following chapters provide an understanding of the water consumption patterns in the City of Melbourne since our base year of 1999/2000. This analysis is then used as the basis for setting water saving targets. Initiatives are tied to these targets to ensure they can be feasibly achieved.

## 3. WATER CONSUMPTION IN THE CITY OF MELBOURNE

### 3.1 INTRODUCTION

Quality drinking water is a finite resource. Its supply is under pressure due to drought conditions in the short term and the City of Melbourne's development towards a more highly populated city in the long term. This chapter investigates existing levels of water consumption within the City of Melbourne.

The data provides an understanding of issues in water use and demand, and highlights the importance of future rigorous and comprehensive information management to more clearly understand the existing conditions and likely future trends of water use in the City of Melbourne.

### 3.2 CITY OF MELBOURNE'S CORPORATE WATER CONSUMPTION

#### 3.2.1 Methodology

To determine the City of Melbourne's corporate potable water use, consumption data was obtained from various departments of the City of Melbourne for the 1999-2000, 2000-2001 and 2001-2002 financial years. The data was categorised according to ICLEI specifications into property types, including 'administration buildings', 'childcare centres', 'town halls' and 'open space'. Data was based on all water invoices received by the City of Melbourne for its assets.

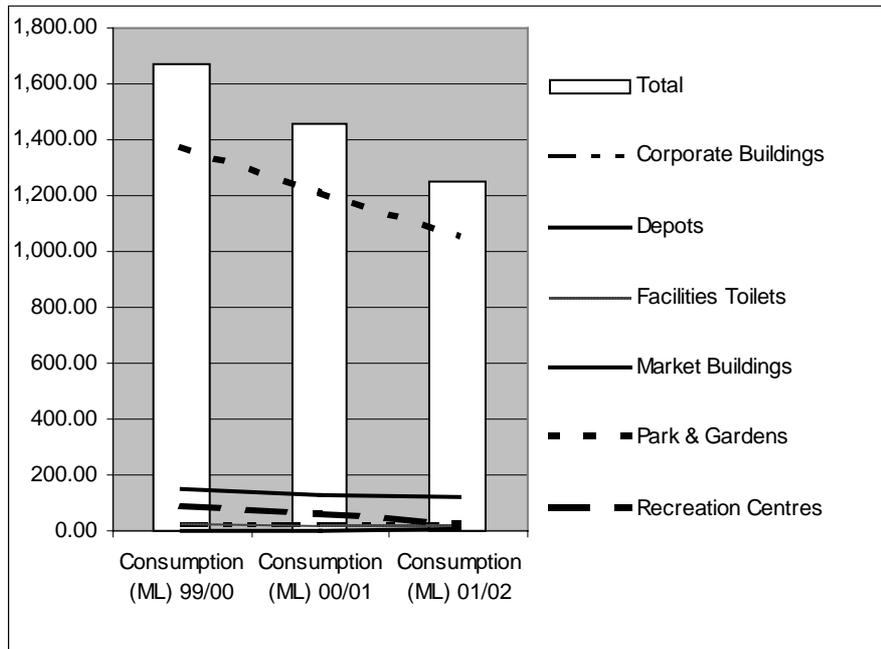
Water used for the purposes of street cleaning has not been included in the water consumption audit. This is because private contractors are undertaking the cleaning and the water bills are not available for this Strategy. It is intended that this information will become available to Council in future years.

A summary of the type of City of Melbourne assets and/or services included under each property type is listed below in Table 2.

<b>Property type</b>	<b>Description</b>
<b>Streets Trees &amp; Plantings</b>	Nature strips, median strips, round-about, irrigation, plantations and trees
<b>Parks &amp; Outdoor Recreation</b>	Tennis courts, golf course, fountains, parks, reserves and gardens (eg. Flemington community garden)
<b>Administration Buildings</b>	Office buildings including the administration area in Town Hall, Council House, and other key office areas.
<b>Markets</b>	Queen Victoria Market and Melbourne Wholesale Fish Market
<b>Community Centres</b>	Mixed halls, and neighbourhood centres
<b>Depots</b>	Works station for parks employees and contractors
<b>Recreation Centres</b>	Sites dedicated to indoor recreation including swimming pools and pavilions.
<b>Facilities</b>	Public conveniences
<b>Childcare Centres</b>	Childcare Centres and Maternal & Child Health Centres.
<b>Town Halls</b>	The function area of the Town Hall – hall, reception and ancillary rooms.
<b>Miscellaneous</b>	Sites that cannot be classified into in any other sector.

**Table 2**

Property type definitions



**Figure 1: Corporate Water Consumption Trends**  
 (Source: City of Melbourne May 2003)

### 3.2.2 Water consumption in general

It was found that about 6% of total demand in the municipality is attributed to Council activities. Figure 1 compares the water consumption of each property type to the total amount of water used by the City of Melbourne. This graph shows that the majority of the City of Melbourne's corporate water use between 1999-2002 was for landscape management in parks and gardens and that this demand has been steadily decreasing due to water saving measures already established as part of Council's Water Campaign.

It is worth noting that the Stage 1 Water Restrictions were applied across metropolitan Melbourne in late 2002 and therefore this impact is not reflected in the data below. Our upcoming audit of 2002/2003 water consumption data will show the effects of Council's Drought Response Plan.

The following pie chart at Figure 2, demonstrates where the City of Melbourne uses its water. The percentage breakdown of water use is by property type for the year 1999/2000. This is also generally representative of the data for 2000-2001 and 2001-2002 (refer to Appendix C for further information).

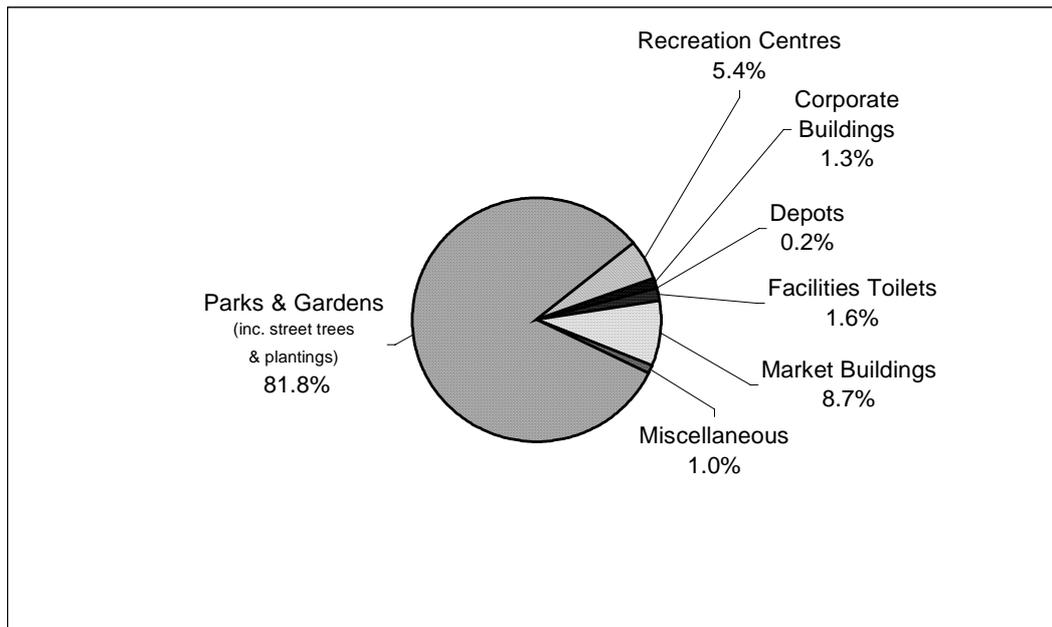


Figure 2 Breakdown of the City of Melbourne's water consumption 1999/2000  
 (Source: Calculations by City of Melbourne, January 2003)

## Parks and Gardens

### *The data*

Water consumption data for the City of Melbourne's parks and gardens has been collated from Council's Parks and Recreation Branch.

Water consumption levels for 57 Council parks, gardens and reserves of all sizes are identified in the data set. The majority of the sites identified for parks and gardens are listed as 'open space' and include median strips, nature strips, trees and roundabouts.

Even in the presence of more systems for data collection, water use in landscape management is highly dependent on weather and climatic conditions, such as rainfall and temperature. It is these conditions, as well as the visible condition of plants that often directs water use in irrigation when there is a far more complex interplay of elements that need to be considered on a microscale, such as soil, composition and moisture content. Therefore, the data presented for water use in landscape management should not be generalised as representing typical patterns in consumption or be used to predict future trends.

### *Water Consumption*

The City of Melbourne's parks and gardens account for approximately 81.8 % of the City of Melbourne's total annual corporate water consumption. Of this open space area, 51% (229 hectares) of water use is attributable to irrigation. The area and yearly consumption of a selection of parks is summarised in Table 3. Between 1999 and 2002, there was a small, steady decrease of watering in most parks.

<b>Park Name</b>	<b>Park Area (ha)</b>	<b>99-00 (ML)</b>	<b>00-01 (ML)</b>	<b>01-02 (ML)</b>	<b>Average Consumption KL/100m<sup>2</sup></b>
Domain	36	191	145	113	42
Fitzroy Gardens	26	72	61	36	22
Fawkner Park	41.1	144	133	94	30
Royal Park	168.2	124	110	96	7
Princes Park	39.3	85	79	54	19
Yarra Park	34.8	54	44	27	12
Treasury Gardens	5.8	36	25	21	46.5
Murchison Square	0.4	3	2	2	57.5
Lincoln Square	1.3	6	7	7	50.7

**Table 3**

Water consumption by the major parks and neighbourhood gardens in the City of Melbourne  
(Source: calculations by the City of Melbourne May 2003)

Table 3 clearly shows that Royal Park — one of the largest parks at 168 hectares — has the lowest water consumption per 100m<sup>2</sup>. Royal Park features an indigenous and native landscape in contrast to other parks designed according to a European aesthetic. This results in less need for irrigation in Royal Park. A large proportion of Royal Park is not irrigated at all. This demonstrates a reduced dependency on water by plant species, and an increased understanding by the community that parks vary with the seasons in terms of growth and greenness.

There are many opportunities for water savings to be made in the City of Melbourne's parks by improving the efficiency of irrigation systems. The City has an on-going asset renewal plan that will assist in achieving efficiencies in irrigation systems throughout the municipal area.

The table shows a variation in amount of water used per 100 square metres in parks that would generally be considered similar in planting and management. This could be due to data anomalies that it is hoped will be continuously improved over time as better data comes to hand. It could also reflect different watering systems and techniques, topography, soil types, and microclimates amongst other things.

### **3.2.3 Other City of Melbourne Facilities**

#### ***The data***

Water consumption data for other City of Melbourne facilities has been categorised into 'buildings', 'markets', 'toilets', 'recreation', 'depots' and 'miscellaneous'. This data is comprehensive for the years between 1999-2002 and is compiled from water accounts paid by the Facilities Management Branch and the Parks and Recreation Branch of the City of Melbourne.

### **Water consumption for the City of Melbourne's buildings/facilities**

The remainder of the City of Melbourne's total corporate water consumption comes from building and assets management. The Melbourne Wholesale Fish Market is by far the most significant user of water in the municipality with a base year consumption of 111 megalitres. This water is used by the fish market primarily for food preparation, along with a minor contribution from toilets and cleaning. It is noted that the Melbourne Wholesale Fish Markets has been steadily decreasing its water consumption each year, most likely in response to water charges and vendor awareness. Fishmongers are tenants at the markets and are therefore charged for water use.

The Queen Victoria Market is also a significant user of water for food preparation, cleaning and toilet use. Currently fruit and vegetable traders at QVM are not charged for water usage.

Buildings occupied by the City of Melbourne (including administrative, cultural, childcare centres and town hall) use 1.3% of the corporate water use. There has been consistent reduction in water use in corporate facilities, which may be attributed to general awareness of the value of water. The selection of new accommodation for the Council will be based on high ESD principles including best practice water management.

<b>Use</b>	<b>99-00 (ML)</b>	<b>00-01 (ML)</b>	<b>01-02 (ML)</b>
Fish Market	111	90	85
Queen Victoria Market	37	40	39
City Baths	22	26	28
Town Hall	9	10	12
225 Bourke Street	3	2	2
200 Lt Collins Street	0.7	3	3

**Table 4**

Water consumption by selected City of Melbourne assets  
(Source: Calculations by City of Melbourne, May 2003)

#### **3.2.4 Significance**

The data on the City of Melbourne's water consumption provides an understanding of the distribution of water demand according to the City's assets and responsibilities. This research indicated that key demand lies in landscape management for parks and gardens. Water management strategies to address this will be explored in Chapter 6.

### 3.3 COMMUNITY WATER CONSUMPTION

#### 3.3.1 Methodology

South East Water and City West Water provided water consumption data for the residential and non-residential communities within the City of Melbourne for the study period 1999–2002. Unlike data for the City of Melbourne’s corporate water use, the community water use data is provided collectively, categorised by postcode in order to understand the municipality according to landuse precincts. These precincts are illustrated in Map 1 (refer to Chapter 1), and detailed in Table 5.

<i>Postcode</i>	<i>Precinct area</i>	<i>Notes</i>	<i>Amount (ML) Non-residential</i>	<i>Amount (ML) Residential</i>
3000	Central City	CBD only	6842	475
3000 & 3002	East Melbourne and parklands north of Yarra		1039	324
3003	West Melbourne		458	156
3004, 3141 & 3181	Domain Parklands, part of South Yarra and Prahran	Postcodes 3141 and 3181 extend beyond municipality boundary	959	299
3006	Southbank		1568	299
3008	Docklands	Assumed Docklands will form part of City of Melbourne municipality	99	0
3051	North Melbourne		895	762
3053	Carlton		1092	862
3054	Part of Carlton North	Postcode 3054 extends beyond municipality boundary		685
3052	Parkville		2167	250
3031	Flemington and Kensington	Postcode extends beyond municipality boundary	1107	1424
3011	West Melbourne Industrial Area	Postcode extends beyond municipality boundary. Assume no residential population	653	0
3205	Port of Melbourne		62	0
3205 & 3207	Fisherman’s Bend	Assume no residential population	158	5
<b>TOTAL</b>			<b>18,243</b>	<b>5,541</b>

**Table 5**

Definition of the City of Melbourne municipality precincts

(Source: Defined by City of Melbourne for study purposes)

The data extraction process provided valuable information, however there were several limitations, including:

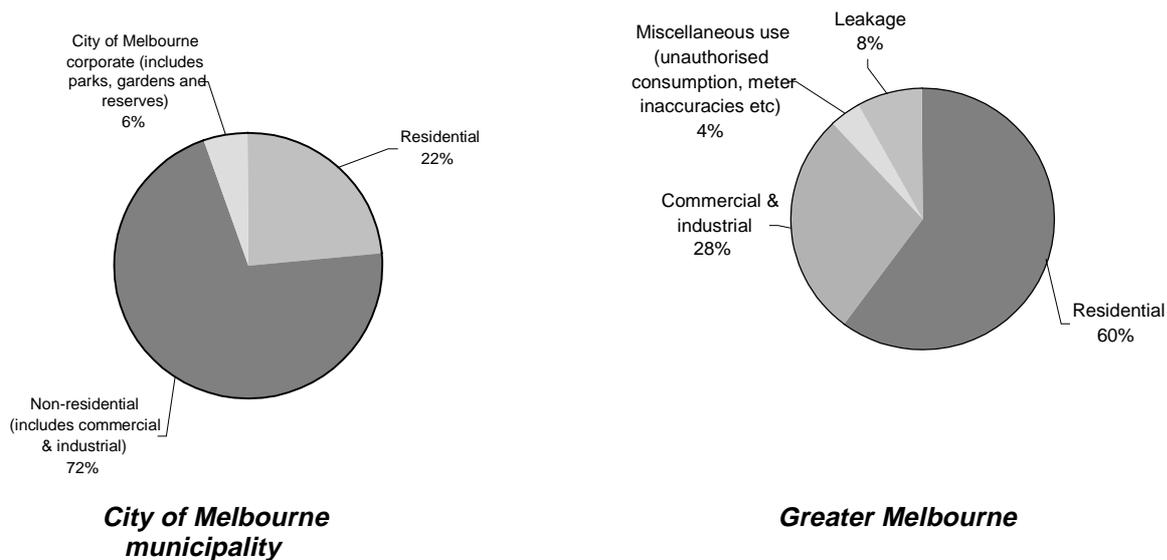
- The figures represent only water that has been paid for. Any non-billable demands on the potable water supply are not recorded.
- The data supplied by SEW and CWW classified water consumption into three broad usage bands: ‘residential’, ‘non-residential’ or ‘City of Melbourne’ corporate use. Non-residential data were received as a single aggregated figure. An effort has been made to predict the likely distribution of this demand.

However to gain a clearer understanding of water consumption patterns in the municipality and to develop further specific targeted strategy actions, more detailed data are required.

- The true residential consumption is not necessarily represented. The retail water companies maintain commercial/industrial buildings converted to apartments in their 'non-residential' category. There is no way to determine how many properties listed as non-residential are actually used for residential purposes. This limitation has no influence on the total consumption profile, however it does affect the split between residential and non-residential demand. For the purposes of this study, and in the absence of further data, the residential profile has been based purely on the residential data received.

### 3.3.2 Water Consumption by the Community

The current water demand across the entire municipality is approximately 25 469ML for our base year (1999/2000). Figure 3 compares the distribution of water usage within the municipality with that for greater Melbourne. It demonstrates that the consumption profiles for the two areas are very different, and as a result, different approaches may need to be taken to formulate an effective water strategy for the municipality.



**Figure 3**

Greater Melbourne's total use for potable water compared with the municipality's total use for potable water 2000-2001. (Source: *Water Resources Strategy*, May 2002 and CoM calculations based on data supplied by SEW, CWW & CoM)

#### Residential Use

Residential use accounts for about 5541ML a year or 22 % of the municipality's potable water demand<sup>9</sup>. To gain a comprehensive picture of residential use, consumption was examined separately for each precinct. There was minimal residential population residing in the industrial and manufacturing areas of West Melbourne (3011), Fisherman's Bend and Port of Melbourne (3207).

<sup>9</sup> Calculations by GHD based on data supplied by SEW, CWW and the City of Melbourne, June 2002

The average consumption per person over the data period was found to be 108kL/year. Given the average household size in the municipality was estimated to be 2.1 in 1999/2000<sup>10</sup>, this puts average household demand at 227kL/year. This figure falls for household consumption is significantly higher than the average water use of 146 KL/year for high-density living. (*Discussion Starter Water Resources Strategy Committee for the Melbourne Area*, June 2001). It is only slightly less than the average water use of 240kL/year for 'traditional suburban households' that have larger gardens, houses and tenant numbers.

### **Non-Residential Use**

The non-residential sector accounts for around 18,243ML/year or 72% of the entire municipality's potable water demand<sup>11</sup>. Non-residential users of potable water fall into a very broad range of landuse types in the City of Melbourne. There is demand by manufacturing industries, offices, hospitals, apartments, universities, restaurants, retail and the entertainment industry. However, as data is unavailable for a definitive breakdown of how much each sector uses, it is difficult to understand where future water savings can be made.

It has therefore been necessary for assumptions to be made to divide this non-residential data down to at least commercial and industrial sectors. This is achieved by analysing City of Melbourne's data regarding proportion of employees in both sectors. The percentage is then used to divide water use in the non-residential sectors. The result of this breakdown is summarised in Table 6 below.

Some of the big water users in this sector are likely to be Melbourne Cricket Ground, Flemington Racecourse, Royal Botanic Gardens, and industries in Port Melbourne and West Melbourne.

The Royal Botanic Gardens has made significant achievements in water savings to date. Over the past five years, the Gardens has reduced its water use by about 40% through careful monitoring and management of the moisture-sensitive irrigation system. In response to the current drought, the Gardens have also been applying xerophytic<sup>12</sup> planting to reduce demand for water, particularly in their award winning Water Conservation Garden.<sup>13</sup>

<b>Sector</b>	<b>Typical land use/employment types</b>	<b>% of overall consumption</b>
Industry	Manufacturing, transport and storage	3
Commercial	Communication, finance, property, government administration, education, health and community, cultural and recreational services, wholesale and retail trade, accommodation, cafes and restaurants.	69
Residential	Houses and apartments	22
City of Melbourne	Parks, gardens and facilities	6
<b>Total</b>		<b>100</b>

**Table 6**

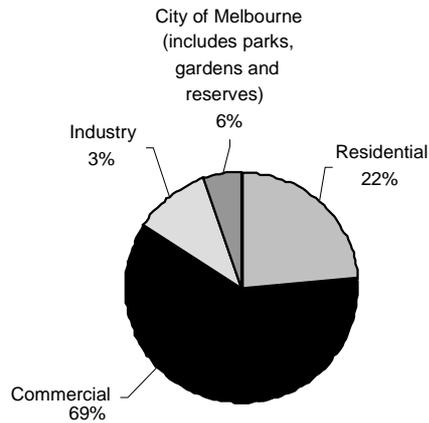
Approximate distribution of non-residential water consumption in the City of Melbourne  
(Source: City of Melbourne estimates based on ABS Greater Melbourne population data, March 2003)

<sup>10</sup> Victorian Government (2000), *Victoria in Future*, Victorian Government, Melbourne, p71.

<sup>11</sup> Calculations by GHD based on data supplied by SEW, CWW and the City of Melbourne, June 2002

<sup>12</sup> Definition - A plant that is adapted to living and growing with limited water because their formation provides water storage or limits *transpiration*, such as cactus and succulents.

<sup>13</sup> The Weekend Australian (February 22-23, 2003)



**Figure 4**

Estimated total water consumption in the municipality  
(Source: City of Melbourne estimates May 2003)

Figure 4 is a revision of Figure 2 to include the estimated distribution of non-residential demand. This Figure is useful for demonstrating that commercial and residential consume approximately 91 % of the total water used, while industry and the City of Melbourne consume the remaining 9 %. This demonstrates that our strategic approach to saving water should emphasise residential and commercial actions. However, the importance of reducing the City of Melbourne’s corporate water use is emphasised because of the leadership example that can help increase awareness and education levels about water management.

### 3.4 SIGNIFICANCE

Water usage within the City of Melbourne municipality is high. This is demonstrated by the average water consumption per household. At 228 kilolitres it is considerably higher than the metropolitan average of high density households at 146 kL per year.

The data on community water use in the City of Melbourne is valuable, however it does not provide sufficiently descriptive information to determine whether water demand varies across different landuse activities<sup>14</sup>. Such information would be particularly useful in identifying focus areas for the City of Melbourne, Melbourne Water, and retail water companies to campaign for water efficient practices.

A general picture of water use has been developed by the analysis of water consumption data. This enables an opportunity to set relevant water saving targets for different water users in the City of Melbourne.

<sup>14</sup> Due to privacy agreements between retailers and their customers, it was not possible to obtain a specific list of ‘high use’ consumers.

## 4 CONSUMPTION PREDICTIONS AND TARGETS 2002–2020

### 4.1 INTRODUCTION

The City of Melbourne is committed to achieving an absolute saving in the amount of water consumed across the municipality. That is, the amount of water consumed in 2020 will be less than the amount of water consumed in 1999. This is a significant goal given the population forecast for the municipality. The residential population is expected to increase from 51,000 residents to 123,000 residents by 2020. There will also be growth in the commercial and industrial sectors of the City.

The water saving targets set are reflected in a range of formats. That is:

- corporate water saving targets are set as 'absolute' water saving targets
- residential water saving targets are set as 'per resident' water saving targets
- non-residential water saving targets are set as 'per employee' water saving targets.

The targets are expressed in different formats due to the methodology used in setting them and are 'converted' to provide a forecast of the absolute amount of water that will ultimately be saved.

### 4.2 METHODOLOGY FOR SETTING TARGETS

The City of Melbourne has sought to achieve a thorough justification for its target setting. It is acknowledged that setting water saving targets in Australia and internationally has to date been on an 'educated guess' approach. The City of Melbourne therefore used its own methodology for establishing targets using references to White's (1998) *Wise Water Management. A Demand Management Manual for Water Utilities*<sup>15</sup> and to the valuable end use research and experiences for setting water targets provided in the Victorian Government's *21<sup>st</sup> Century Melbourne: A WaterSmart City – The Final Report* (2002).

The City of Melbourne has followed an eight-step process for setting its water saving targets. This is set out in Appendix D.

### 4.3 RAINFALL TRENDS

Targets for water consumption are affected by climate and rainfall variations. By setting long term targets for reducing water consumption, it is possible to modulate any annual variations in rainfall and climate. It is noted that there are likely to be long term climate variations arising over the coming decades and centuries. This climate change arises from natural and human induced changes such as greenhouse gas emissions. Whilst studies have not been definite about the change that will occur to our climate, it is likely that rainfall will decrease and temperatures will slightly increase.<sup>16</sup>

---

<sup>15</sup> Wise Water Management (1998), Stuart White

<sup>16</sup> Victorian Greenhouse Strategy, Department of Natural Resource Management, 2002

The rainfall data from 1999/2000 is described in Table 7. This shows that rainfall has decreased annually in the initial three years of the *Sustainable Water Management Strategy* however this is only a small amount of data and cannot be used as a basis for any predictions. This data reflects the current drought and is not intended to reflect climate change, which requires much longer-term analysis.

	<b>1999/2000</b>	<b>2000/2001</b>	<b>2001/2002</b>
<b>Rainfall(mm)</b>	621.30	617.30	500.10

Table 7: Annual Rainfall in City of Melbourne

(Source: Based on Melbourne Water estimation of ABS data)

#### **4.4 WATER CONSUMPTION TRENDS 2003–2020**

##### **4.4.1 The City of Melbourne’s future water consumption**

The trend in water consumption for the City of Melbourne’s corporate assets is predicted to be relatively stable. Any growth in demand will primarily result from increased employee numbers and possible acquisition of further water consuming assets (such as parks in the Docklands area). The development of a new Council House to replace an existing building will increase water consumption during construction, however with its planned water efficiency features it will result in water savings over time. Generally, it is considered that variations to water consumption by Council is expected to be minimal during the period to 2020.

##### **4.4.2 Local community’s future water consumption**

The City of Melbourne municipality will experience significant growth in its residential population over the next two decades. Forecasts have indicated that the permanent population will rise from 51,000 people in 1999 to 123,000 people in 2020. This 141% increase in local population will place significant demands on the water supply needed in the municipality. Currently residential water use makes up 22% of municipal water, however is predicted to grow to 36%. This is a major consideration addressed in this Strategy.

Drinking water is used for a wide variety of non-residential activities in the municipality, such as industry, commercial; retail or entertainment land uses. An effort has been made to understand the composition of non-residential demand. For the purposes of forecasting demand it has been broken down into commercial and industrial categories, however this has relied on the use of significant assumptions.

The commercial sector is by far the greatest user of water in the City of Melbourne at 69% of municipal water use. This is to be expected with the large number of offices, services, and retail premises that can be found in the Central Business District, Southbank, and Carlton amongst other areas.

The industrial sector is a small water user concentrated in pockets of heavy and light industry existing primarily in West Melbourne and Port Melbourne. The water use totals 730 megalitres which is 3% of the water used in the City of Melbourne.

The City of Melbourne municipality has a high visitation rate by people taking part in entertainment, sporting events and jobs. The impact of these visits on water consumption has been absorbed in this Strategy

under commercial, industrial and corporate water rates. For example, the water used by visitors using toilet facilities at the MCG will be absorbed in the total water consumption for the commercial sector.

The above-predicted large demand for residential, commercial and industrial water would create significant demands on greater Melbourne and Victoria's wider water supply and possibly contribute to the need for extra metropolitan water supply infrastructure. It is considered that the City of Melbourne needs to prevent the above 'business as usual' increase in demand for water from arising by setting a strategy that seeks to reduce the absolute amount of water consumed within the municipality.

## 4.5 WATER SAVING TARGETS

### 4.5.1 Corporate Water Saving Targets

Water saving targets have been developed as a means of setting goals for reducing water consumption.

For Council water use, savings can be made from different areas including the Town Halls, administrative buildings, the markets, pavilions, depots, public toilets, parks and gardens. Table 8 below has set out water saving targets for each of these water uses. The targets are based on an absolute water saving.

The targets have been calculated using a methodology outlined in Appendix D.

Careful consideration has been given to the range of key actions that will be undertaken to achieve these designated targets. These are set out in Chapter 6 of the Strategy.

Corporate				
Land Use	Water Consumption 1999 –2000 (megalitres)	Target reduction	2020 forecast absolute water savings (megalitres)	Comments on the forecast absolute water savings
<b>Buildings</b>	23	35%	8	It is assumed that savings in corporate water use will be absolute. This is because growth in population, industry etc will not generally result in growth in corporate water demand. There will be some growth due to likely future management of Docklands etc, however it is considered that the saving can be viewed as absolute – 28% The water saving target for parks and gardens includes the 8% saving from the proposed Royal Park Wetlands project.
<b>Markets</b>	147	45%	66.2	
<b>Parks &amp; Gardens</b>	1,379	26%	358.5	
<b>Depot</b>	3.2	30%	1	
<b>Toilets</b>	27.7	30%	8.3	
<b>Recreation</b>	90.9	30%	27.3	
<b>Miscellaneous</b>	14	30%	4.2	
<b>Total</b>	<b>1,685</b>	<b>28%</b>	<b>474</b>	

Table 8: Table of Corporate Water Savings Targets

(Source: City of Melbourne May 2003)

### 4.5.2 Community Water Saving Targets (Residential, Commercial and Industrial Water Users)

Water saving targets are identified for commercial, industrial and residential water use in Table 9. Key initiatives for achieving these targets are set out in Chapter 6.

In the case of residential water use, more extensive target setting was undertaken due to the presence of relevant end-use data. This is shown in Appendix E.

The targets that have been set have all been based on a thorough end use analysis. Whilst there are still significant gaps in water consumption data available, it has provided us with the best available base for determining the City Of Melbourne's water saving targets. The End Use Analysis table is at Appendix F.

<b>Non Residential</b>				
<b>Land Use</b>	<b>Water Consumption 1999 –2000 (megalitres)</b>	<b>Target reduction</b>	<b>2020 forecast absolute water savings (megalitres)</b>	<b>Comments on the forecast absolute water savings</b>
<b>Industry</b>	730	40% (per employee)	199	Targets have been set on a per employee basis as this was the means of forecasting future non-residential water demand. It is necessary to 'convert' this to an absolute saving – 27%
<b>Commercial</b>	17,513	40% (per employee)	4,762	
<b>Total</b>	<b>18,243</b>	<b>27% (absolute)</b>	<b>4,961</b>	

Table 9: Table of Non-Residential Water Savings Targets  
(Source: City of Melbourne May 2003)

<b>Residential</b>				
<b>Land Use</b>	<b>Water Consumption 1999 –2000 (megalitres)</b>	<b>Target reduction</b>	<b>2020 forecast absolute water savings (megalitres)</b>	<b>Comments on the forecast absolute water savings</b>
<b>Residential</b>	5,541	40% (per resident)	- 2493	Targets have been set on a per resident basis to avoid showing a 'negative target'. This would not be reflective of the significant efforts in residential water savings.
<b>Total</b>	<b>5,541</b>	<b>-45% (absolute)</b>	<b>-2493</b>	A 'negative target' is unavoidable in the residential sector due to very large residential population increase that is forecast.

Table 10: Table of Residential Water Savings Targets  
(Source: City of Melbourne May 2003)

### 4.5.3 Absolute Water Saving Targets

The City Of Melbourne has developed a range of water saving targets for different water users in the municipality with an aim of using less water in the year 2020 than was used in the year 1999. To set these targets, a range of modelling was undertaken to ensure the most effective and feasible targets are put in place. The modelling also needs to take into account the likelihood that there will be less rainfall in 2020 due to the effects of climate change, and less water yield due to the effects of forest management in catchment areas.

Table 11 below calculates the full range of forecast water saving reductions to reveal an absolute water saving target of 12%. This is a stretch goal that requires residents, businesses and Council to each cut water use by 28%-40% compared to today's consumption rates in order to accommodate the water use of new businesses and dwellings. Ideally, a higher absolute water saving target would be a better environmental outcome, however it is acknowledged across the water industry that the City Of Melbourne will be hosting far greater residential growth than most other municipalities and is therefore achieving the best reduction it can under these growth pressures.

The conversion to absolute saving was reliant on a range of assumptions explained in Appendix G.

<b>TOTAL – Using Above Calculations</b>				
<b>Land Use</b>	<b>Water Consumption 1999 –2000 (megalitres)</b>	<b>Target reduction (absolute)</b>	<b>2020 forecast absolute water savings (megalitres)</b>	<b>Comments on the forecast absolute water savings</b>
<b>Corporate</b>	1,685	28%	+474	It is noted that climate change and forest management in catchments could reduce future water supplies therefore a target falling below zero will provide best outcome for future water supplies and the environment.
<b>Non-Residential</b>	18,243	27%	+4,961	
<b>Residential</b>	5,541	-45%	-2,493	
<b>Total</b>	<b>25,469</b>	<b>12%</b>	<b>+2,942</b>	

Table 11: Table of Absolute Water Savings to be Achieved by 2020 in the City of Melbourne

(Source: City of Melbourne May 2003)

The City of Melbourne municipality is committed to achieving ecological improvements through water saving initiatives. The successful implementation of this strategy will result in Council and the community consuming significantly less water in 2020 than it would have otherwise under 'business as usual' conditions. The water saved will be retained in Melbourne's metropolitan water reservoirs helping the planning for long term sustainable water management in accordance with the Victorian Government's *Water Resources Strategy*.

In addition to the water savings achieved by moving beyond 'business as usual' practices, the City of Melbourne is planning to achieve a further 12% absolute savings. The City of Melbourne would like to see these savings committed to environmental flows. It is hoped that Melbourne Water would consider this proposal once these water savings have been realised.

#### **4.6 SIGNIFICANCE**

Water demand management can appear to be a large and difficult objective to achieve across a municipality. In order to better understand and implement this objective, setting goals for residential, commercial, industrial and corporate sectors helps makes task of saving water more manageable.

Water saving targets are goals set to ensure water is managed to achieve the highest reduction of consumption possible. They have been set using the best information available to date, and can be reviewed when further information becomes available in the coming years.

The targets have been set with the overall goal of achieving an absolute reduction in the amount of water consumed by the municipality in 2020 compared to 1999. The target is 12% below the current amount of water used which helps account for the predicted reduction in rainfall due to climate change and yield loss due to forest management in catchment areas.

Setting water saving targets is an important component of a water demand management strategy. It is now important to consider ways that the City of Melbourne, Melbourne's water industry, and the community can work to achieve these goals.

## **5 WAYS TO SAVE POTABLE WATER**

### **5.1 INTRODUCTION**

Once we understand where water is being used throughout the municipality, we need to ask ourselves how we can best take action to reduce our long-term impact on the environment and on future water supplies. The first step is to reduce water demand by the City of Melbourne and the community. Demand management is essential for effective and efficient management of water most particularly in municipalities such as the City of Melbourne where forecast population growth is placing extra demands on our water sources.

Strategic planning is a key aspect of a successful demand management strategy. This means understanding the current patterns of water use and determining the potential reduction in water use that can occur through improvement to water-using design, management, equipment and behaviour. Programs need to be developed to achieve these improvements.

The *Sustainable Water Management Strategy* has undertaken an analysis of water consumption patterns from 1999-2002. The setting of water targets then followed this first step in demand management. These targets provide an important goal and monitoring point for the strategy to base itself around.

It is now necessary to describe demand management methods for achieving the water saving targets. Such methods include demand reduction, water harvesting and water re-use.

### **5.2 DEMAND REDUCTION MEASURES FOR POTABLE WATER**

#### **5.2.1 Education**

A community education program to help people use water more efficiently is an integral component of water demand management.

The communication program aims to make people aware that reducing water consumption is necessary because it provides a range of ecological, social and economic benefits. The program also needs to identify the implications of not practising better water management.

Residents and businesses in the City of Melbourne are able to help achieve water saving commitments by being more aware of their water use, and changing to more efficient appliances when next needing to upgrade them. These are described below. People may also install rainwater harvesting and greywater reuse systems in their houses or businesses. Developers in the City of Melbourne can contribute by integrating rainwater and greywater systems into their development proposals, whilst existing large businesses can do water audits and retrofit where possible to reduce water consumption.

There is a range of activities that people in the municipality can undertake to be more efficient with their water consumption. The City of Melbourne will assist its residents and businesses to be more efficient by researching, monitoring, reviewing, communicating and educating about water use. It will also take a

leadership role by reducing its own water use, and use its finding as a means of raising the awareness of the local community.<sup>17</sup>

Educational support for relevant professionals will also be provided. Enabling professionals to keep up to date with changing water technology, practices, and design is an effective means of enabling consumers to learn about water saving practices. Training support is an important component of the Water Campaign – from architects, planners, builders, plumbers, manufacturers, and landscape professionals amongst others.

### **5.2.2 Toilet Flushing**

Toilet flushing typically uses around 25% of the water in the home<sup>18</sup>. All modern units have dual flushing which reduces the water consumption by around 50% (*SEW Home Water Audit, 2002*). For around the last twenty years it has been regulation to install these toilets in new premises or when replacing old units. However, there is still a substantial number of old toilets in the community, and replacing these represents an area for water savings.

The City of Melbourne will target water consumption reduction in this area by encouraging installation of dual flush toilets in:

- Older houses which still have high use flushing and no dual flushes;
- Older office blocks, retail and other commercial and industrial premises which still have high use for flushing; and
- Newer premises which are under construction or in planning and offer an opportunity to pursue the extra efficient devices.

It is estimated that 67% of houses in Greater Melbourne have dual flush toilets<sup>19</sup>. This study assumes that there is a greater proportion of older houses in the City of Melbourne municipality, and therefore assumes that the penetration of dual flush toilets in the LGA is slightly lower at 50%. Currently, there is no data available on the proportion of old style high use toilets in the general office blocks of the CBD and other premises in the City of Melbourne. It was assumed that 90% of water demand by the Office and Retail sectors is due to toilet use.

The *Sustainable Water Management Strategy – Part 1* also supports the development of rainwater and greywater use and re-use in residential, commercial and industrial premises. This is particularly encouraged in new developments whereby such systems can be installed with minimal capital expenditure.

### **5.2.3 Showers**

Showering uses around 24% of the water in the typical home. Modern showerhead units are available which reduces the water consumption by up to 35%. The water retailers encourage their use and offer appropriate models for sale. There may be a view that lower use showerheads do not deliver the same

---

<sup>17</sup> Wise Water Management (1998), Stuart White

<sup>18</sup> Planning For The Future Of Our Water Resources – 21<sup>st</sup> Century Melbourne: a Water Smart City (May2002), Water Resource Strategy Committee for the Melbourne Area.

<sup>19</sup> Planning For The Future Of Our Water Resources – 21<sup>st</sup> Century Melbourne: a Water Smart City (May2002), Water Resource Strategy Committee for the Melbourne Area.

shower “experience”, and this view may offer a particular challenge with the sales staff for high priced apartments.

Low water use shower roses have been taken up by a lot less households than dual flush toilets, (around 30%) and are not required by any current regulation. The Victorian Government has indicated that AAA shower roses may be regulated by 2005.

The estimated yearly saving of up to 1,053ML is based on the assumption that around 19% of current residential water use is for showers, and 0.5 – 1% of non-residential use is for showers in commercial premises and other places of employment.

Reducing water pressure at the household meter can also prevent significant wastage of water in the bathroom, as well as the kitchen, laundry and garden.

#### **5.2.4 Washing Machines**

AAAA rated washing machines, which are generally front loading machines, use around 50% less water than typical top loaders. The typical proportion of water used in a house by these is around 19%.<sup>20</sup> It appears that many modern apartments are designed around the use of front loaders, as they also save space. AAAA machines often have a longer cycle time, typically cannot be opened during use and are typically more expensive. As a result the penetration of front loaders into households may be as low as 9%.<sup>21</sup> Washing Machines are also used in the non-residential sector in Retail areas (such as Laundromats) and the Service Sector (such as hospitals, nursing homes etc)



By 2020, the total residential water use for washing machines is expected to be up to 2002ML assuming 19% of all residential use.

#### **5.2.5 Residential Garden Watering**

External household use in Greater Melbourne accounts for around 35% of all household demand, predominantly on the garden.<sup>22</sup> Based on the residential consumption figures analysed in this study, and assuming higher density living on average, this figure is expected to be around 20% in the LGA. Note that this proportion is likely to be significantly lower for the new high-density development, which is dominating the predicted growth in the near future.

There is no single simple measure that will reduce water consumption in gardens. There is instead a wide range of possibilities ranging from technical or intrusive, to common sense:

---

<sup>20</sup> Planning For The Future Of Our Water Resources – 21<sup>st</sup> Century Melbourne: a Water Smart City (May2002), Water Resource Strategy Committee for the Melbourne Area.

<sup>21</sup> Planning For The Future Of Our Water Resources – 21<sup>st</sup> Century Melbourne: a Water Smart City (May2002), Water Resource Strategy Committee for the Melbourne Area.

<sup>22</sup> Planning For The Future Of Our Water Resources – 21<sup>st</sup> Century Melbourne: a Water Smart City (May2002), Water Resource Strategy Committee for the Melbourne Area.

- Change to lower water use plants;
- Install and/ or retrofit rainwater tanks into households for garden use.
- Greywater re-use in gardens within health requirements.
- Sophisticated approaches to watering possibly including moisture sensing and drip irrigation type techniques;
- Avoiding watering during times of high evaporation, and before it is required after rain (or during rain as some automated systems do);
- Install technology to reduce water pressure at the meter for gardening and household use.

The available data suggests that the total water use for gardening (excluding the City of Melbourne owned parks and gardens) is currently around 1,108 ML, and that this will grow to around 2,669 ML by 2020. It is noted that this assumption may overstate the growth, as it is unclear how much of the predicted population growth for the LGA will occur in apartments and how much garden area such apartment blocks might have.

Converting to native, low water or indigenous plants could reduce garden watering by more than 75% (based on ICLEI indicator data, Section 6). Sophisticated approaches to watering could reduce water use by 10 to 20% in some cases. Due the lack of data in this area, it is assumed that the possible savings lie in the range of 5 to 25% of water currently used on gardens.

### **5.2.6 Commercial Water Use**

Water use varies significantly from one type of commercial use to another. In the case of offices, the water use is primarily for air conditioning cooling towers, toilet flushing, bathrooms, kitchens, and cleaning. Private sporting venues such as the Melbourne Cricket Ground use extensive amounts of water for watering turf, as well as toilets, kitchens and cleaning. Restaurants use large amounts of water in the kitchen for cleaning and food preparation, however other retail premises such as a clothing outlet will use very little water.

To date, there is very little data about commercial water use. The most effective means of reducing commercial water use is for businesses to have a water audit undertaken of their premises. This is considered a worthy investment as investing in water efficiency generally provides a favourable payback period. For commercial premises with large open space areas, it is best to alter landscaping design and practices to save water.

Data and case studies about commercial water use will be increasingly available as a source of advice on water efficiency in commercial premises.

### **5.2.7 Industrial Water Use**

Industry uses water for cooling, cleaning, and as part of products that are sold. In the City of Melbourne municipality, it is expected that such use may account for around 30% of the total water consumption.

A unique and important feature of industrial water use is that the quality of water required differs from that needed for household use. In some cases the water supplied is not good enough, and additional treatment is used. In other cases, the water supplied is 'too good' and a lesser quality would suffice if available.

In addition, water is often a minor expense to many businesses. Typically water is around 1% of business costs. Therefore, although significant water savings may be available, they are not pursued because other issues are seen to be more important. Finally, water supply in greater Melbourne is very reliable. Since industry has rarely seen it fail, the importance of water to their business may not be well understood.

GHD's experience is that many industrial premises 'waste' at least 5% of the water they 'use'. Therefore, by simply paying attention, savings of that order are typically available for minimal or even no cost. Savings of up to around 20% are often possible with some capital investment but without major recycling.

Given the very large range of industry sizes and types, much more detailed research would be required to fully understand the possible savings.

### **5.3 WATER HARVESTING AS AN ALTERNATIVE WATER SOURCE**

There are several opportunities to harness water in the City.

#### **5.3.1 Rainwater from Roofs.**

The City of Melbourne supports the use of rainwater tanks as a means of providing water supply and stormwater detention. Residential rainwater tanks are also valuable for tending to introduce a household culture of resource awareness. Residents will become more aware of their water use and the impact of rainfall, and will adjust their behaviour accordingly. Apartment and other higher density housing could investigate shared storage of rainwater. The City of Melbourne will develop guidelines that advise on the effective use of rainwater tanks in residential dwellings. These guidelines will outline planning, design, siting, technology, installation, standards, maintenance and lifecycle issues.

Large roofs like the Queen Victoria Market can become demonstration pilots and practical tools for water harvesting. The pilots would consider water quality issues such as air pollution and dust on roofs and would be analysed to determine the practical benefits. A large project of this nature will bring significant benefits in community perception and positive reinforcement of the need for water conservation.

Larger industrial sites with expansive roofs or car park space could collect water, and particularly if it is for their own use, the opportunities for them to understand the quality impacts of their own activities and then adjust to match quality to requirements appear significant. Port Melbourne and West Melbourne industrial estates are a candidate for this type of initiative.



### **5.3.2 Rainwater On Ground**

Harvesting rainwater for the purpose of watering private and public gardens can be achieved through landscape design that makes best use of rain events. Design can ensure that garden layout and species selection is relevant to the type of rainfall that occurs in the City of Melbourne area. The incorporation of swales for larger sites or public areas assists in increasing the 'garden area' of a development, and allows excess water from big rain events to enter the groundwater rather than simply running off into the stormwater system. The City of Melbourne will develop policies to promote retention, and even the re-establishment of permeable surface areas for both its own works and in development assessments.

### **5.3.3 Storm Water from Drains.**

Several significant drains run under the City and draw from a wide catchment. Capture and use of this water is an important opportunity for water supply, however it involves a quality issue, as storm water is often contaminated to some degree.

It is noted that the City lies at the base of the catchment and therefore sits 'above' large flows of wastewater and storm water, which are potential alternative sources for the future. However, significant practical and cost barriers make such alternatives unattractive at present.

There is also an issue regarding storage. In order to make any significant use of the volumes available, large storage's would be required. For example, to store even 5% of the municipality's annual consumption would involve the construction of a 2,200 ML storage. Areas of open land and existing wetlands could be reconfigured to act as storage's to draw on for irrigation. Alternatively the water could be stored in underground tank systems. Analysis would be required to determine the likely benefit versus the economic and social impacts and it may be that opportunities are limited in the City

In every case the use of storm water as a resource requires consideration of and a balance between finding a use where lower water quality is acceptable, and collecting and storing the water for when it is needed.

## **5.4 WATER RE-USE AS AN ALTERNATIVE WATER SOURCE**

### **5.4.1 Greywater**

Water used in the home for showers and from baths and washing machines is relatively clean and can be recovered for use in the garden or for toilet flushing. This source is of a lower quality than rainwater, but is more reliable. Many water sensitive design approaches combine the use of rainwater with a supplement of greywater.

The position of Department of Human Services and other stakeholders is important, as there are public health concerns relating to the bacteria that exists in greywater. Care needs to be taken to ensure there is no possibility of connecting greywater to the drinking water supply, or of people coming into direct contact with greywater. Greywater also contains a number of pollutants including organic matter, nutrients, salts and detergents. These pollutants can damage the environment if greywater is not recycled responsibly.

Irrigation with greywater has been used successfully, but there is a risk that some sensitive garden plants and soil may be affected by long term use of greywater.

However, many of the conservation groups believe that there are unnecessary barriers preventing greywater use. Particularly if combined with some rainwater capture, the savings from greywater could range up to 30 to 40%.

Residents may choose to divert untreated greywater for immediate reuse. This can be done as long as there are no adverse impacts on public health or the environment caused by greywater run-off to stormwater. The City of Melbourne will develop guidelines to advise residents and businesses about effective greywater installation. Plumbers accredited with the Green Plumbers program will be particularly helpful in advising and implementing greywater systems.

Grey-water reuse is possible in high-rise buildings, but the costs are much lower if the concept is incorporated in the original design and piping. The City of Melbourne encourages incorporation of greywater systems and efficient water management in the development or retrofitting of commercial premises.

Water re-use can be applied in the industrial processes as a means of cost efficiency for businesses as long as expenditure for improvements have a short payback period. With the rising costs of water over the years there is an increasing incentive for sustainable water practices.

Many industrial premises produce quantities of wastewater, which contains only a limited and known range of contaminants. Therefore it can be more straightforward to treat this wastewater, or in some cases supply as is to other industrial users nearby.

#### **5.4.2 Blackwater**

Several main sewers run under the city. These carry large and reliable flows of water that can be accessed for non-drinking purposes. Clearly quality is the issue. Different levels of treatment are possible.

Current technology provides water that can be used without extensive restrictions at costs of around \$1500 / ML or higher. Note that end user prices for potable water in metropolitan Melbourne are around \$780/ML.

The City of Melbourne has undertaken a trial of water mining, also known as sewer mining, in the Domain. While water mining is practical, and the City of Melbourne is well placed to utilise this resource, the current operating costs appear high. Issues relating to production and storage capacity and whether they can meet a fluctuating irrigation demand typical to vegetation and in response to Melbourne's varying weather, require investigation. The quality of the water from the sewer mining process was very high.

As with all alternative sourcing of water, consideration needs to be given to other ecological factors such as greenhouse gas emissions. The social implications will also need to be considered for a triple bottom line basis for decision making.

### **5.5 INCENTIVES**

#### **5.5.1 The Role of Incentives**

Incentives are a valuable tool for encouraging water efficiency in households, businesses and industry. Incentives communicate the importance of water conservation and help people to take steps in being more aware and efficient with their use of water.

Incentives can come in the form of water efficient equipment, or in the adoption of water saving behaviour by local users. Examples include providing water audits and follow up advice for water users and setting up a loan program for water saving equipment. Other incentives include rebates (on water bills or rates) for the consumer, providing water efficient equipment free of charge; and developer incentives for the incorporation of water harvesting and re-use schemes in new construction.<sup>23</sup>

It is important that incentives are offered as part of a strategic plan for water conservation. This will ensure that the incentives are appropriate and effective at achieving the objectives of a sustainable water program. Regular monitoring of the uptake, use and cost-effectiveness of incentives will ensure that only those funding and encouragement schemes that add value will continue.

Incentive programs that are well funded are able to assist in introducing people who are otherwise uninterested to water conservation. With such programs, the incentive has an important role as a catalyst for further action.

If the program cannot be funded extensively, then it is likely that the incentives will only reach those who are already undertaking water saving initiatives. While this is more limited as a means of communication, it still serves an important role in encouraging the efforts of those undertaking water conservation efforts.

To support the *Sustainable Water Management Strategy – Part 1*, the City of Melbourne commits to the promotion and provision of a range of incentives over the next two decades. The program of incentives will be reviewed in accordance with the monitoring of water consumption patterns across the municipality.

### 5.5.2 Incentive Options

A range of incentive options will be considered and promoted by the City Of Melbourne. These include:

- **Discount Water Efficient Appliances:** During 2003/04 Council will develop a program to encourage the uptake of subsidised water efficient and energy efficient products by residents. While the exact structure of this program is yet to be determined it is envisaged that the program would provide City Of Melbourne residents with the opportunity to purchase products such as water efficient showerheads and flow regulators at a subsidised price. A process could be developed whereby agreed stores or manufacturers (decided through a competitive tendering process) offer products at a discount rate. This could include a take-back policy for old appliances to enable them to be recycled with or without modification. Alternatively, the products could be bulk purchased by the City of Melbourne corporation and sold to residents at discount price. This proposal will be researched and developed in the 2003/2004 financial year.
- **Payment by Savings** - The City of Melbourne will consider partnering with water retailers to provide a service to residents that will install water efficient technology paid for over time by residents in their water bills. The consumer is able to join the program and receive the water saving infrastructure that restricts water flow, however will not notice the additional cost in their bill, as the savings in water use

---

<sup>23</sup> Wise Water Management (1998), Stuart White

will offset it. After the water saving equipment has been installed, the premises will be investigated – a system of this kind is currently being operated by Yarra Valley Water for commercial premises.

- **AAA Shower Rose Kit:** This kit provides residents with a AAA Rated Shower Rose and instructions for installation. This enables residents to install the shower rose themselves and avoid the cost of plumber for installation. The kit could be purchased via a toll-free telephone line, enabling the potential company to send the kit to the customer and the invoice to the water retailer. The water retailer can then add the cost of the shower rose to the water bill, minus the water rebate. This has the benefit of enabling the consumer to avoid filling in the paperwork for the AAA shower rose rebate that is being offered by the water retailers. The feasibility of this idea will be explored with the water retailers and possible shower appliance companies. The City of Melbourne will promote this initiative if it proceeds.
- **State Government Rebates for Rainwater and Greywater Use:** Since January 2003, residents of Victoria have had the opportunity to reduce their potable water consumption by installing water saving products, rainwater tanks or/and greywater systems into their homes. Research has indicated that the take up of this rebate is very low. Over the initial four month period of the offer only one resident has installed a rainwater tank, and only six residences have installed water saving products eg. AAA shower heads. This low take up rate could indicate a lack of support for water saving options, or could merely be due to low awareness of the scheme. It is also believed that access to the rebate involves considerable paperwork, which may act as a disincentive for claiming. The City of Melbourne will partner with the water retailers to best seek to maximise this rebate opportunity.
- **Audit and Action Programs** – City West Water and South East Water have been providing free water audits to the large water users in each municipality. This service has been taken up by many companies and provides them with a greater understanding of their water use and costs. Follow up action to address excessive water use needs to be pursued by companies to make the audit worthwhile. The City of Melbourne will liaise with business and industry to encourage audit and action programs to be undertaken.
- **Loans Program** – The City of Melbourne can investigate the feasibility of partnering with financial institutions to offer low interest loans for water saving equipment such as rainwater tanks. It is necessary to determine whether such loans would increase uptake of water efficient features. If it is an effective way to implement water saving then Council will undertake this partnership.
- **Community and Environment Grants** – A range of community and environment grants are available for beneficial initiatives such as water conservation. The City of Melbourne will provide updated information to its residents and businesses about possible grants from government and business that could assist in saving water. Over time, the City of Melbourne will also consider a small grants program in any areas that are identified as useful in achieving water conservation objectives.

## 5.6 FINANCIAL FEASIBILITY OF APPLYING WATER SAVING CHANGES

Incentives aside, it is considered that planning for water efficiency in the household, business and industry is smart resource management that will result in long term savings.

Financial analyses undertaken by the City of Melbourne have shown that applying water efficient appliances, technology and design to houses and apartments will have an upfront cost that can be repaid within years. For example, a house with all water efficient appliances (such as AAA rated showerheads, AAAA washing machines, dual flush toilets, mulch, sink nozzle etc) is calculated to have a payback period of six years. The savings over twenty years are therefore significant. Installing rainwater tanks and greywater systems in dwellings has a longer payback period, but it too will likely see twofold return on investment in twenty years. Further details are provided in Appendix 9.

Other studies have shown financial benefits. Figtree Place in Newcastle incorporated water sensitive urban design features into its 27 dwelling residential development resulting in a saving of \$25,900 or 1% of construction costs. This equated to a saving of \$959 per dwelling in construction costs.<sup>24</sup>

A recent case study has shown that the Peter Lalor Secondary College has achieved a 36.7% saving in water consumption by installing water efficient appliances, reducing water flow rates, and installing a more appropriate hot water system. The measures have resulted in total annual cost savings of \$3,574 made up of savings from water costs, sewerage discharge costs and energy costs. Based on installation costs, the payback period for the school is identified to be 12.7 months.<sup>25</sup>

At this stage costing for water efficient practices in commercial and industrial premises have not been developed due to lack of data. This further financial analysis will be research by the City of Melbourne.

By supporting water efficiency, the *Sustainable Water Management Strategy – Part 1* plays an important role in promoting long term affordability for its residents and businesses. This is an important social objective for the City Of Melbourne.

## **5.7 SIGNIFICANCE**

This chapter provides a variety of ways to reduce our consumption of drinking quality water. This includes reducing our waste, reducing our demand, harvesting our water from rain and stormwater drains, and re-using our water in a variety of ways.

Significant growth is underway and much of it is high-density residential development including high-rise apartments. There may be significant opportunities for demand reduction, recycling and storm water reclamation in such projects, but the approaches will be different to those for developments on the outskirts of greater Melbourne. Also, this development in the city is happening now. Swift action could make a real difference in areas such as planning. If a few years go by, the opportunity will be lost and the costs of retrofit will be brought up as a barrier to change.

The City of Melbourne is committed to undertaking leadership programs in reducing water use. In particular, greywater systems will be applied in the proposed new Council House and the proposed Royal Park Wetlands. In the case of the latter, substitute supplies will continue to be investigated in partnership with Melbourne Water and encouraged as an alternative water source.

For water users outside of Council, education campaigns and communication campaigns will be undertaken to encourage best practice water management. Associated planning policies will be developed to ensure the requirements and potential for rainwater harvesting and greywater re-use are maximised. The City of

---

<sup>24</sup> Coombes, Kuczera and al. 2000a

<sup>25</sup> Water Efficiency Service (2003), Yarra Valley Water

Melbourne, in partnership with City West Water and Environs Australia is committed to running the 'Sustainability Street' community development program that is aimed at raising awareness and involvement in these environmental issues.

Incentives also have a role to play in taking action to conserve water. These schemes will develop in the context of our *Sustainable Water Management Strategy*. The City of Melbourne cannot directly undertake some of these schemes, however may be in the position to provide incentives and educate the community.

Details of water savings actions that can and will be undertaken to achieve water saving targets are set out in the following and final strategy implementation chapter.

## 6 STRATEGY IMPLEMENTATION

### 6.1 INTRODUCTION

This chapter proposes a way forward for implementing the strategies for conserving drinking quality water in the City of Melbourne. As a local government, the City of Melbourne is not in a position to directly implement some of these levers or measures. However it is a high profile and well regarded organisation with the ability to influence public policy outcomes and to support initiatives by other bodies within the municipality. The strategy also focuses on what the City of Melbourne can do within its own facilities to lead by example in promoting sustainable water practices.

### 6.2 KEY STRATEGIC MEASURES

There are a wide range of ways that business, residences and government organisations can reduce potable water consumption. The City of Melbourne will approach its key water saving actions under the four strategic measures set out in Table 12.

<b><i>Measure</i></b>	<b><i>Purpose</i></b>	<b><i>Potential Partners</i></b>
Leadership	Lead by example in reducing corporate demands on potable water. Share experience and knowledge with local business, industry and residents.	Melbourne Water, City West Water, South East Water, CSIRO, Queen Victoria Markets.
Strategy and Regulation	Implement policies and guidelines that influence corporate and community use of potable water. This includes policy, planning controls, regulations, local laws, and building and street activity permits	Melbourne Water, City West Water, South East Water, development and construction industry,
Education and Communication	Promote sustainable water management, raise the awareness of impacts, training for staff and industry, community engagement. The objective is to work towards long term cultural change in the way people, business and government use water.	Melbourne Water, City West Water, South East Water, community groups, industry groups (Property Council of Australia, Green Plumbers, Green Gardeners, Royal Australian Institute of Architects, Australian Water Association), manufacturers, businesses, universities.
Implementation and Monitoring	Data management, annual water consumption reviews, action planning, incentives, applying geographic information systems.	Melbourne Water, City West Water, South East Water, financial institutions, water industry, manufacturers,

**Table 12**

Summary of measures to reduce potable water consumption in the City of Melbourne

The range of water saving actions that can be implemented for residential, commercial, industrial and corporate water use is set out in Table 13 & 14. Council will apply these water saving actions over the duration of the twenty year Strategy. Additional water saving ideas and technology will arise over the coming years, and these will be added to the range of actions that help meet water saving targets. It is from the list of actions that the first Action Plan has been developed, as set out in Chapter 7.

Land use	Target Reduction	Key Initiatives
<b>Buildings</b>	35%	Retrofit dual flush toilets in all buildings Retrofit water efficient showers in all buildings Reduction in water pressure Green building design for Council House Landscaping for sustainable water outcomes eg: childcare centres and cultural buildings In-house education and promotion of water smart practices
<b>Markets</b>	40%	Education program for vendors Water audit and implementation of identified water savings Rainwater harvesting – 80%-100% possible for Queen Victoria Market Greywater implementation Reduction of flow rate on hoses
<b>Parks &amp; Gardens</b>	26%	Royal Park wetland stormwater reuse project (8% water saving calculated)  Introduction of moisture sensitive irrigation Program to fix leakage in fountains. Install water-recirculating systems in the fountains not recycling water Some installation of greywater management systems Sewer mining piloting Water efficient landscape design. Reduced irrigation in turf median strips. Alternative paving design median strips. Contract management to reflect water conservation and stormwater management
<b>Depot</b>	25%	Some rainwater harvesting Retrofit any dual flush toilets & install AAA shower roses, where possible. Educating employees on wash-down practices
<b>Toilets</b>	20%	Retrofit dual flush toilets Feasibility of rainwater harvesting and greywater re-use for toilet flushing Sample water less toilet Improved internal cleaning
<b>Recreation</b>	30%	Efficient water management at local swimming pools (such as prompt identification and fixing of leaks) Re-use of swimming pool water Retrofit dual flush toilets Installation of AAA shower roses General staff and visitor education
<b>Miscellaneous</b>	5%	General Education Technological improvements
<b>Total</b>	<b>28%</b>	

**Table 13:** Estimated water savings per City of Melbourne land use

(Source: City of Melbourne May 2003)

Land use	Target Reduction	Key Initiatives
<b>Residential</b>	40% per resident	Installation of diverters, rainwater & greywater tanks. Retrofit dual flush toilets Install AAA shower roses Install AAAA washing machines Install AAA washing machines Green building design. Reduction in water pressure to reduce flow rates Water efficient landscape design including mulching Education on garden practices Some installation of greywater re-use in gardens. Case study on street/community. Education re: concrete wash-down & car washing practices.

Land use	Target Reduction	Key Initiatives
<b>Industry</b>	40% per employee	Installation of rainwater & greywater tanks. Retrofit dual flush toilets & AAA shower rose. Reduction in water pressure Educating industry about wash-down practices. Green landscape/building design. Revising industrial practices eg. Cooling machinery.
<b>Commercial</b>	40% per employee	Retrofit dual flush toilets, AAA shower rose & AAA dishwasher. Installation of rainwater & greywater tanks, where possible, water re-use in toilet Reduction in water pressure Innovations in new residential buildings to incorporate greywater/rainwater use. Educating retailers about wash-down practices. Green Landscape/Building design. Revising food-handling practices.

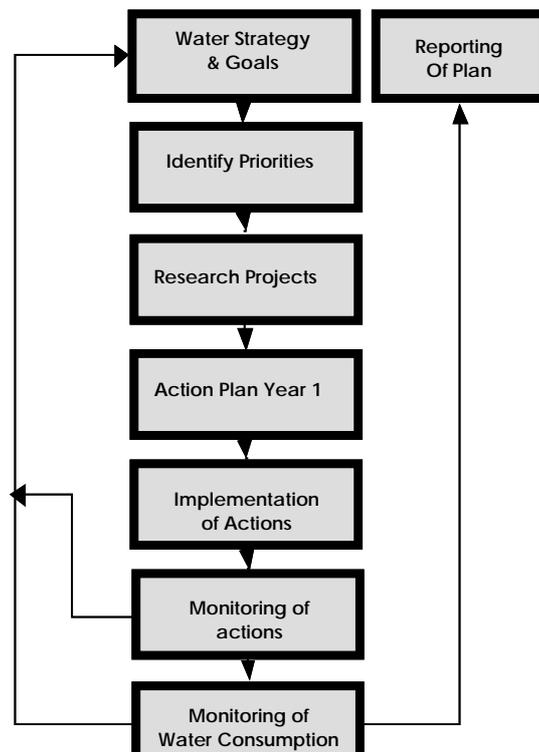
**Table 14:** Estimated water savings Residential and Non-residential land uses  
(Source: City of Melbourne May 2003)

### 6.3 ANNUAL ACTION PLANS AND PRIORITIES

Implementation of the strategy can be progressively achieved by realising water consumption targets identified in annual water action plans. The water action plan for each financial year will be reviewed against:

- the objectives of the strategy;
- priority areas for water consumption reduction;
- monitoring of the performance of actions; and
- the current action plans' contribution to the strategy's long-term goals.

In response to an annual review, new projects designed to reduce water consumption and maximise opportunities for the substitution of sources of water will be added to the water action plan. Completed projects may no longer be listed and the plans reviewed, while other projects may be maintained if deemed to have longer-term quantifiable impacts. The action plan process is summarised by the flow diagram at Figure 5.



**Figure 5:**  
Action Plan process

## 6.4 COORDINATION OF THE STRATEGY

Coordination of the strategy implementation will require the City of Melbourne to play a central role in the ongoing promotion, leadership and management of the partnerships required to deliver these challenging actions.

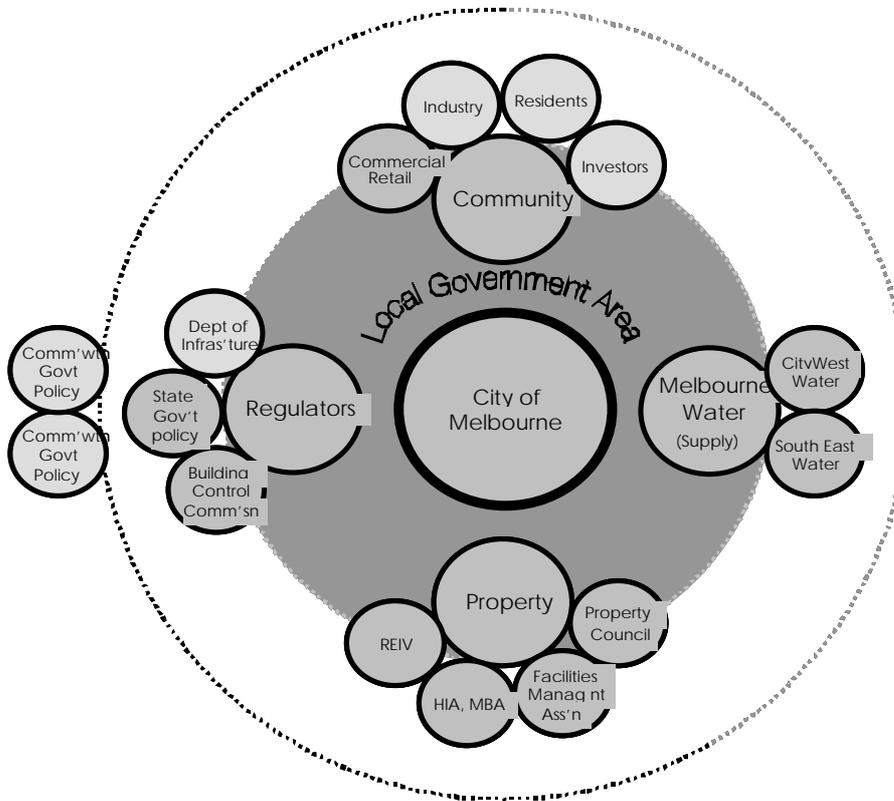


Figure 6  
Coordination of the strategy

## 6.5 STRATEGY FUNDING

Many of the action plan projects will require operational, research or management funding. It is likely that specific actions will be reviewed, considered and assessed to fit within the City of Melbourne's normal business planning processes and systems.

## **7. WATER SAVING ACTION PLAN 2003/2004**

### **7.1 FIRST ACTION PLAN - 2003/2004**

The inaugural Action Plan is included in the *Sustainable Water Management Strategy – Part 1*. The Action Plan responds to the key strategic measures outlined at the beginning of this chapter. Key actions that the City of Melbourne is committing to in its first three years have been selected from the range of initiatives that specified above as a means of achieving water saving targets.

Water Strategy Action Plan 2003/2004 has been set out in the flowchart at Figure 7.

The Action Plan will be reviewed on an annual basis.

### **7.2 REDUCING WATER CONSUMPTION**

#### **7.2.1 The City of Melbourne**

As part of its *Corporate Plan 2002–2005*, the City of Melbourne has set targets to reduce the amount of potable water used by its programs. The *Corporate Plan* targets will now be informed by the *Sustainable Water Management Strategy – Part 1*.

As maintenance of the many parks and gardens dominates the City of Melbourne's water use, reduction in this area is considered separately from other City of Melbourne facilities.

#### ***Parks and gardens***

The greatest opportunity for the City of Melbourne to reduce its water use is in the area of parks, gardens and street medians.

It is noted that water use for gardens is directly dependent on climatic conditions and rainfall, a variable that can make forecasting and target setting difficult. For the purposes of this strategy however, targets are set that reflect savings that can be achieved through changes to watering practices such as applying drip irrigation in some instances where water is running off onto pavements due to current sprinkler irrigation. It is not the intention to reduce watering to the point of causing horticultural damage to trees and plantings. It is also not the intention to deny the City of Melbourne's obligations to preserve its significant heritage landscape artefacts by maintaining necessary water levels.

There are many opportunities to reduce the potable water demand in parks, gardens and medians however, it must be recognised that many initiatives require substantial investment and that progress in this area may be very dependent on the funding available to implement water efficient practices and/or alternative water sources. It is recognised that the financing can only be achieved gradually over time, hence the importance of setting a target over a considerable period of time, to 2020.

The development of the Royal Park Wetlands and associated water reuse project offers an opportunity to reduce water consumption in the municipality by 8%. The project will capture the stormwater run-off from the Royal Melbourne Zoo, treat via the wetlands system and re-use within the municipality.

As with other water saving targets that are set in this Strategy, the parks and gardens targets will be reviewed and revised regularly. This revision will be responsive to growing information about water use, target setting, technology, design and education.

### ***Other City of Melbourne assets***

Other City of Melbourne facilities account for around 18% of the total corporate water demand. Detailed consumption data for 1999 to 2002 have been analysed for the purposes of this study, however knowledge gaps still exist. For example, the proportion of City of Melbourne buildings using water-efficient appliances is not known.

The Melbourne Wholesale Fish Markets and the Queen Victoria Fish Markets are large water users, consuming 110,200 kilolitres and 36,470 kilolitres of water respectively in the base year of 1999/2000. This total 8.7% of corporate water use. From this, it is recognised that water management is a priority for the City of Melbourne markets. A program to work with Queen Victoria Market is currently in development with objectives to reduce water consumption, reduce stormwater run-off, and improve stormwater quality. The program will also have a high communication and education component given the high profile of the Queen Victoria Markets. Continual water efficiency improvements will be made at the Melbourne Wholesale Fish Markets, however a comprehensive scheme will not be developed until the future of this market in its current location is determined.

The development of the new Council House provides an opportunity to develop a commercial building that meets international best practice standards in achieving potable water efficiency. This will provide knowledge and awareness that can be passed on to the development industry and other key players in the City Of Melbourne.

For the City of Melbourne to progress with the *Sustainable Water Management Strategy – Part 1*, a full water audit of all City of Melbourne corporate facilities was undertaken. The results of the audit illustrate where the greatest potential lies for reducing water demand in the City of Melbourne.

### **7.2.2 Community**

Education will be the key component of the *Sustainable Water Management Strategy* Action Plan.

Communicating the intent and goals of the Strategy along with advice and assistance on how households and businesses can achieve these goals will be an important implementation tool. Council will undertake a range of leadership actions to reduce corporate water use as a way of encouraging local businesses and residences to also take up water saving initiatives.

Council will also develop policy documents and regulatory provisions where necessary that will assist with the inclusion of rainwater harvesting and greywater systems into development applications. A clear and helpful position on these water efficiency measures will help promote water conservation in the municipality.

## **7.3 MONITORING AND REVIEW**

Strategically it is necessary to commit to annual monitoring and recording of water consumption. This will provide a source of information and review that will inform Council and the community of the best way to continue saving water.

### 7.3.1 Data Improvements

Monitoring and review is important for all aspects of the *Sustainable Water Management Strategy – Part 1*. Data collection will form a vital part of monitoring for the Strategy. This will comprise an annual audit and report which will form the basis for analysis of changes in water consuming behaviour. Any noticeable trends or water users will be considered as part of the review of annual Action Plans that seek to conserve water.

Actions that can be undertaken over time to ensure the continuous improvement of data include:

- establish comprehensive recording system of water consumption across all Council assets;
- complete a water audit for all Council facilities to include assessment of showers, toilet cleaning practices, wash down etc. This is required to make a full assessment of the potential savings and re-confirm strategy targets;
- work in partnership with water retailers City West Water and South East Water to develop a more detailed understanding of water consumption in the non-residential sector of the community;
- undertake base water audits for a range of businesses to have better understanding of water use and opportunities for saving water;
- work with other Council's around Australia or from similar climatic regions to benchmark the City of Melbourne's water use;
- manage data through geographic information systems to enable spatial analysis of water management.

The above matters will be addressed in a Data Protocol that aims to ensure continuous improvement of data access and quality.

### 7.3.2 Target Setting Revisions

The water saving targets will be monitored to ensure they are viable and effective in promoting water conservation initiatives. The setting of targets has relied on a range of assumptions, due to the lack of research, knowledge and experience in the water industry about the practice of water demand management. It is the intention to review the *Sustainable Water Management Strategy* and its targets every three years (and the associated Action Plan will be reviewed annually). The reviews enable the information gaps to be filled hence reducing the reliance on a range of assumptions for setting targets.

The targets will be reviewed subject to additional information including:

- Research and advice on methodologies for water demand management and target setting;
- End use data for water use, particularly in commercial and industrial sectors;
- Research into the effect of climate change on water supplies and weather patterns;
- Community interest, involvement and reaction to water demand management strategies;
- Triple Bottom Line assessment of Action Plans for reducing consumption of drinking quality water to date.

It is noted that many of the initiatives for achieving water savings are not within the responsibility of the City of Melbourne. It will be necessary for the City of Melbourne to form key partnerships with the water

industry, the development industry, the landscaping industry, businesses, industry, education and research providers and the community to best achieve the necessary results. Many of these key partnerships are in their beginning phases, and all assumptions for setting water saving targets are based on feasible partnership initiatives only.

#### **7.4 SIGNIFICANCE**

The City of Melbourne has developed an Action Plan for reducing water consumption in the immediate years. The Action Plan has been developed in line with the key strategic measures developed in response to a municipality-wide water consumption audit.

The key projects in the Action Plan will result in water savings for Council. This enables Council to have a leadership role in reducing water consumption thereby providing the inspiration and knowledge to encourage other organisations and residences in the municipality to be more efficient with their own water use. With on-going improvements in research, design, technology and practice it will be necessary for the City of Melbourne to review its Action Plan annually, in accordance with new information and data. Similarly, the *Sustainable Water Management Plan* will need to be revised in three years to reflect a rapidly changing industry.

# Water Strategy Action Plan 2003/2004

## Leadership

The City of Melbourne corporation uses 6% of the total water consumed in the municipality.

The City of Melbourne will lead by example in reducing its own demands on potable water.

This will encourage local businesses, industries and residents to make water saving efforts.

The experiences and knowledge gained from Council projects will be shared with the community as a means of raising awareness, knowledge and interest.

Initial actions are:

### Queen Victoria Markets.

Water management, re-use, recycling and substitution.

Education and marketing angle.

### 'Council House' Redevelopment.

Best practice water management and procurement on a commercial budget. Communicate features of the building to wide audience.

### Royal Park Wetlands

Create wetland to treat stormwater from Melbourne Zoo and recycle it for a range of uses.

## Strategy and Regulation

The City of Melbourne is able to implement policies and guidelines that influence internal and external practices.

This includes policy, planning controls, regulations, local laws, building and street activity permits to apply sustainable water management provisions.

Identify impediments and possible incentives.

Initial actions are:

Rainwater Tank Policy  
Guidelines for Water Sensitive Urban Design  
Grey Water Use Policy  
Soft Paving Materials Policy  
Ecological Sustainable Building Policy Review

Open Space and Recreational Facilities Water Management Guidelines

Principles of design, new irrigation technology, sewer mining, new planting or management techniques, water audits, EMP's.

## Education and Communication

Education is an important on-going component of any program that seeks to achieve a cultural change. This applies to water conservation.

The City of Melbourne will promote its own water saving initiatives as an educational opportunity.

Training for staff will be on-going to keep up with the continuous improvement associated with 'sustainability'.

Initial actions are:

Property Council program regarding water conservation in the development industry.  
Green Gardeners Industry Forums  
Green Plumbers Industry Forum  
Council House sessions  
Staff training.

Communication is vital for the Sustainable Water Program.

Will develop a Communication Strategy to reach range of target audiences – residents, businesses and industry.

Initial actions are:

Sustainability Street – a community development program with sustainability objectives  
Incorporate water message into existing special events eg: Moomba.  
Cross promotion where relevant with water retailers, neighbouring councils etc

Advocate for water conservation that is beyond the control of local government.

On-going promotion of technology, design ideas, community initiatives.

## Implementation and Monitoring

### Data Management

Generate an agreed and efficient data management protocol for water consumption and monitoring for the City of Melbourne.

### Annual Review

An annual review of water consumption will be undertaken, recorded and reported.

### Action Plans

Short term Action Plans will be developed to achieve progressive gains in water savings. These will be reviewed annually subject to project evaluation, and annual data analysis.

### Incentives

Incentives will be provided to aid implementation. The incentives will be linked to regulatory development, communication and on-going monitoring to ensure effectiveness. Partnerships will be a vital element of incentives.

### Geographic Information Systems

GIS is a tool that will be applied to the on-going monitoring and management of the water management program.

**City Of Melbourne**

# GLOSSARY

<b><i>Term used</i></b>	<b><i>Definition</i></b>
<b>Blackwater</b>	Household wastewater that contains solids waste (ie. the stream from toilets)
<b>CWW</b>	City West Water
<b>ESD</b>	Ecologically Sustainable Development
<b>Greywater</b>	Household wastewater that has not come into contact with toilet waste. It includes wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, laundry tubs and kitchen sinks.
<b>ICLEI</b>	International Council for Local Environment Initiatives
<b>Potable Water</b>	Water fit for human consumption. Also referred to as 'drinking quality water'.
<b>Stormwater</b>	Precipitation that accumulates in natural and/or constructed systems during and following a storm event. This is surface runoff (ie. rainfall) that flows over the ground towards lower elevations without infiltrating the soil
<b>Sustainable</b>	More than 100 definitions of sustainability and sustainable development exist. The best known is that by the WCED: development is sustainable where it 'meets the needs of the present without compromising the ability of future generations to meet their own needs.'
<b>SEW</b>	South East Water
<b>SWMP</b>	Storm Water Management Plan (2000) for MCC
<b>SWMS</b>	Sustainable Water Management Strategy (2003) — this study
<b>TBL</b>	Triple Bottom Line (ie. sustainability principles incorporating cultural, environmental and economic considerations)
<b>Xerophyte</b>	A plant that is adapted to living and growing with limited water because their formation provides water storage or limits <i>transpiration</i> , such as cactus and succulents.

## 7 BIBLIOGRAPHY

### 7.2 DATA

Australian Bureau of Statistics (May 2000), *Water Account for Australia 1993/94 to 1996/97*, cat. no. 4610.0, Austats Canberra.

City West Water (May–June 2002), *Water Consumption Data*, City West Water for Melbourne City Council, Melbourne.

Melbourne City Council (2000), *CLUE 2000*, <http://www.melbourne.vic.gov.au/clue/document/00ECA1.pdf>

O'Shaughnessy P & Jayasuriya (1991), *Water Supply Catchment Hydrology Research – Status Report*. Melbourne Water.

South East Water (May–June 2002), *Water Consumption Data*, South East Water for Melbourne City Council, Melbourne.

### 7.3 POLICY AND PROJECT INFORMATION

Australian Landscape Management, GHD, Max Nankervis and Associates and Totally Sustainable (June 2002), *Growing Green: An Environmental Plan for Melbourne's Parks, Gardens and Recreational Facilities (Draft Paper)*, Parks and Recreation Group, Melbourne City Council, Melbourne.

Barlow M. & Clarke T. (2002), *Blue Gold. The Fight to Stop the Corporate Theft of the World's Water*. The New Press. New York.

Brisbane City Council (October 1997), *Urban Stormwater Management Strategy*, (version no. 1), Brisbane City Council, Brisbane.

Connell Wagner (July 2000), *Southbank Flood Study: Miles Street Precinct*, Connell Wagner for Melbourne City Council, Melbourne.

Coombes P.J and Kuczera G. (2000a) 'Tank Paddock: A Comparison between WSUD and Traditional Approaches' Research Report for Newcastle City Council. Department of Civil Surveying and Environmental Engineering. University of Newcastle.

CSIRO (1999), *Urban Stormwater: Best Practice Environmental Management Guidelines*, CSIRO Publishing, Melbourne.

Department of Infrastructure (2000), *Victoria in Future 2000: The Victorian Government's Population Projections 1996–2021*, Victorian State Government, Melbourne.

Transurban (2002), [http://www.transurban.com.au/content/media/18\\_Oct\\_2001.htm](http://www.transurban.com.au/content/media/18_Oct_2001.htm)

Department of Natural Resources and Environment (2002), *Victorian Greenhouse Strategy*. NRE

Docklands Authority (November 2000), *Melbourne Docklands 2000+*, Docklands Authority, Melbourne.

Environmental and Land Management and Ecological Engineering (August–September 2001), *Port Phillip Coastal and Marine Planning Program, Stormwater Implementation Project: Statutory Framework and Standards*, Environmental and Land Management and Ecological Engineering for Association of Bayside Municipalities (ABM), Melbourne.

ID Consulting (1999), *Population Estimates and Forecasts Prepared for the Community Services Branch based on 1996 Census Data and Updated ABS Approvals Data*, ID Consulting for Melbourne City Council, Melbourne.

Melbourne City Council (2002), *Census of Land Use and Employment, 2000*, <http://www.melbourne.vic.gov.au/clue/index.cfm>

Melbourne City Council (December 2001) *City Plan 2010*, Melbourne City Council, Melbourne.

Melbourne City Council (2002), *Draft Annual Plan 2002-2003*, Melbourne City Council, Melbourne.

Melbourne City Council (2002), *Draft Corporate Plan for the City of Melbourne 2002–2005*, Melbourne City Council, Melbourne.

Melbourne City Council (October 2000), *Economic and Population Profile: Melbourne City Suburbs*, Melbourne City Council, Melbourne.

Melbourne City Council (ca. 2000), *Melbourne Green Map: A Guide to Green Sites, Services and Resources in the City of Melbourne*, Melbourne City Council, Melbourne.

- Melbourne City Council (ca. 1995–2000), *Tree Policy*, Melbourne City Council, Melbourne.
- Melbourne City Council (ca. 1995–2000), *Parks Policy*, Melbourne City Council, Melbourne.
- Melbourne City Council (May 2000), *Flagstaff Gardens Draft Master Plan*, Melbourne City Council, Melbourne.
- Melbourne City Council (1999) *Activities Local Law 1999*, Melbourne City Council, Melbourne.
- Moreland City Council (October 1997), *Moreland Landscape Guidelines and Technical Notes*, Moreland City Council, Melbourne.
- Moreland City Council (October 1997), *Moreland Open Space Strategy*, Moreland City Council, Melbourne.
- Melbourne Water Corporation (2002) <http://www.melbournewater.com.au>
- OECD (2002), *Towards Sustainable Household Consumption? Trends & Policies In OECD Countries*. OECD Paris.
- Swanson, R. (1984), *Melbourne's Historic Public Gardens: A Management and Conservation Guide*, Landform Australia Pty. Ltd. for Melbourne City Council, Melbourne.
- The Age (2002), <http://www.theage.com.au/articles/2002/07/23/1027332364436.html>
- Victorian Stormwater Action Program (2002), *Fact Sheet. Protecting Stormwater Quality from Building and Construction Sites Project*, Victorian Stormwater Action Program, Melbourne.
- Victorian Stormwater Action Program (ca. 2000+), *Protecting Stormwater Quality from Building and Construction Sites*, Victorian Stormwater Action Program, Melbourne.
- Water Resources Strategy Committee for the Melbourne Area (June 2001), *Discussion Starter: Stage One in Developing a Water Resources Strategy for the Greater Melbourne Area*, Water Resources Strategy Committee and Victorian State Government, Melbourne.
- Water Resources Strategy Committee for the Melbourne Area (May 2002), *Strategy Directions Report: Stage 2 in developing a Water Resources Strategy for the Greater Melbourne area*, Water Resources Strategy Committee and Victorian State Government, Melbourne.
- Water Resources Strategy Committee for the Melbourne Area (October 2002), *Twenty First Century Melbourne: A WaterSmart City - The Final Report*, Water Resources Strategy Committee and Victorian State Government, Melbourne.
- WBM Oceanics Australia (January 2000), *City of Melbourne Stormwater Management Plan Volume 1 Final*, WBM Oceanics Australia for Melbourne City Council, Melbourne.
- White S. (ed) (1998), *Wise Water Management. A Demand Management Manual For Water Utilities*.
- 7.4 GENERAL INFORMATION**
- Hitchmough, J.D. (1994), *Urban Landscape Management*, Inkata Press, Sydney.
- Marsh (1991), *Landscape Planning: Environmental Applications* (2<sup>nd</sup> ed.), John Wiley and Sons, Inc., Toronto.

## APPENDIX A

---

### Strategy Methodology

The goal for sustainable water management in the City of Melbourne is to reduce potable water consumption. How can this Strategy best provide for results on the ground?

#### **a) Demand for Water**

Early water strategies were generally shaped around the supply of water. Authorities would forecast the amount of water needed based on current use, and then take action to provide a greater source of water supply. In direct contrast to this method, the City of Melbourne uses the more current method of working within the parameters of existing water supply and seeking to manage future water demand accordingly. This will provide for a much sounder ecological and social solution to water management, not to mention the economic benefits of promoting the water conservation industry.

Two key methods of reducing potable water consumption will be pursued in the Strategy. This includes an emphasis on demand management to help people and businesses reduce the amount of water they use each day. The other is the promotion of water re-use and harvesting for residential, commercial, industrial and Council purposes. Technologies for greywater systems, sewer mining, and rainwater tanks are continuously improving, and should be used more widely as a means of reducing demand for potable water.

#### **b) The Role of Education and Community Engagement**

It is important to express the context of water management. This will help with the reasoning and justification for water saving actions. This context needs to acknowledge the global aspect of water management, and then localise by providing a catchment understanding of ecological, social and economic issues relating to water. These holistic considerations are then applied at a municipal level.

Changing water practices requires changes in behaviours, infrastructure and systems. Such a cultural change will meet significant resistance, and this needs to be acknowledged in any program for meeting sustainable water goals.

A long-term management approach is the most effective way to encourage cultural change. By investing time into a programme, a continuous education and community engagement campaign can be implemented that will expose the public to the issues, ideas and solutions associated with water management. Education needs to expose people to different options so that they are free to make their own informed behavioural decisions. A short-term education campaign can merely come across as prescriptive, not providing the audience with the time to respond thoughtfully to the issues at hand.

Education campaigns can be designed with different audiences, approaches and involvement in mind. The City of Melbourne has a range of audiences that it could target and involve: employees, residents, rate-payers, elderly residents, children and school groups, industry operators, business owners, development industry, landscaping industry, and the media. The City of Melbourne should focus primarily on its residential, business and industry owners and operators to best achieve local water savings. It is acknowledged that complementary water education programs are likely to be run for different audiences by other organisations such as Melbourne Water, EPA, Australian Conservation Foundation, Environment Australia, Green Plumbers etc. Community engagement opportunities also arise due to the motivation of existing community groups, individuals and non-government organisations.

#### **c) The Role of Research**

Research for sustainable water management policy, technology and implementation is continuously raising new issues and solutions that need to be considered in this Strategy.

Continual research is needed to enable the strategy to be relevant due to a quickly changing knowledge base. It is intended that relevant research from the water industry and other sources will be incorporated into the Strategy via the annual revision of the Action Plans.

Council-specific research will likely relate to data analysis, target setting, community engagement and consultation, case studies, monitoring, and links with related Council strategies that are developed over time. It is hoped that many of the assumptions used in this Strategy can be replaced by knowledge over time.

#### **d) The Role of Action**

The key premise of the water management education campaign by Council is to 'lead by example'. It is Council's intention to develop a commercially viable greywater treatment system as part of the proposed new Council House. Similarly there are proposed plans for rainwater harvesting at Queen Victoria Market, and examples of mulching in Council's parks and gardens and other such actions. This approach was requested by many of the public who commented on the draft version of this Strategy. It was similarly requested that Council implement the Strategy by focusing on a small number of achievable projects that will see results on the ground. This approach has been adopted in the Strategy in preference for a more comprehensive list of possible actions to undertake.

Action Plans will seek to achieve a range of short-term gains that add up to a long-term strategy. The Action Plan will be revised every 12 months on the basis of progress, research, feedback, consultation, partnerships, budgets, monitoring and review.

#### **e) Using a Triple Bottom Line Decision Making Approach**

The City of Melbourne is committed to decision making based on consideration of ecological, social and economic factors.

- **Connected and Accessible City**

The *Sustainable Water Management Strategy* is unlikely to impact on either the connectedness or accessibility of the municipality generally or its transport and communications infrastructure specifically.

- **Innovative and Vital Business City**

Council's Strategy and the State government's water management measures are likely to have a significant positive influence on the development of the City's environmental management sector particularly those businesses dealing in water efficient technologies or sustainable water management systems. Implementation of the Strategy may lead to the development of expertise or technologies that could be exported internationally. Additionally, the Strategy and the State's water plans may result in increased investment in sustainable water management technologies and related product research and development. However, the direct impacts are not quantifiable at this stage.

Addressing the issue of sustainable water management is likely to assist Melbourne to grow its reputation as a "knowledge city" and may well lead to the creation of jobs in the environmental management sector.

The implementation of cost effective water saving measures, as outlined in the Strategy, will assist business to reduce operating costs thereby assisting businesses maintain their financial sustainability.

- **Inclusive And Engaging City**

The sustainable management of water will ensure Melbourne's heritage trees, tree lined streets and parks and gardens in general will have access to a consistent water supply thereby maintaining quality open spaces for community use.

- **Environmentally Responsible City**

The successful implementation of the Strategy will result in an approximately 12 % reduction in current water consumption levels across the municipality by 2020. Total water savings are forecast as 2,900 megalitres.

While the strategy will produce environmental benefits in terms of water management, care will need to be taken to ensure that this does not happen at the expense of Council's greenhouse abatement programs. Certain water efficient technologies and conservation measures will require the use of energy consuming plant and machinery to enable them to operate (eg pumps for rainwater or greywater reuse systems). In these circumstances it is recommended that most energy efficient products be used.

The Strategy is not likely to impact negatively on the City's biodiversity. A reduction in water demands from the City is likely to have a positive impact on the biodiversity of Melbourne's water catchments. Additionally, the successful achievement of the Strategy's targets should contribute to delaying the need for the construction of additional water storage facilities in the future.

## **f) Strategy Assumptions**

A number of assumptions have directed the strategy recommendations, including:

- City of Melbourne population is forecast to increase from 51,000 residents in 1999 to 123,000 residents in 2020.
- City of Melbourne industry and commercial sectors will increase by 2020, however it will not experience the growth of the residential sector. There are no forecasts for industry and commercial development, and assumptions were made based on greater Melbourne growth to calculate absolute water savings.
- Technology for saving, re-using and improving the quality of water will improve, and in most cases be more affordable, over time;
- City of Melbourne regulations and policies will be continuously revised providing important opportunities for including sustainable water objectives, requirements and actions.
- Data used as the basis for this Strategy is not perfect, however it will progressively improve.
- Targets for water saving and water quality have been set using the best knowledge to date with the purpose of providing a goal. The target can be varied over time if greater knowledge helps devise a more appropriate target.
- Other Council's in the Port Phillip catchment area will be undertaking sustainable water management programs providing the opportunity for catchment wide responses to water issues in the future.

## APPENDIX B

---

### Project Partners

This study has been undertaken by the City of Melbourne in collaboration with Melbourne Water and the International Council for Local Environmental Initiatives (ICLEI). City West Water and South East Water have supplied water consumption data and advice.

#### 1. City of Melbourne

The City of Melbourne's own water use comprises only a small proportion of the total water consumption in the municipality. However, the Council can play a significant leadership and stewardship role in advancing the strategy's objectives. As Melbourne's local government authority and an active participant in environmental organisations such as ICLEI and the Association of Bayside Municipalities, the City of Melbourne can promote water conservation, harvesting and re-use and lead by example.

#### 2 Melbourne Water

Melbourne Water manages water resources in metropolitan Melbourne, providing bulk supply to its retail water customers such as City West Water, South East Water and Yarra Valley Water. Melbourne Water manages the treatment and disposal of more than 95 % of Melbourne's sewage and collects stormwater from municipal drainage systems for transport to waterways, Port Phillip Bay and Western Port. Melbourne Water also manages waterways and floodplains in greater Melbourne. It works with the State Government to define Victoria's strategic direction in water supply and stormwater quality issues, and in this capacity has significantly contributed to preparing *21<sup>st</sup> Century Melbourne: A WaterSmart City – Final Report* (2002)

#### 3 City West Water and South East Water

City West Water (CWW) and South East Water (SEW) provide drinking water, sewerage and trade waste services to customers in the City of Melbourne area. South East Water services the south east regions of Melbourne, including the City of Melbourne area south of the Yarra River. City West Water operates in the central business district and the inner and western suburbs of Melbourne. As retail water companies, South East Water and City West Water purchase bulk water and sewage transport and treatment services from wholesaler Melbourne Water. They are also responsible for the management of related infrastructure, including sewage and water pumping stations and pipelines, major water tanks, and small local sewage treatment plants. The retail companies are required by the State Government to promote water conservation within their jurisdictions. As the retailers have direct contact with consumers, they are in an ideal position to be influential regarding consumer behaviour.

#### 4 International Council for Local Environmental Initiatives (ICLEI)

ICLEI is a membership organisation of local governments and their associations. It is dedicated to establishing and assisting a worldwide network of municipalities to achieve tangible improvements in global environmental conditions.

ICLEI has initiated the Water Campaign<sup>26</sup> that provides local governments with a structured and coordinated program for improving the sustainability of water management within their municipalities. The City of Melbourne has been a pilot Council for this program, and is now leading a number of councils across Australia in undertaking the necessary milestones in working towards water management. It is this program that has instigated and formed the basis of this *Sustainable Water Management Strategy*.

#### 5 Other Partners

The *Sustainable Water Management Strategy* offers a range of opportunities to join with other industry and community organisations to manage water more effectively. The City of Melbourne will actively seek these partnerships as a means of promoting water management in the municipality and across the water industry.

The Property Council of Australia (Victoria) are a City of Melbourne partner in promoting sustainable development in the commercial development sector. Other potential partners in the development sector include the Facilities Management Association, Housing Industry Association, Master Builders Association and the Real Estate Institute of Victoria.

The City of Melbourne will develop important partnerships with the water industry including the Australian Water Association, Stormwater Industry Association and water product and service manufacturers. These partnerships will be vital in sharing knowledge, awareness and experiences about water conservation and management.

---

<sup>26</sup> Refer Appendix A for further information

Professional associations including the Royal Institute of Architects and the Planning Institute of Australia will also provide partnerships based around education and awareness raising. Partnerships with Universities will provide similar benefits, RMIT University already a partner with the City of Melbourne on a Rooftop Greening project.

The State Government, including the Department of Sustainability and Environment, and Department of Health will be an important partner in developing and implementing policies on water consumption.

Non-government organisations such as Environs Australia and the Australian Conservation Foundation and more will be able to provide partnerships on projects and awareness building for sustainable water management.

Partnerships with local businesses, industries and community groups will be an important means of implementing water management on the ground to achieve water savings and to provide experiences that other urban areas can learn from.

The City of Melbourne welcomes beneficial partnerships from a range of different players in the development, planning, building, construction, business, industrial and community sectors to help in achieving its goals of best practice water management.

## APPENDIX C

### Breakdown of City of Melbourne water consumption 1999-2002

Sector	Consumption (kl) 99/00	Cost 99/00	Consumption (kl) 00/01	Cost 00/01	Consumption (kl) 01/02	Cost 01/02
Administration Buildings	10,453.00	\$5,667.00	9,136.00	\$9,540.00	5,607.00	\$8,321.00
Child Care Centres	0.00	\$0.00	4,721.00	\$8,092.00	5,107.00	\$7,772.00
Cultural Buildings	253.00	\$175.00				
Depots	3,227.00	\$2,238.00	2,980.00	\$2,135.00	4,918.00	\$3,689.00
Facilities Toilets	27,780.00	\$19,130.00	22,087.00	\$22,160.00	19,749.00	\$22,855.00
Gardens-Planter Boxes	168	\$115.00	965	\$697.00	291	\$217.00
Market Buildings	146,650.00	\$101,189.00	129,834.00	\$93,870.00	124,329.00	\$93,533.00
Miscellaneous	14,944.00	\$9,490.00	20,896.00	\$15,068.00	18,245.00	\$13,696.00
Street Trees & Plantings	254,742.00	\$175,975.00	197,675.00	\$142,566.00	238,873.00	\$178,317.00
Parks & Outdoor Recreation	1,124,390.00	\$779,939.00	985,928.00	\$704,500.00	856,887.00	\$638,441.00
Recreation Centres	90,937.00	\$78,348.00	63,708.00	\$46,040.00	25,041.00	\$18,805.00
Town Halls	11,911.00	\$7,004.00	9,741.00	\$13,819.00	11,317.00	\$16,842.00
<b>Total</b>	<b>1,685,455.00</b>	<b>\$1,179,270.00</b>	<b>1,339,226.00</b>	<b>\$980,043.00</b>	<b>1,208,605.00</b>	<b>\$927,407.00</b>

## APPENDIX D

### Eight Step Process for Setting Water Saving Targets

---

#### City of Melbourne

#### 8 Step Process for Setting Water Saving Targets

- 1 Principles:** Established guiding principles for water management  
↓
- 2 Audit:** Collated water consumption data for the previous three years, using 99/00 as a base year. The data is separated into corporate and community water use.  
↓
- 3 End Use Analysis:** Collated all existing water use statistics (eg: AAA shower roses use 35% less water).  
↓
- 4 Forecasting Growth:** Extrapolated forecast growth levels for residential, industrial and commercial sectors. This required the use of significant assumptions particularly for the non-residential sectors.  
↓
- 5 End Use Modelling:** Calculated likely water savings per residential, industry, commercial and corporate sectors using information collected in Steps 2, 3 & 4 (eg: likely that 70% houses will install AAA shower roses saving a total of 411megalitres of water). This step also required the use of significant assumptions.  
↓
- 6 Setting Targets:** Feasible water saving targets were set based on the End Use Modelling (residential expressed as 'per capita targets', non-residential expressed as 'per employee targets', and corporate expressed as 'absolute targets')  
↓
- 7 Absolute Water Savings:** Calculated absolute water saving achieved by converting the per capita and per employee reductions described in Step 6.  
↓
- 8 Validation:** Consulted on targets and methodology with key stakeholders and interested parties.

## **APPENDIX E**

### End Use Modelling for Setting Residential Water Saving Targets

---

Calculations Of Residential Target Setting		
Appliance	Calculations	% Saved
<p><b>Showers</b></p> <p>Showers use 24% of household water.</p>	<p>It is estimated that 70% of households (17, 024 homes in CoM) do not use water efficient showerheads (<i>Water Resources Strategy</i>).</p> <p>City of Melbourne has 24,320 households each with 2.1 persons on average.</p> <p>Showerheads use: A: 12 to 15 litres per minute, AA: 9-12 litres per minute AAA: 7.5 – 9 litres per minute</p> <p>An average shower is 7 minutes long (<i>Water Resources Strategy</i>).</p> <p>---</p> <p>12L x 7 min x 2.1 persons x 365 days x 17,024 dwellings = 1096ML used if households retain old 'A' showerheads</p> <p>7.5L x 7min x 2.1 persons x 365 days x 17,024 dwellings = 685ML used if all households had 'AAA' showerheads.</p> <p>1096ML – 685ML = 411 megalitres saved</p>	<p>411ML is equal to 7% reduction in water use.</p>
<p><b>Toilets</b></p> <p>Toilets use an estimated 25% of average household water consumption.</p>	<p>Totals 1108 megalitres of water per year for toilet flushing for CoM residents.</p> <p>It is estimated that 50% of households do not have dual flush toilets (<i>Water Res. Stgy</i>). For the City of Melbourne, this totals 12,160 households.</p> <p>11 litres – single flush.</p> <p>6/3 litres - dual flushes (averaged at 5 litres per flush 6 flushes per day)</p> <p>Toilet is 54,000 litres per household</p> <p>---</p> <p>11L x 6 flushes x 2.1 persons x 365 days x 12,160 dwellings = 615ML used by the 50% of h/h not on a single flush system.</p> <p>5L x 6 flushes x 2.1 persons x 365 days x 12,160 dwellings = 280ML used if above mentioned 50% of households switched to dual flush.</p> <p>615 – 280 = 335ML saved by installing dual flush toilets</p>	<p>335ML is equivalent to 6% reduction in total water used.</p>
<p><b>Washing Machines</b></p> <p>It is estimated that washing machines use 19% of residential water consumption.</p>	<p>Top loader washing machines (AA rated) make up 85% of the current Australian market. (<i>Water Resources Strategy</i>).</p> <p>A: 26-34 litres/kg dry clothes, AA: 18-26 litres/kg dry clothes AAA: 12-18 litres/kg dry clothes, AAAA: 8-12 litres/kg dry clothes</p> <p>Top loader washing machine uses 130 litres per load. AAAA washing machines use 40 litres per load.</p> <p>AAAA washing machines are recommended for regulation by 2010 (<i>Water Res. Stgy</i>).</p> <p>---</p> <p>130L/load x 4 loads x 52 weeks x 20,672 dwellings = 560ML used if 85% of households washing machines were AA</p> <p>40L/load x 4 loads x 52 weeks x 10,336 dwellings = 86ML used if 43% of household's washing machines were converted to AAAA</p> <p>560ml – 86ml = 474megalitres</p> <p>474ML saved / 5541 total residential water use x 100 = 9% saved by installing AAAA washing machines</p>	<p>474ML is equivalent to 9% reduction in water used.</p>
<p><b>Garden Practices</b></p> <p>Outdoor water use is expected to be around 20% for the City of Melbourne (GHD).</p>	<p>Based on the residential consumption figures analysed in this study, and assuming higher density living on average, outdoor water use is expected to be around 20% for the City of Melbourne (GHD). Any reduction in water pressure will also reduce consumption.</p> <p>At 20%, external residential water use makes up 1108ML</p> <p>Water savings possible by drip watering, tap timers, mulching and water efficient plants.</p> <p>It would be conservative to estimate that a 5% reduction in external water use can be achieved by 2020. This will result in savings of 277ML of water.</p>	<p>5% reduction is 277ML water saving.</p>
<p><b>Kitchens</b></p> <p>Estimated to be 12% of household water use.</p>	<p>Savings achieved through water efficient tap fittings and dishwashers, and future reductions in water pressure.</p> <p>These have not been calculated, however will be additional water saving sources.</p>	<p>N/A</p>
<p><b>Technical Improvements</b></p>	<p>Water savings can be achieved through the application of greywater systems, flow diverters, rainwater tanks and pressure flow reducers. It is considered that a 15% saving can be made through technical improvements, however for the purpose of this analysis, a conservative 10% saving is assumed (to be revised in coming years as further research comes to hand).</p> <p>This will result in a saving of 554 megalitres.</p>	<p>554ML is equivalent to 10% reduction in water used.</p>
<p><b>Education &amp; Communication</b></p>	<p>All of the above means of saving water are dependent on education (with some regulation). Opportunities such as 'Sustainability Street', can be pursued. The water savings from education are expected to result in at least a 5% water saving (Vox Bandicoot). The City of Melbourne will provide leadership by committing to showcase projects that encourage and raise awareness of water efficiency.</p> <p>This will result in a saving of 277ML</p>	<p>277ML is equivalent to 5% water savings.</p>
<p><b>TOTAL</b></p>		<p>37% stretched to 40% Saved 2216mL</p>

## APPENDIX F

### End Use Data for Setting Targets

Non Residential Water Use – End Use Analysis		
Land use	Key Initiatives	Justification of Targets
Industry 40% target reduction	Revising industrial practices eg. Cooling machinery using greywater or rainwater	Wastewater technology – greywater, rainwater/stormwater can reduce water used by 60%. (US Green Building Council)
	Water audit with follow up action.	Industrial water audit and education can save 1.5% of water used. (21 <sup>st</sup> Century Melbourne: Strategy Directions Report)
	Use an 'award' scheme as incentive	No data available
	Set up information management system to monitor water use.	No data available
	Green building design.	Water reduction in industrial buildings using green design practises, can be up to 30%. (US Green Building Council)
	Retrofit dual flush toilets	Save average 5 litres water per flush. Flush 6 times a day (Yarra Valley Water)
	Install AAA shower rose.	Average of 4.5 litres per minute saved between A and AAA shower rose. People shower for an average of 7minutes. (Yarra Valley Water)
	Educate industry eg: washdown practices.	CERES indicates they will have data on this within two years (CERES)
Commercial 40% target reduction	Green building design.	Water reduction in industrial buildings using green design practises, can be up to 30%. (US Green Building Council)
	Undertake water audit with follow up action.	Water audit and education can save 1.5% of water used. (21 <sup>st</sup> Century Melbourne: Strategy Directions Report)
	Use an 'award' scheme as incentive	No data available
	Set up information management system to monitor water use.	No data available
	Retrofit dual flush toilets	Save an average of 5 litres of water per flush and flush 6 times a day (YVW)
	Retrofit AAA shower rose. Note: more showers will be going in all new buildings.	Average of 4.5 litres per minute saved between A and AAA shower rose. People shower for an average of 7minutes. (Yarra Valley Water)
	Retrofit AAA dishwasher.	No data available
	Planning and landscape approvals to require water savings	
	Installation of rainwater & greywater tanks. eg. at Exhibition Centre	The use of rain & grey water tanks can save up to 60% water consumption. (University of Newcastle) Note: could be difficult to site.
Educating retailers about wash-down and food handling practices.	CERES indicates they will have data on this within two years (CERES)	
<b>Total 27%</b>	<b>An absolute saving of: 27%</b>	

Residential Water Use – End Use Analysis		
Land use	Key Initiatives	Justification of Targets
Residential 40% target reduction	Installation of rainwater tanks	The use of rainwater tanks can save up to 55% by supplying water for gardens, cleaning, laundry and toilet flushing. (Uni of Newcastle)
	Installation of diverters	No data available. Conservative estimate 20% reduction.
	Installation of greywater tanks	Greywater can supply 20% of water for use in the garden and toilets. (Ozwater Convention 2003 – www.awaozwater.net)
	Retrofit dual flush toilets	Toilets use 20% of household water, dual-flush toilets save 50% of consumption. Hence, it is a likely a city-wide water saving of 6% can be made. (Saving water in the home- www.yvw.com.au)
	Install AAA shower roses	Showers form 19% of residential use. 70% of households don't have water efficient shower heads. Hence, a likely city-wide water saving of 7% can be achieved. (Saving water in the home- www.yvw.com.au)
	Install AAAA washing machines	Top loader washing machines make up 85% of the current Australian market. If 'A' rated washing machine uses 120 litres per load and 'AAAA' rated used 40 litres per load (Water Resources Strategy). This totals 8% reduction of water.
	Install AAA dishwashers	No data available.
	Reduction of flow rate on hoses	Save up to 20% of water (Yarra Valley Water)
	Water efficient landscape design including mulching	Green landscape design can reduce water use by 50% (Leadership in Energy & Environmental Design - US Green building council)
	Reduction in water pressure	PIC testing reduction from 800-1000 Kpa down to 500-350 Kpa
	Planning and landscape approvals to require water savings	
	Education on garden practices	Green garden practices can reduce water consumption by 1%. (21 <sup>st</sup> Century Melbourne: Strategy Directions Report)
	Case study on street/community.	Vox Bandicoot likely to have data within two years.
Education eg: concrete wash-down & car washing practices.	Can achieve 1% reduction in water use through educating the community about wash-down practices. (21 <sup>st</sup> Century Melbourne: Strategy Directions Report)	
<b>Total -45%</b>	<b>An absolute saving of -45%</b>	

## Corporate Water Use – End Use Analysis

Land use	Key Initiatives	Justification of Targets
<b>Buildings</b>  35% target reduction	Retrofit dual flush toilets in all buildings	Save an average of 5 litres of water per flush and flush 6 times a day (Yarra Valley Water)
	Retrofit water efficient showers in all buildings	Average of 4.5 litres per minute saved between A and AAA shower rose. People shower for an average of 7minutes. (Yarra Valley Water)
	Green building design for Council House	Water reduction in industrial buildings using green design practises, can be up to 30%. (US Green Building Council)
	Landscaping for sustainable water management – eg: childcare centres	Green landscape design can reduce water use by 50% (US Green Building Council)
	In-house education and promotion of water smart practices	Discussion with CERES indicates they will have data on this within two years (CERES)
<b>Markets</b>  45% target reduction	Education program for vendors	Discussion with CERES indicates they will have data on this within two years (CERES)
	Water audit & identified actions for water savings	No data available
	Rainwater harvesting – 80%-100% possible for Queen Victoria Market	The use of rainwater tanks can save up to 55% by supplying water for gardens, cleaning, laundry and toilet flushing. (Costing of water cycle infrastructure saving from water sensitive urban design – Uni. of Newcastle)
	Greywater implementation	Greywater can supply 20% of water for use in the garden and toilets. (Ozwater Convention 2003 – www.awaozwater.net)
	Reduction of flow rate on hoses	Save up to 20% of water (Yarra Valley Water)
<b>Parks &amp; Gardens</b>  26% target reduction	Water efficient landscape design, including mulching. (Eg. Alternative paving design - median strips)	Water saving of 50% through efficient landscape design. (Wise Water Management – Stuart White, Institute of Sustainable Futures, University of Technology Sydney)
	Gradual introduction of moisture sensitive irrigation eg drips watering system. Monitor plant water needs at micro scale & water accordingly	Royal Botanic Gardens reduced water consumption by 40% using water sensitive irrigation systems over a 5 year period. ( RBG -Director of Gardens)
	Water management plan for open space.	0.2% reduction of water used through education. (21 <sup>st</sup> Century Melbourne: Strategy Directions Report)
	Identify & fix leakages in fountains and ponds.	25% of the water consumption of one fountain within the Fitzroy Garden was saved through the fixing of leakages. (City of Melbourne)
	For remaining 4/5 fountains not already converted install water-recirculating systems.	Will save 75% of the fountain water consumption. (City of Melbourne)
	Some installation of greywater management systems	Greywater can supply 20% of water for use in the garden and toilets. (Ozwater Convention 2003 – www.awaozwater.net)
	Sewer mining piloting	No data available
	Contract management to reflect water conservation	No data available
	Stormwater harvesting	Royal Park Wetlands will provide re-use water for a range of uses. There are other wetland/ stormwater opportunities in Council Parks. (CoM)
	<b>Depot</b>  30% target reduction	Some rainwater harvesting
Retrofit dual flush toilets in depots		Save an average of 5 litres of water per flush and flush 6 times a day (YVW)
Install AAA shower roses		Average of 4.5 litres per minute saved between A and AAA shower rose. People shower for an average of 7minutes. (Yarra Valley Water)
Educating employees on wash-down practices		CERES indicates they will have data on this within two years (CERES)
<b>Toilets</b>  30% target reduction	Retrofit dual flush toilets	Save an average of 5 litres of water per flush (YVW) Audit to be completed.
	Feasibility and application of rainwater harvesting	The use of rainwater tanks can save up to 55% by supplying water for gardens, cleaning, laundry and toilet flushing. (Costing of water cycle infrastructure savings from water sensitive urban design – Uni. of Newcastle)
	Sample water less and compost toilet/s.	Audit to be completed.
<b>Recreation</b>  30% target reduction	Efficient water management in pool centres. Includes water audits.	For example, the use of rainwater tanks can save up to 55% by supplying water for gardens, cleaning and toilet flushing. (Uni. of Newcastle) Prompt identification and fixing of leaks.
	Re-use swimming pool water/backwash	No data available
	Retrofit dual flush toilets	Save an average of 5 litres of water per flush and flush 6 times a day (YVW)
	Installation of AAA shower roses	Average of 4.5 litres per minute saved between A and AAA shower rose. People shower for an average of 7 minutes. (Yarra Valley Water)
	General staff and visitor education	CERES has indicated data available within two years (CERES)
<b>Miscellaneous</b> 30% target reduction	General Education	CERES has indicated data available within two years (CERES)
	Technological improvements	Wastewater technology such as reusing greywater and stormwater can reduce water used by 50%. (US Green Building Council)
<b>Total</b> 28%	<b>An absolute saving of: 28%</b>	

## APPENDIX G

### Calculating Absolute Water Savings

#### Forecast Growth In Water Demand in Commercial and Industrial Sectors

How many commercial and industrial businesses will there be in the City of Melbourne by 2020? And as a result, what will be the water demand from these businesses in 2020?

These are the questions that need to be answered to set City of Melbourne's per employee water saving targets to a level that will ensure an absolute reduction in water use by 2020.

It seems that it is not an easy question to answer. The City has done some forecasting for industry and commercial premises projecting to 2010. No forecasts have been done to 2020, and it is considered that an extrapolation of the 2010 forecast would not be an accurate way forward.

It was necessary to look beyond Council's research to determine the projected growth for business.

Australian Bureau of Statistics (ABS) data has therefore been used. Unfortunately the ABS doesn't project economic growth at LGA level. Even at a national level, the uncertainty associated with projections of economic growth is high when a timeframe of more than a year or two is considered. The Federal and State budgets project only for the forthcoming year. To say that the same level will continue for even the next five years is highly uncertain.

Therefore an approach using a projection for the *population* growth of metro Melbourne is used. The assumptions in this process are:

1. Commercial and industrial activity in the City of Melbourne is largely driven by demand from the whole of metropolitan Melbourne, not just from the City of Melbourne municipality.
2. Given our inability to project economic growth per se, we need to at least tie it to population growth using an assumption that standard of living is unlikely to decline. Associated with this, is a further assumption that the proportion of goods & services consumed by population in metro Melb *that is produced within Melb LGA* will remain constant.
3. The 'water efficiency' of production will remain constant. This is a standard 'business as usual' assumption.

Population growth, shown by ABS census figures was 1.056% per year between 1991 & 2001. Using this trend and the above assumptions, the 2020 Melbourne metropolitan population will be 4,188,600.

This gives us, as a business as usual projection for the water demand in 2020:

Industrial (730/3451900) x 4188600 = 885 megalitres

Commercial (17,513/3451900) x 4188600 = 21251 megalitres

The next question to ask is how much can this level of water demand be reduced by changing practices, technology and education?

Our research into end use analysis has indicated that commercial and industrial water demand can be reduced by 40% per employee. The following calculations determine how many megalitres of water will be saved with a 40% per employee water saving target.

Industrial = (water consumption 99/00/ GMP) x 40% of consumption x 2020 GMP  
= (730/3451900) x 0.60 x 4188600  
= 531 megalitres

Commercial =(water consumption 99/00/ GMP) x 40% of consumption x 2020 GMP  
=(17,513/3451900) x 0.6 x 4188600  
= 12,750 megalitres

Therefore 2020 projections for water savings are:

Industrial = 730 - 531 = 199 megalitres

Commercial = 17,513 - 12,750 = 4763 megalitres

These figures have been used in the water use modelling.

## Commercial and Industrial Breakdown

The breakdown of commercial and industry was achieved by looking at the proportion of employees in both sectors, using City of Melbourne research by the Statistics Unit (Figures Below). The percentage was then used to divide water use in the Non-residential areas.

<b>Total Industry Employment = 5,166</b>
<b>Total Commercial Employment=127,352</b>
<b>Total Water Consumption Both Sectors = 18,243ML</b>

### Industry:

The calculations

- Percentage of employment in industrial sector  $5,166/127,352 \times 100/1 = 4\%$
- Percentage of employment in commercial sector is therefore = 96%
- Breakdown of water consumption for industry  $18,243/100 \times 4 = 730\text{ML}$
- Water consumption for commercial is therefore = 17,513

Sector	Employment 2000
Aircraft manufacture	838
Electronic equipment manufacture	511
Motor vehicles and parts; other transport equipment	3,817
<b>Total Employment Industry</b>	<b>5,166</b>

Community services	2,431
Scientific research, technical and computer services	9,997
Photographic & Scientific equip.	243
Health services	21,595
Banking	21,563
Legal, accounting, marketing and business management services	28,112
Education	14,997
Retail Trade	16,018
Accommodation, cafes & restaurants	11,266
Personal services	1,130
<b>Total Employment Commercial</b>	<b>127,352</b>

## APPENDIX H

### Financial Feasibility of Implementing Water Efficiencies in the Household

<b>House Scenario 1 – Demand Management</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	By 2020, cost saving using water efficient appliances is \$2460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
Garden Practices	Watering tube - \$21.95 Gardening water timer - \$33.00 Garden trigger nozzle - \$25.00 Mulch (6 x 50L Bag) - \$41.70 Lawn seed - \$21.50		
<b>Total</b>	<b>\$743.65</b>	<b>\$123</b>	<b>\$2,460</b>

<b>House Scenario 2 – Demand management + Rainwater Harvesting</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	\$2,460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
Garden Practices	Watering tube - \$21.95 Gardening water timer - \$33.00 Garden trigger nozzle - \$25.00 Garden mulch(50L Bag) - \$6.95 Lawn seed - \$21.50		
Rainwater Tank + Installation	\$1,128.00 (4,500L)	\$33 saving using rainwater	\$660
<b>Total</b>	<b>\$1,871.65</b>	<b>\$156</b>	<b>\$3,120</b>

<b>House Scenario 3 – Demand Management, Rainwater Harvesting + Grey Water System</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	\$2,460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
Garden Practices	Watering tube - \$21.95 Gardening water timer - \$33.00 Garden trigger nozzle - \$25.00 Garden mulch(50L Bag)- \$6.95 Lawn seed - \$21.50		
Rainwater Tank + Installation	\$1,128.00 (4,500L)	\$33 saving using rainwater	\$660
Greywater System	\$750	Using grey water saves \$33	\$660
<b>Total</b>	<b>\$2,621.65</b>	<b>\$189</b>	<b>\$3,780</b>

<b>Apartment Scenario 1 – Demand Management Refit</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
Shower Timer	\$11.00	\$123 using water efficient appliance and education	\$2,460
Water Level Alarm	\$14.50		
Kitchen Sink Nozzle	\$15.00		
AAA Shower Heads	\$160.00		
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	\$0 (technically no cost to be water efficient as any cistern will be dual flush)		
<b>Total</b>	<b>\$729.75</b>	<b>\$123</b>	<b>\$2,460</b>

<b>Apartment Scenario 2 – Built In</b>			
<b>Appliance</b>	<b>Marginal Cost</b>	<b>Cost Benefits (per year)</b>	<b>Cost Benefit by 2020</b>
AAA Shower Heads	----	\$123 using water efficient appliance and education	\$2,460
AAAA Washing Machines	\$400.00 (this covers the extra cost for a AAAA washing machine instead of a standard top loader)		
Dual Flush Toilets	----		
Garden Practices	----		
<b>Total</b>	\$400	\$123	\$2,460

**FINANCE ATTACHMENT**

---

**SUSTAINABLE WATER MANAGEMENT STRATEGY – PART 1**

---

Funding of \$4,800,000 has been provided in the 2003/04 Draft budget (03PR080R) for Parks' Renewal Works. This funding includes renewal of irrigation systems.

Additional funding requirements will be subject to the budget processes.

**Joe Groher**  
Manager Financial Services

## LEGAL ATTACHMENT

---

### SUSTAINABLE WATER MANAGEMENT STRATEGY – PART 1

---

No direct legal issues arise from the recommendation in the report, however Schedule 1 of the *Local Government Act 1989* (“Act”) provides that the functions of a Council include:

- "7. *Any other functions relating to the peace, order and good government of the municipal district including –*
- (5) *Information;*
  - (7) *Encouragement of commerce, industry and agriculture;*
  - (8) *Environment control, protection and conservation;"*

In addition, the objectives of the Council detailed in section 7 of the Act include:

- “(c) to ensure adequate planning for the future of its municipal district;*
- (d) to represent and promote the interests of the community and to be responsive to the needs of the community;"*

The recommendation is within the functions and powers of the Council.

**Alison Lyon**  
Manager Governance Services