REPORT 3
(1215\52\IM)

WATER EFFICIENCY AND CONSERVATION PLAN

1. Purpose of Report

This report seeks the Strategy and Policy Committee's (SPC) agreement to release for consultation a discussion document containing a 'Draft Water Efficiency & Conservation Plan'. The report notes possible funding implications of options for water conservation and efficiency measures. It does not, however, seek any funding commitments from Councillors at this stage.

2. Executive Summary

On 15 October 2009 SPC considered a report outlining the bulk potable water supply and demand situation in the Wellington region. The report noted that given current levels of demand and water supply and storage infrastructure, Wellington region's water supply system cannot meet previously agreed security of supply standards.

That report also noted scenarios for addressing the water supply and demand situation into the future. It noted the cost-effective role that water efficiency and conservation could play in reducing the overall costs of providing a safe and secure water supply. In particular, it noted that it may be possible to defer decisions on major capital expenditure past 2014 - with potential financial, environmental and social benefit to the city.

After considering the information, SPC adopted "an interim target" of stabilising water consumption at current levels. SPC agreed to consult on the "next phase" of a water conservation and efficiency plan, focussing "on education and the more easily achieved water efficiencies". More expensive or onerous options will be considered after the results of this next phase are known. SPC agreed that the possible future role of water meters and/or dams if savings are not made is to be clearly articulated in consultation documents.

Finally SPC agreed to consult on what service level is acceptable, including frequency of water restrictions, and requested staff to explore funding mechanisms for water conservation.

This report responds to each of these decisions by recommending that the consultation document attached as appendix 2 be released for public consultation.

The consultation document is in two parts. Part one outlines the strategic context for water supply and demand in the Wellington region. It discusses the role of water efficiency and conservation and benefits this could have, particularly for deferring major capital investment in the water supply system. Part one also discusses security of supply issues and options for restrictions on water use. The public's feedback is sought on these issues.

Part two of the discussion document provides a draft water conservation and efficiency plan for Wellington city. As directed by SPC it focuses on less expensive and/or onerous options at this stage.

The draft Plan notes, in general terms, the possible fiscal implications of the measures being proposed to encourage water efficiency. Given the focus of this phase of the Plan, the possible fiscal implications are reasonably modest. Following consultation officers would firm up recommendations on measures, any funding estimates and make specific recommendations for Councillors' consideration. No funding implications would arise prior to the 2011-2012 draft Annual Plan process.

Elements of the Plan, if agreed, would be discussed with other cities that share Wellington city's bulk water supply system as well as Greater Wellington Regional Council (GWRC).

3. Recommendations

Officers recommend that the Committee:

1. *Receive the information.*

2. *Agree to release of the consultation document attached as appendix 2 to this report, which includes a "Draft Water Efficiency & Conservation Plan for Wellington City"*

3. *Note that indicative funding implications of the draft Plan are noted in the consultation document, but that no funding commitments would arise without further consideration by Councillors and, in any event, not before the 2011-2012 draft Annual Plan process.*

4. *Note that consultation would occur over July 2010 with oral hearings and a final report to a relevant Committee late this calendar year or early in the New Year.*

5. *Note that any funding commitments would be considered by Councillors as part of the 2011/12 Draft Annual Plan process.*

6. *Delegate to the Chief Executive and the Environment Portfolio Leader the authority to make any changes to the Consultation Document required as a result of decisions of this committee, prior to it being released for consultation.*

4. Background

On 15 October 2009 SPC considered a report outlining the bulk potable water supply and demand situation in the Wellington region. The report noted that given current levels of demand and water supply and storage infrastructure, Wellington region's water supply system cannot meet previously agreed security of supply standards.

That paper also noted scenarios for addressing the water supply and demand situation into the future. It noted the cost-effective role that water efficiency and conservation could play in reducing the overall costs of providing a safe and secure water supply. After considering the information SPC agreed a number of resolutions regarding water. In summary SPC:

- Adopted "an interim target of stabilising water consumption in acknowledgement of the goal:
  "To accommodate Wellington city's population growth through to 2025 with the same amount of water we have available to us now."

- Agreed to a phased approach to water demand management whereby education and the more easily achieved water efficiencies are undertaken first prior to more expensive or onerous options being considered.

- Agreed to consult in May 2010 on the next phase of the water conservation plan, ensuring that the consultation materials make it clear that water meters and dams are potentially part of the future and explain the cost benefit of them.

- Agreed to consult on what service level is acceptable, including frequency of water restrictions.

- Requested staff to explore funding mechanisms for water conservation.

This report is in response to these decisions by SPC. It recommends the release for consultation of a discussion document on water supply and demand issues and the role of water efficiency and conservation.

5. Discussion

5.1 Water Supply and Demand Scenarios for Wellington Region

Greater Wellington Regional Council (GWRC) supplies Wellington city's bulk potable water. The same system also supplies Porirua, Hutt and Upper Hutt cities. GWRC has identified when the bulk water supply levels of service would be compromised by increased population, demand from commerce and industry or affected by adverse effects from climate change.

GWRC's inability to supply sufficient water to meet the city's (and the region's) demand could result in water restrictions beyond those currently in place. The current agreed level of service for security of supply is to meet a 'one in fifty year' (drought) event without significant additional water restrictions. Because of increased demand, the actual level of service now is approximated as adequate for a 'one in twenty-six year' event. Without action this service level will reduce even further to the point where restrictions on water use extend beyond preventing the use of garden sprinklers.

It is somewhat difficult to make comparisons with other cities and their respective level of service for water supply since cities take different approaches to managing demand for water. For example, Auckland and Perth plan for a 'one in two hundred year' drought event. It should be noted, however, that extensive conservation and efficiency measures, including universal metering, have been implemented at considerable expense in order to establish these standards.

Wellington generally receives sufficient rainfall to meet its annual requirements several times over. What Wellington lacks as a region is the ability to store sufficient quantities of untreated water for when our rainfall, or inflow of water, is at its lowest.

Wellington's vulnerability to earthquakes and other geological events, such as landslides, adds further pressure to the security of supply with inevitable delays in restoring the water supply following a major incident directly affecting the economic and social recovery as well.

GWRC has provided a number of short term options to augment water supply and/or storage leading up to 2014. However, even with these measures in place – and unless some additional measures are taken to reduce demand – a decision will be needed in about 2014 on whether the Wellington region will:

- Live with summer water shortages and accept more regular, longer and more stringent restrictions on water use

- Augment supply – probably with a major dam, but there are other options

- Aggressively reduce demand – probably with universal water meters and tariffs – but there are other options.

The last two options would require significant capital investment.

It is not the purpose of either this report or the discussion document to explore the pros and cons of the above options. This is likely to happen at a future stage, including in the context of GWRC's upcoming "Draft Wellington Regional Water Strategy".

Rather, these issues are raised here as the overall supply situation provides critical context for why Wellington should reduce demand for water and the benefits this would have.

5.2 Conservation versus Efficiency

There are two approaches to reducing water consumption in the urban environment; conservation and efficiency.

Water conservation is reducing the amount of an activity we undertake. Examples include not washing cars, taking shorter showers, or reducing the number of times the garden is watered. Conservation measures generally require behaviour changes by consumers. They are relatively cheap to implement, but are seen by some in the community as "going without".

Economic literature shows that conservation measures are typically difficult to sustain for long periods, and require a high degree of both information and enforcement to be effective. Conservation measures are, nonetheless, a very important tool for managing short-term demand peaks and/or significant drought events. Consequently, they are vital to a cost effective water supply system that would otherwise have to provide for "every eventuality" – something that would be extremely expensive.

Efficiency measures on the other hand reduce water consumption by allowing the same level of activity to be undertaken but using less water to do it. Examples include front loader washing machines, dual flush toilets, using rainwater collection systems, low flow shower heads, and leak detection and repair.

Efficiency measures generally require investment in 'hardware', but once in place will go on making water savings without requiring behavioural change. They are therefore more sustainable longer term than conservation measures and do not require people to "go without". The key drawback with efficiency measures is that they can be expensive to implement, especially if they are being

retrofitted to an existing building or being implement before some item of hardware (say a top loading washing machine) is due for replacement. Efficiency measures can also take a number of years to roll-out.

The draft water efficiency and conservation plan contains both efficiency and conservation proposals. However, its main focus is on efficiency measures since these are generally less onerous and provide more reliable, ongoing and cumulative results.

5.3 Implementing a 'Water Efficiency & Conservation Plan'

The plan considers consumers under four sectors, each requiring slightly different approaches and resources. The identified sectors are:

- Wellington City Council
- Central Government
- Commerce and Industry
- Residential

The Council's operations are identified separately in recognition of SPC's October 2009 decision that "*Council continues to take a leadership role implementing water efficiencies in our operations and supply networks*".

For each sector initiatives or focus areas have been identified. These are described in draft discussion document appended to this report (refer pages 33 to 37).

There are no remedies or initiatives that could be considered 'instant' or 'singular'. It is more appropriate to consider a combination of many measures that will lead to a wider, longer term reduction in overall consumption.

Determining which actions to undertake in which order across each sector will allow for easy gains to be established as more complex approaches and resources are developed.

This adoption of a phased approach will also allow assessment of which of the earlier gains are worth expanding on and how this might be achieved.

Tools available to Council

Council has a number of "tools" available to encourage reductions in water consumptions. The more onerous or expensive of these tools (for example universal meters, and regulations) will not be considered at this stage until other options have been tried and assessed. Nonetheless, there are still many tools Council could employ, including:

- Information and education
- Providing measurement devices and self-assessment tools
- Providing 'free' expert services (e.g. plumbers, advisors)
- Funding support such as grants and/or loans for installation of new water efficient hardware
- Pricing incentives (especially where meters are in place)
- Partnerships with retailers and service providers to promote certain hardware or initiatives
- Advocating for central government action where issues have national application
- Direct investment of Council resources on specific initiatives or hardware, eg leak detection, upgrading community housing

Research shows that information and education alone are generally not sufficient to change behaviour.[1] . However, they are important components of a package of measures.

It is proposed that a Water Efficiency and Conservation Plan includes a significant programme of education and information. Ideally, this should be supported by other specific measures.

5.4 Costs and Benefits

Making precise cost and benefit estimates for a particular measure is difficult because:

- of the way charges for bulk water are made tends to dilute the final financial benefits to Council
- the level of benefit derived depends on actions by other cities (e.g. to defer a major capital investment)
- the actual costs of a measures are highly variable
- the measures themselves may induce counteracting behaviour changes[2].

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[1] Geller, E. S. It takes more than information to save energy. *American Psychologist, 47*, 814-815, 1992

[2] Lehman, P.K., & Geller E.S., Behaviour analysis and environmental protection, accomplishments and potential for more, *Behaviour and Social Issues 13*, 13-22, 2004

In Wellington the cost of water supply is made of variable and fixed costs. The fixed cost portion does not reduce significantly with reduced water use. This fixed portion covers such things as maintenance, depreciation, and other capital costs. The variable costs cover pumping costs, treatment and other operating costs like a proportion of labour costs.

The following table shows the breakdown of the cubic metre charge for water in Wellington – this indicates the portion of fixed and variable costs within the $1.78 charged for each cubic metre of water.

Due to the way the bulk supply charges are calculated by GWRC the portion of the variable cost for Wellington is relative our share of the regional consumption. In the current financial year this is 54%.

Table 1: Bulk water supply costs

	GWRC	**WCC**	**Total per m³**
Fixed costs per m³	*$ 0.387*	*$ 1.215*	*$ 1.602*
Variable costs per m³	*$ 0.043*	*$ 0.135*	*$ 0.178*
Total cost	*$ 0.43*	*$ 1.35*	*$ 1.78*
Potential for savings	*$ 0.023**	*$0.135*	*$0.158*

*potential for savings by WCC is the percentage of WCC's consumption of the regional bulk supply (54%)

This means that every cubic metre of water saved in a year results in operational savings of just $0.158 for that year. However, as noted above, the operational savings are only part of the story. Another important issue is the possibility of deferring the capital expense of installing universal water metres or constructing a dam for a number of years.

According to GWRC's research the cost of building a dam would mean a rates increase of around $70 per household – equivalent to a lump-sum cost of about $875. The cost of installing meters is estimated to add approximately $50 to the average rates bill each year – equivalent to a lump-sum cost of about $625.

Based on an assumed cost for a dam of $150m in 2022 the net present value of the savings generated by deferring the construction of a dam are about $3.5m for each year the dam is deferred. Because Wellington city uses a little over half the bulk water supplied, our share of this economic benefit would be about $1.9 million for each year the building of a dam is deferred.

How much water we need to save and at what cost

The key question is how much water we need to save in order to defer major capital expenditure. Wellington city's water demand has been increasing at a little under 1 percent per annum over the medium term[3]. We now consume an average of 83 megalitres per day, which is 30,300 megalitres per year. To defer major capital investment Wellington city's consumption needs to at least maintain this level of consumption particularly over the summer months – noting that even this will mean maintaining security of supply standards at below previously agreed standards.

By 2016 Wellington will need to reduce its consumption by 14 litres per person per day to maintain an overall consumption of 83 megalitres per day. This is a 3 percent saving on current consumption rates.

By 2021 population growth will lift this reduction requirement to 30 litres per person per day if we are going to maintain demand at today's levels. This is a 7 percent saving on current consumption rates.

In total volume terms Wellington city needs to save 1000 megalitres per year by 2016 (compared to business as usual) and 2200 megalitres per year by 2021 (compared to business as usual) in order to maintain the current total demand.

Taking benefits from both the deferred capital expenditure and operating costs into consideration, and the need for a reasonable cost to benefit ratio for Council investments, Council should consider measures costing up to $1.00 per 1000 litres of water saved per year. Total expenditure on reduce water use should be limited to not more than about $1 million per year – provided enough water can be saved overall to defer major capital expenditure.

However, we will only be able to defer capital expenditure if total consumption across all cities connected to the bulk water system is maintained at current levels.

Indicative costs of possible measures

Many water supply authorities have undertaken incentive or subsidy based programmes that encourage old technology being replaced with more efficient versions.

Table 2 provides an indication of those measures that are likely to be the most cost effective compared to the water savings they would make. It is important to note that for many "hardware" based measures the timing of replacement of hardware makes a significant difference to the marginal cost effectiveness of the measures.

[3] Wellington city's per person consumption has actually been decreasing due to a range of factors, even though total water use has increased. Actual use in any given year is significantly influenced by weather.

Table 2: Possible water efficiency measures: Indicative costs and benefits and priority for implementation

Priority	Application	Indicative cost relative to "non-efficient" hardware		Estimated water savings per year	Comments	Energy savings
		Installed in new building	Retrofitted			
Possible hardware measures						
High	Low-flow shower head	nil	$200 - $300	30,300 – 60,000 litres p/a per unit*	Good savings are possible. No additional cost if low flow shower head is installed from new (or when renovating). Replacing existing shower heads should still be relatively inexpensive – but this depends on it being a straightforward replacement.	yes
High	Dual flush toilets	nil	$500	33,000 –37,000 litres p/a per unit*	Good savings are possible. No additional cost if a dual flush toilet is installed from new (or when renovating). Replacing existing toilets may be costly as a one-off exercise.	
High	Leak resilient taps / water fittings	nil	$500 - $1000 per house	Up to 20,000 litres per year per leaking tap	Good long-term savings potential since this helps eliminate dripping taps and reduces taps being left running.	yes
High	Front loading washing machine	nil	$1000 - $1500	22,000 litres p/a per unit*	Good savings are possible. No additional cost if a front loader is purchased when an old machine needs replacing. Replacing existing machines within their lifecycle is expensive and may be difficult to justify compared to water savings made.	yes
Medium	Irrigation systems – automatic moisture sensing	$3,000	$3,000	Up to 50% of external water use	Offers good savings but expensive. Probably need other drivers for investing in the upper end of these technologies. Good potential over summer months.	
Low	Rainwater collection and reuse	$1,000 - $3,000+	$1,000 - $3,000+	Variable	Savings are possible, though these may not be at critical times – since tanks will empty quickly during dry-spells. Widespread implementation is expensive compared to "centralised" storage option. Also lack of control over when and how water is used. Very good benefits for emergency (individual) water supply in event of a major natural disturbance, such as a major earthquake.	
Low	Greywater reuse	$3,000+	$3,000+	30,000 litres per year	Good savings are possible, but installing systems is costly compared to alternatives.	
Medium	Hot water recirculators	$500.00	$750 approx	Approx 20,000 litres in a two bathroom, 4 person household or about 10-20%	Good long term savings. Provides for good energy savings as well through reduced water heating requirements.	yes
Medium	Water-less urinals	Low additional cost	$1,000 per unit		Dependant on usage – estimates are up to 6 litres per flush not required. Cost depends on style of urinal selected, benefits largely for commercial applications.	

Other possible measures		Indicative cost	Possible savings	Comments	
Medium	Leak detection / repair – home and commercial (includes “free plumber” to help detect and fix leaks	$150,000		Potential for conservation and increased efficiency through these mechanisms is reasonably high but difficult to quantify as the approach is dependant on uptake. Cost is significant and will need to be assessed further.	
High	Leak detection and repair – Council’s network	$108,000 (already budgeted)		This work is currently underway	
High	Information website	$20,000		Potential for conservation and increased efficiency through these mechanisms is reasonably high but difficult to quantify. Other regions that have used these mechanisms have reported reductions up to 10%.	
High	Other education & information initiatives	$50,000			
High	Working with local retailers and service providers – dedicated staff plus support materials	$100,000			

5.5 Options for Funding a Water Efficiency and Conservation Plan

Council should consider measure costing up to $1.00 per 1000 litres of water saved per year up to total expenditure of about $1 million per year – provided enough water can be saved overall to defer major capital expenditure.

Since most of the economic benefit of reduced water use is deferred future costs (rather than actual operational savings) additional funding would be needed.

One potential area of income generation is to increase the charges currently passed onto consumers. This might be appropriate given that the level of water consumption arguably is a reasonable proxy for the contribution each consumer makes to the underlying problem.

The following table illustrates how this might be applied. The table assumes a 1 percent increase in charges. The rate of increase is scalable depending on the level of funding required.

	Current	New	Increase	Income	
Base differential (residential)	¢0.04731	¢0.04781	1.06%	$156,300	
Base differential (commercial)	¢0.236568	¢0.239076	1.06%	$24,000	
Base differential (un-metered residential)	$125.00	$126.25	1.00%	$72,600	
Base differential (metered residential)	$107.00	$108.07	1.00%	$740	
Base differential (metered residential)	$1.78	$1.798	1.00%	$4,400	
Base differential (metered residential)	$1.78	$1.798	1.00%	$125,120	
Potential income for redirection to water conservation rebate schemes					$383,160

With a budget of approximately $400,000 per year $500 could be made available to 800 ratepayers a year to support water saving hardware.

Alternatively, say, half the funding could be used for initiatives such as education & information services, support for leak detection and repair on private properties, etc and the remaining half could be used for hardware grants.

Another funding option would be for the Council to provide a loan facility for people to purchase water efficient hardware, then to repay those loans by an additional charge on their rates. There are a number of challenges with this approach, including what happens where a property is sold and potential for

Council being left with unsecured debt. It may also be administratively difficult. We do not recommend this mechanism at least in the initial stages of the plan.

Alternatively funding could be provided from general rates. This might be considered appropriate given that savings made, especially savings from deferral of capital expenditure, are likely to be generalised across all ratepayers.

5.6 Levels of service

Wellington City Council has a 'Water Charter' which outlines roles and responsibilities in relation to the provision of potable water. Year round watering restrictions currently provide that 'garden sprinklering' can be undertaken on alternative days between the hours of 6 am to 8 am and 7 pm to 9 pm.

One potential remedy for peak demand stresses is to reduce the 'level of service' to provide for larger gaps between watering days and/or other water use restrictions. This would require greater vigilance, visible enforcement and potentially punitive responses in order to make such a move effective.

The acceptability of such approaches will be put to the community in the formal consultation phase during July.

The construction of a dam would extend the level of service well beyond the 'one in fifty' security of supply standard – though without greater discussion over size and actual storage capacity it is not possible to provide a final figure.

6. Initial consultation

On May 11 we used the 'Our Wellington' page to introduce the conservation and efficiency approach for demand management to Wellington residents. Residents were invited to provide feedback. A small number of residents took up the opportunity. The Environment Reference Group was also consulted. In addition, we have been communicating with a number of stakeholders, resident and action groups, interested parties and government departments and agencies.

Overall there was support for doing more to reduce water consumption. There was not support in general for universal metering.

About half the respondents considered that the Council should do more to support water tanks to collect rain water.

One respondent noted that the Council should make efficiency gains where possible but should also build a new dam as soon as possible.

7. Conclusion

The development of a 'Water Efficiency and Conservation Plan' is an important step toward the introduction of widespread and equitable approaches to more efficiently using a valuable and limited resource.

This initial step has the potential to set Wellington of a proactive path towards maintaining a sustainable water supply that meets the needs of a growing city. It is therefore important that the various communities that make up our city are engaged.

Contact Officers: *Bryan Smith, Principal Advisor, Policy*
Paul Glennie, Strategic Policy Analyst, Capacity Infrastructure Services Ltd

Supporting Information

1)Strategic Fit / Strategic Outcome

This paper policy supports the Council and Community outcomes and builds towards a greater ability to meet current levels of service. Agreement will contribute to Council meeting the outcome of making the city more sustainable.

2) LTCCP/Annual Plan reference and long term financial impact

No LTCCP/Annual Plan impacts are evident at this stage. Final implementation of a water efficiency and conservation plan will generate business cases for those initiatives that may impact the LTCCP or Annual Plan.

3) Treaty of Waitangi considerations

It is not considered that this report raises any Treaty of Waitangi issues.

4) Decision-Making

This is not a significant decision. The report sets out a number of options for consultation.

5) Consultation

a)General Consultation

Consultation has commenced via ongoing communications with stakeholders, interested parties and individuals. Feedback and comments have been sought via media reports and formal consultation is planned for July. Public meetings are planned for the end of July.

b) Consultation with Maori

Water issues, particularly regarding extraction and the quality of waterways, are significant for Maori. Specific consultation with tangata whenua will be undertaken.

6) Legal Implications

No legal implications are evident at this stage. Should such a situation arise when the final implementation of a water efficiency and conservation plan occurs legal advice will be sought and reported on.

7) Consistency with existing policy

This report's recommendations are consistent with existing WCC policy.

Appendix 1:

Discussion Document

Water Supply and Demand in Wellington

And

A Draft Water Efficiency and Conservation Plan

Introduction

Wellington city faces the challenge managing a finite amount of potable water[4] that can be supplied in a single day with a growing population, increased urban spread and commercial growth.

This challenging situation is replicated to varying extents in the other cities that make up the Wellington region.

As Wellington's population, business communities and urban demand increases over the coming years shortfalls are likely to occur at certain times of the year between what can be supplied and what is required to maintain our current lifestyles or business requirements.

At some point Wellington as a region will almost certainly be faced with a major decision about how to manage such shortfalls. We will have three main choices:

- Live with them and accept more regular, longer and more stringent restrictions on water use
- Augment supply – probably with a major dam, but there are other options
- Aggressively reduce demand – probably with universal water meters and tariffs – but there are other options.

The last two options would require significant capital investment.

A decision between these three options is not required for a few years yet.

In October 2009, the Council considered these issues and reached a number of decisions. Specifically it was decided to:

- Adopt "an interim target of stabilising water consumption in acknowledgement of the goal:

  "To accommodate Wellington city's population growth through to 2025 with the same amount of water we have available to us now."
- Agree to a phased approach to water demand management whereby education and the more easily achieved water efficiencies are undertaken first prior to more expensive or onerous options being considered.
- Agree to consult in 2010 on the next phase of the water conservation plan, ensuring that the consultation materials make it clear that water meters and dams are potentially part of the future and explain the cost benefit of them.

[4] Potable water or drinking water is water of sufficiently high quality that it can be consumed or used without risk of immediate or long term harm. The water supplied to households, commerce and industry is all of drinking water standard, even though only a very small proportion is actually consumed or used in food preparation.

- Agree to consult on what service level is acceptable, including frequency of water restrictions.
- Request staff to explore funding mechanisms for water conservation.

Council now wants to explore, implement and evaluate measures to reduce of water consumption. The focus at this stage will be on less expensive and/or onerous measures. If successful such measures could have significant benefits for all Wellingtonians, including:

- Reduced overall cost to ratepayers for bulk water supply
- Reduced costs to residents for energy – since water use and energy use are often linked
- Deferred major capital investment, with associated financial benefits for the city
- Reduced waste water that must be treated.

The consultation document is in two parts. Part one outlines the current situation for water supply and demand in the Wellington region. It discusses the role of water efficiency and conservation and benefits this could have. Part one also discusses security of supply issues and options for restrictions on water use. The public's feedback is sought on these issues.

Part two of the discussion document provides a draft water efficiency and conservation plan for Wellington city. It focuses on less expensive and/or onerous options at this stage.

The draft Plan notes in general terms the possible cost of the water efficiency and conservation measures contained in the Plan. Following consultation Council officers would firm up any cost estimates and make specific recommendations for Councillors' consideration. No fiscal implications would arise prior to the 2011-2012 draft Annual Plan process.

The public's feedback is sought on the Draft Water Efficiency and Conservation Plan.

Submissions

The full Draft Water Efficiency and Conservation Plan is available:

- from city libraries
- the Service Centre at 101 Wakefield Street
- online at at www.Wellington.govt.nz
- from Paul Glennie on 9103100

If you would like us to come and talk to your group about this Water Efficiency and Conservation Plan please contact Paul.

Submissions close 5 pm Friday 30 July. To give the Council your suggestions please fill in and return the attached submission form or make a submission online at www.Wellington.govt.nz

Part One:

Water Supply and Demand in Wellington

Water in Wellington – who does what and what it costs.

Wellington's bulk water supply is provided by Greater Wellington Regional Council. Water is collected from rivers and aquifers (natural underground collection points) and treated to meet drinking water standards.

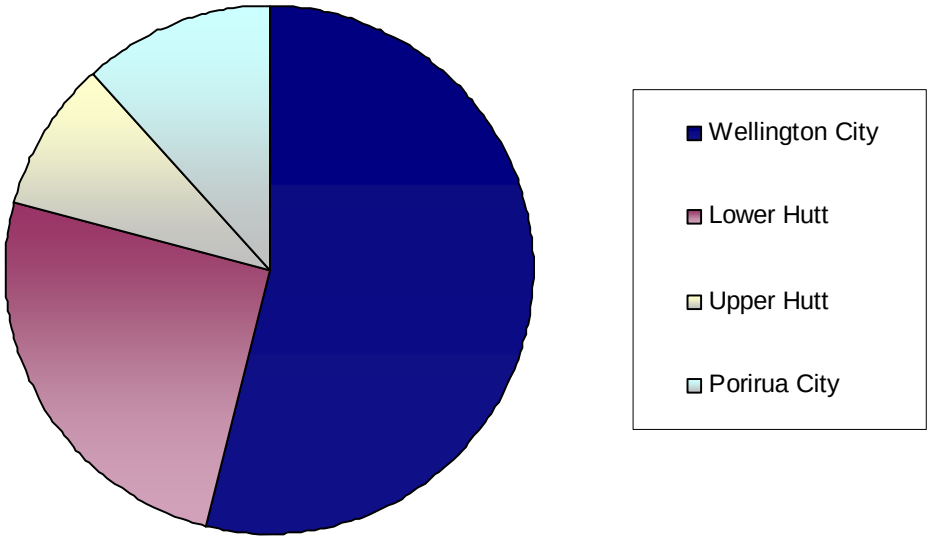
Wellington City Council purchases potable water in bulk from Greater Wellington Regional Council (GWRC). Porirua City, Hutt City and Upper City Councils also purchase bulk potable water from the same water supply system.

Wellington City is responsible for distributing water around the city. It owns the pipe infrastructure, pumping stations and various reservoirs around the city. The Council Controlled Organisation "Capacity Infrastructure Services Limited" manages the infrastructure on behalf of Wellington City, Hutt City and Upper Hutt City councils.

Chart 1 shows the amount of potable water supplied and used from the GWRC system that Wellington City is connected to. Wellington City uses around 30,300 mega litres of water each year (30 billion litres) which is a little over half the water consumed from the system.

Wellington city pays GWRC around $13 million per year for this water. A further $5.6 million per year is spent on managing water supplies within Wellington city itself.

About 90 percent of these costs relate to the fixed costs of supplying water, for example for maintaining infrastructure. Only about 10 percent of the costs of water supply are variable, or example labour costs or treating the water to drinking standards.



Graph 1: Water consumed from the GWRC bulk water supply

The chart is important in the context of Wellington's water supply and demand situation because it illustrates that Wellington City's actions alone cannot

influence all demand for water from the system. However, at over 50 percent of demand, Wellington city has an important role to play.

Water supply and demand in Wellington

Based on current demand and infrastructure the Wellington region does not have sufficient water storage to meet its agreed security of supply standards (see later discussion on supply standards)[5].

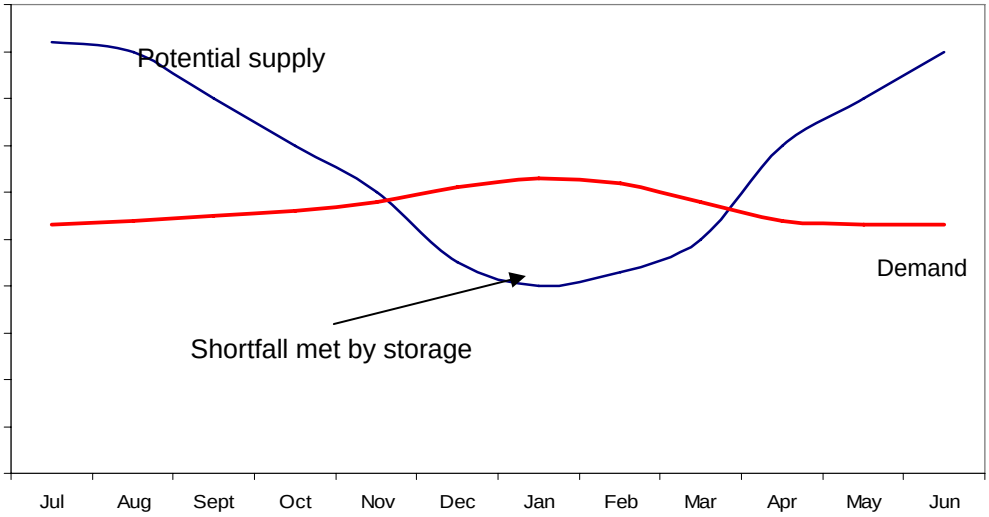
This situation will be further exacerbated by population growth and associated increased demand for water. This will mean imposed water restrictions will become increasingly likely unless water demand is reduced or more storage is built. The severity and duration of any restrictions may also increase over time.

Climate change may further exacerbate water supply and demand concerns, though at this stage it is impossible to accurately predict how. Climate scientists suggest that climate could become more variable. This means that even if Wellington were to get more rainfall overall, dry spells could still be longer and more severe putting pressure on the water supply system at critical times.

Graph 2 shows the current water supply and demand situation. It shows that for most of the year the water available far exceeds Wellington's demands. During these periods the potential inflow into the water system is far greater than the water actually extracted for use and/or storage. However, over summer low inflow levels combined with higher demand means that more water is flowing out of the system than is available to flow in. This is when the water stored in the lakes at Te Marua and elsewhere is used to make up the shortfall.

In a normal year and for our current population there is more than enough water stored in the lakes to make up this shortfall between inflow and outflow.

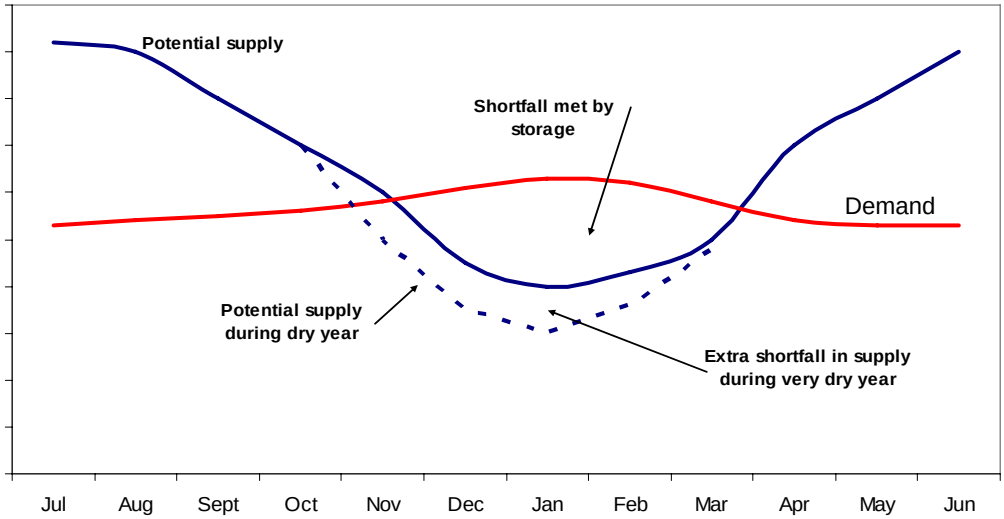
[5] Security of supply standards relate to the likelihood that increased water restrictions will need to be imposed. The agreed standard is that increased restrictions should only be required for events (dry spells) that occur 1 in 50 years. Currently the system is providing a 1 in 26 year security of supply.



Graph 2: Water supply and demand in Wellington in a normal year

Graph 3 shows what happens when we get an unusually dry year – for example a one in 30 year drought over summer. When this happens the amount of water coming into the system over summer is much lower than normal, meaning the amount of shortfall between supply and demand increases.

Unfortunately, in very dry summers demand for water often also increases making the situation worse (though this is not shown on the graph it would increase the amount of shortfall between demand and supply).



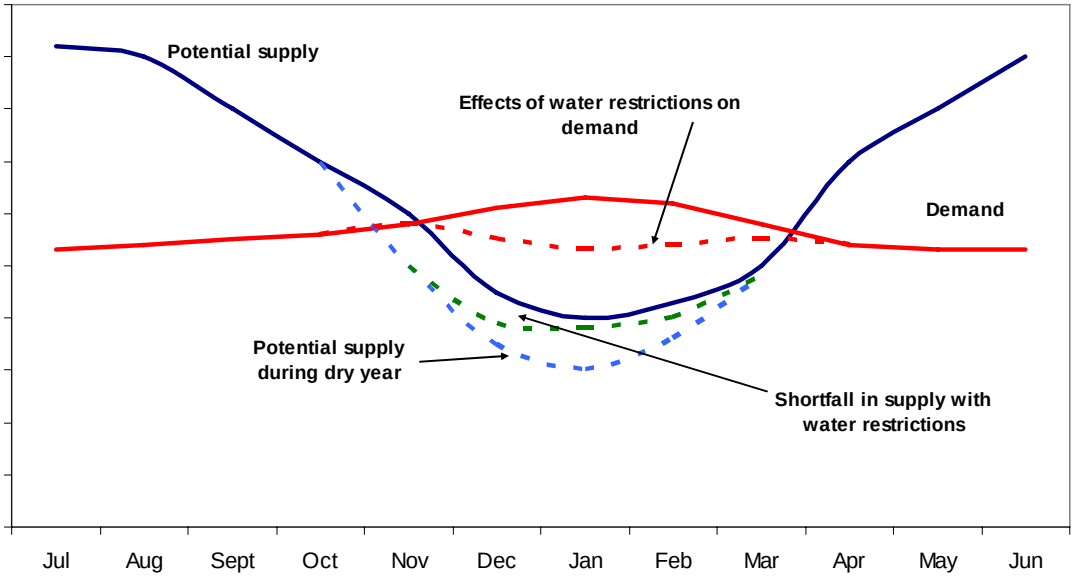
Graph 3: Effect of a very dry year on shortfalls in supply

Imposed water restrictions

The shortfall between supply and demand can be supplied from the dams for the majority of dry years. But, if the short fall becomes too great, then to ensure demand for water does not overwhelm the ability of the dams to supply it Councils will ask users to conserve water. In severe cases Councils may be compelled to impose water restrictions – or in other words - compulsory conservation measures.

In such cases Councils will always seek to ensure that water for the necessities of life is available. That means the first uses of water to be restricted are 'non-essential' things like watering gardens and washing cars. As the shortfall between supply and demand increases, the level of restrictions on water use must become increasing severe. Graph 4 shows how water restrictions are used to manage the shortfall between supply and demand in very dry years.

For illustrative purposes graph 4 shows a large drop in demand. In reality though it is quite difficult to achieve large drops in demand through conservation measures (say 15 percent savings and above). Such levels of demand reduction typically require mandatory restrictions with high levels of information and enforcement of the rules. Sustaining such measures for more than a few months (other than in a crisis situation) is also very difficult.



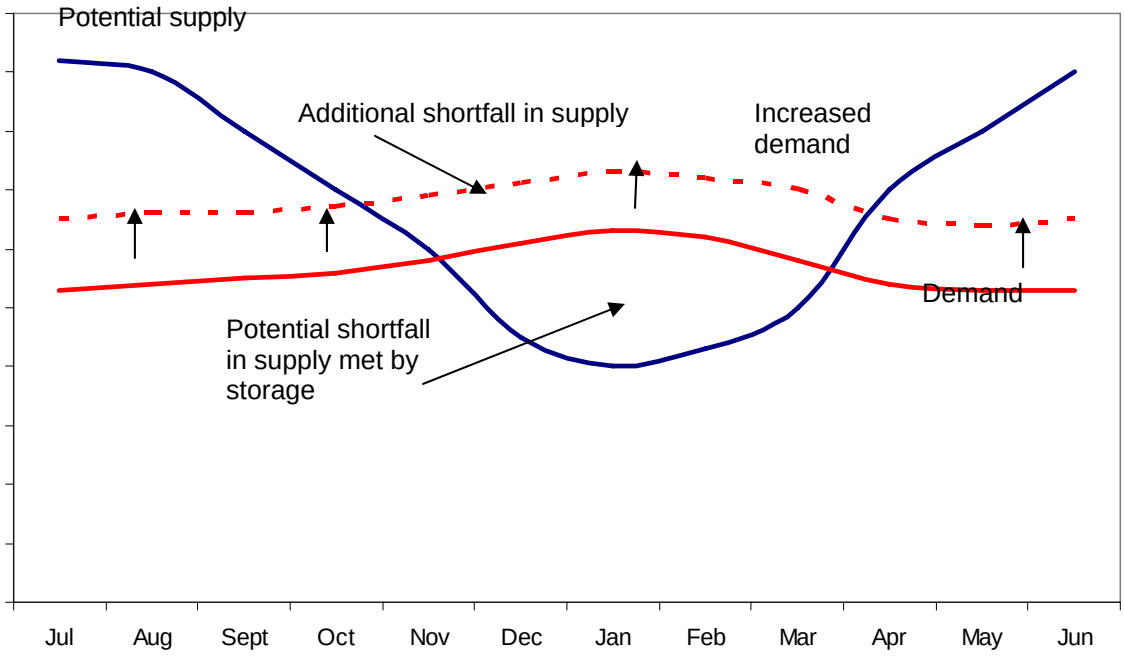
Graph 4: Effect of water restrictions on managing a water supply shortfall in a very dry year

Population increases and demand growth.

As population increases, demand for water tends to increase also, putting additional pressure on the potable water system and exacerbating times where supply and demand might already be tight.

Graph 5 shows how increasing population will, all other things being equal, increase demand for water and thereby increase Wellington's shortfall in supply over the summer months.

This in turn exacerbates the risk of water restrictions being needed and the likely severity and duration of those water restrictions. Because of underlying increases in demand, Wellington region's dams already now only have enough water to meet a dry-spell that occurs 1 in 26 years, rather than the previously agreed performance standard of a 1 in 50 year dry spell.



Graph 5: Effect of increasing demand on shortfall in supply

Graph 5 highlights an important issue for Wellington going forward. This is that at some point in the medium term (around 2020-2025) – and unless something is done to reduce demand in the meantime – the shortfall in supply over summer will be greater than the capability of the storage facilities to meet it[6].

At that point Wellington would be forced to either:

[6] This already assumes that some interim steps are taken to both increase storage capacity (for example raising the levels of the lakes a Te Marua) and increase water inflows (for example develop the Upper Hutt aquifer and reduce the minimum low flows in the Hutt river).

- Take aggressive steps to reduce demand (for example universal water meters and tariffs and/or significant water restrictions over the summer period); or
- Build substantial new water storage infrastructure to ensure the summer shortfall can be supplied from stored water

Because building a new storage facility (assuming it was a new dam) would take about 8 to 10 years, the point at which Wellington needs to decide which approach it will take is actually much sooner than when the situation becomes critical.

Council staff believe that, unless a plan is implemented to reduce demand for water very soon, a decision will be needed in about 2014 on whether to build storage infrastructure or pursue aggressive demand reduction in the early 2020s.

Either approach is expensive in terms of capital outlay. For example, the net present value (cost) of the approach in which a dam is built in 2022 is around $70 million. Installing universal meters in the early 2020s has a net present value (cost) of around $52 million[7]. According to Greater Wellington Regional Council's research the cost of building a dam would mean a rates increase of around $70 per household per year – equivalent to a lump-sum cost of about $875. The cost of installing meters is estimated to add approximately $50 to the average rates bill each year – equivalent to a lump-sum cost of about $625.

Both approaches have their pro and cons, though it is not the purpose of this discussion document to assess either approach.

Rather, the issue is raised because one of the key benefits of implementing water efficiency measures now is to defer the need for large expenditure on either aggressive demand reduction (probably by universal water meters) or new storage facilities (probably the construction of a dam).

To illustrate the potential benefits, Council staff have estimated that deferring a new dam by one year (from 2022 to 2023) provides about $4 million in net economic benefit[8] for the region. Deferring a dam by 5 years has about $18 million in benefits.

It is important to note however, that at some point large capital expenditure is likely to be needed, since increasing demand through population growth is eventually likely to outstrip our ability to make efficient gains.

Your input

Security of supply and imposition of water restrictions

We would like to hear your views on how we should approach water restrictions over drier periods, those times when demand is particularly high, or supply is seriously low.

[7] Costs are sourced from Greater Wellington Regional Council analysis undertaken in DATE
[8] Net present value

Reducing demand over summer, which is most easily done by restricting outdoor and potentially less important activities, will mean that the water supply that we do have can go further towards meeting demand.

Currently Wellington operates year round sprinkler restrictions that allow for garden sprinklers to be operated on alternative days between 6 am and 8 am and 7 pm and 9 pm. During the summer of 2009/10 we instigated patrols so that we could advise people of the water restrictions and how they affected people.

How do you think the Council should approach and enforce water restrictions? Should the alternate days be extended, say to a three day gap or perhaps we should allocate odd and even property numbers two days a week on which watering is permitted? Should those residents breaking any such rules be fined or what other penalties might be applied?

Do you think it would be acceptable to extend water use restrictions to other 'non-essential' activities like washing cars and houses?

How often do you think such additional restrictions should be required – every year, once every few years, hardly ever, or under no circumstances?

Your thoughts and ideas are important to us and we invite you to use one or more of the following options to give us your input.

Part Two:

Draft Water Efficiency and Conservation Plan

Introduction

Wellington is fortunate in that over the year the region receives plenty of rainfall to supply the needs of people. The challenge though is that our rainfall is not evenly distributed throughout the year. During summer, the available water can be much less than that needed to meet the needs of the cities in the region. This is also the time when demand for water is at its highest. Storage facilities – like the dams at Te Marua - make up the shortfall during these dry months.

As Wellington's population, business communities and urban demand increases over the coming years, shortfalls are likely to be more acute at certain times of the year. In particularly dry years additional water use restrictions may be need to manage the water supply and demand balance.

At some point Wellington as a region will be faced with a major decision about how to manage such shortfalls. This will probably have significant capital investment implications.

But, it may be possible for the city to defer major capital investment for a considerable period of time. To do this, we need to accommodate population and commercial growth from within the existing water supply system.

The Council therefore wants to explore, implement and evaluate measures to reduce or water consumption. The focus at this stage will be on less expensive and/or onerous measures. If successful such measures could have a number of significant benefits for all Wellingtonians, including:

- Reduced overall cost to ratepayers for bulk water supply
- Reduced costs to residents for energy – since water use and energy use are often linked
- Deferred major capital investment, with associated financial benefits for the city
- Reduced waste water that must be treated.

Tools available to encourage reduced water use

Council has a number of "tools" available to encourage reductions in water consumptions. The more onerous or expensive of these tools (for example universal meters and regulations) will not be considered at this stage until other options have been tried and assessed. Nonetheless, there are still many tools Council could employ, including:

- Information and education
- Providing measurement devices and self-assessment tools
- Providing ‘free’ expert services
- Funding support such as grants and/or loans for installation of new technology
- Pricing incentives (especially where meters are in place)
- Partnerships with retailers and service providers to promote certain technologies or initiatives
- Advocating for central government action where issues have national application
- Direct investment of Council resources on specific initiatives or hardware, eg leak detection, upgrade of community housing

Research shows that information and education alone are generally not sufficient to change behaviour. However, they are important components of a package of measures, so are a key focus of the Plan.

The Council’s Role

Wellington City Council, in conjunction with Greater Wellington Regional Council, Hutt City Council, Porirua City Council and Upper Hutt City Council, is exploring how the community can conserve water as well as making more efficient use of the water we have now.

Council will also take a leadership role in its own operations. In doing so Council will ensure that any initiatives to reduce water use will not negatively impact on the operation of parks, gardens and other amenities that require water in order to meet the needs of the community.

A phased approach is proposed that allows for a wider discussion of the water supply and demand issues the region is facing, dissemination of water efficiency and conservation information and the implementation and introduction of water use assessment tools. This may include:

- Residential and commercial water use calculators.
- Audit tools for residential and commercial consumers.

- Web based information on consumption, conservation and efficiency opportunities, water efficient appliances (their availability and performance) and related ‘FAQs’.

- Reporting mechanisms to regularly show consumption and effects of water initiatives.

- Readily available register of water smart appliances and their claimed performance.

Conservation versus Efficiency

There are two approaches to reducing water consumption in the urban environment; conservation and efficiency.

Water conservation is reducing the amount of an activity we undertake. Examples include not washing cars, taking shorter showers, or reducing the number of times the garden is watered. Conservation measures generally require behaviour changes by consumers. They are relatively cheap and fast to implement, but can be difficult to sustain over long periods of time. To be effective, conservation measures typically require a high degree of both information and enforcement to be effective.

Conservation measures are a very important tool for managing short-term demand peaks and/or significant drought events. Consequently, they are vital to a cost effective water supply system that would otherwise have to provide for “every eventuality” – something that would be extremely expensive.

Efficiency measures on the other hand reduce water consumption by allowing the same level of activity to be undertaken but using less water to do it. Examples include front loader washing machines, dual flush toilets, rainwater collection systems, low flow shower heads, and leak detection and repair.

Efficiency measures generally require investment in ‘hardware’, but once in place will go on making water savings without requiring behavioural change. They are therefore typically sustainable longer term than conservation measures. The key drawback is that they can be expensive to implement, especially if they are being retrofitted to an existing building or being implement before some item of hardware (say a top loading washing machine) is due for replacement. Efficiency measures can also take a number of years to roll-out.

The draft water efficiency and conservation plan contains both efficiency and conservation proposals. However, its main focus is on efficiency measures since these are generally less onerous on people and provide more reliable ongoing results.

Community focus areas

In this Plan consumers are divided into four sectors, each requiring slightly different approaches and resources. The identified sectors are:

- Wellington City Council
- Central Government
- Commerce and Industry
- Residential

There are no remedies that could be considered ‘instant’ or ‘singular’. It is more appropriate to consider a combination of many measures that will lead to a reduction in overall consumption.

A table providing approximate costs and water savings from various measures is provided in **Annex 1**.

Wellington City Council (operations)

Proposed key initiatives and focus areas:

- Assessments of Council’s water use and opportunities for reductions. Publish report of findings along with water efficiency and conservation initiatives to be implemented. Consideration will also be given to setting targets across the Council.
- Increased investment in leak detection and repair across Council network.
- Water efficiency hardware installed in community housing as items need replacement.

As a major user of water across the city it is important that we have a complete understanding of our requirements and the opportunities that may exist for us to do better.

Initially the process will be about gaining an understanding of individual department’s water needs. We need to understand how water is used and for what purpose. There is no point is creating a raft of potential solutions that remove the ability for a service to be delivered to our communities.

Assessments of needs and opportunities are planned to be carried out over the next few years. Once assessments have been carried out we will publish a report of those findings along with any water efficiency and conservation opportunities. There will also be considering targets for water reduction where

appropriate and we will indicate where we have had our successes and the lessons we have learned.

Leak detection and repair

One important area of Council operations that can be progressed now is leak detection and subsequent repairs. Last year we replaced over 9.5 kilometres of pipes and carried out repairs in response to nearly 4,000 reported leaks.

A recent study of Wellington City Council's active leak detection programme by consultants Montgomery Watson Harza (MWH) indicates that the current budget of $108,000 would need to be increased by $74,000 to meet the point where additional investment would exceed the monetary value of the water being saved. Additional investment in this area will be part of Council's efforts to reduce water demand. Additional budget provision is not needed for this work as it can be met from reprioritisation from within existing budgets and should be off-set by savings elsewhere.
The information we gain from assessing repairs allows us to talk to other water users in order to prevent accidental damage to the network or hydrants not being closed fully when contractors or other users have finished working with them.

As assessment of the type of repairs being undertaken by our contractors shows that there may be a need for tobies to be inspected more regularly and that fire hydrants are not being closed properly.

As discussed within the later 'residential sector' it is important to understand that fixing leaks in the Council network provides only a partial solution given that a portion of water loss occurs on private property[9].

Community housing

Another area where Council will take a lead position is in the upgrading of Council community housing, including:

- Installing rain water tanks at Marshall Court Flats and Hanson Court Flats.
- Where tap ware is being replaced - low flow tap ware will be used.
- Where shower heads are being renewed they will be low flow types.
- Where toilets are being renewed they will be the dual flush low volume type.

Funding is already provided for these measures.

[9] The definition of "private property' includes any reticulated network beyond the point of supply regardless of ownership. Accordingly a leaky tap in a public facility is considered to be a private leak.

Central government

Proposed key initiatives and focus areas:

- Provide timely and authoritative information on options, costs and benefits of reducing water consumption.
- Working with institutions to identify and capture opportunities to reduce water use.
- Develop self-assessment tools to monitor consumption and performance against targets.
- Increased leak detection and repair.

As with the Council's operations and business units there is scope for engagement with central Government departments and agencies over how water is used within their business requirements.

We will be contacting schools, hospitals, care facilities and Government departments to establish what opportunities exist to introduce water efficiency at various levels.

In order to facilitate participation a self assessment tool will be developed for building operators and tenants so that a baseline for water consumption can be established. This will allow assessments to be made against different technologies that may be more suitable than others for different built environments.

It is important that both Council and central government entities work together to ensure that opportunities are maximised. This will allow technologies and better water practices to be introduced to employees as well allowing a transfer of knowledge from the workplace to the home.

Commerce and industry

Proposed key initiatives and focus areas:

- Provide timely and authoritative information on options, costs and benefits of reducing water consumption.
- Working with companies to identify and capture opportunities to reduce water use.
- Develop self-assessment tools to monitor consumption and performance against targets.
- Increased leak detection and repair. This may include a 'free' plumbing service to assist in leak detection and repair.

In Wellington the majority of commercial premises pay for the water that they use. For this reason there are commercial gains for a water efficient commercial enterprise with the appropriate applications of technology.

Not all of the water efficient technologies on the market today will be suitable for a city wide application – however with the right level of information being available we hope to assist businesses to make the right choice in how they can best save water, energy and potentially increase their bottom line.

We will be developing self assessment tools for businesses to establish how much water they use against how much they may be able to save. In some cases we may also look at offering incentives or subsidies if that is the most appropriate way of introducing new technologies or practices.

As with the central government sector there is also scope for information learnt at commercial enterprises to be transferred to the employee's home. When this happens and technologies are adopted at both the work place and in the home there is potential for an increase in water conservation or efficiency achieved.

Residential

Proposed key initiatives and focus areas:

- Provide timely and authoritative information on options, costs and benefits of reducing water consumption.
- Develop self-assessment tools to monitor consumption – including making measuring devices available to homeowners
- Leak detection and repair – including providing a 'free' plumbing service
- Working with local retailers and service providers to promote water efficient options
- Consider grants scheme for replacement of specific hardware, including toilets, and showerheads.

There is a need to address water conservation and its efficient use across the whole community. This means that residents will be asked to do their bit also if we are to achieve the goal of maintaining the level of water consumed over the coming years.

To achieve this we intend to make available as much information on water efficiency technologies as possible. The development of a web based water conservation and efficiency portal will provide a wide range of information allowing residents, and business, to calculate their water consumption.

Because the bulk of our higher demands come during the summer or drier months we will also be including information about drought resistant trees,

shrubs and other plants as well as those native plants that require less water to thrive in Wellington.

As water savings and energy saving are interlinked the site will also offer advise on energy savings and how more efficient use of water could potentially reduce the household power bill.

In addition to the web based tools we will make written material available to the communities covering frequently asked questions and directing people to companies who sell water efficient technologies.

We will also be making available to people voluntary meters so that the volume of water going into a home can be accurately measured. Even if you are not paying for your water though the metered arrangement there is always the ability to measure the amount of water that you and your family are using.

On-site metering is also an ideal way to identify where a potential leak or inefficient appliance might be increasing the water consumption.

Because we know that a leak that may look small, but can lead to a considerable loss of water over time, we will also be developing facilities where residents and businesses can seek assistance in locating leaks or getting problems sorted.

For this we will provide a prompt response if you tell us your toby is leaking. We will also be looking at employing a plumber to come around and fix leaks and offer advice on water conservation and efficiency.

We will seeking to work with local retailers to ensure consumers know about the benefits of water-efficient hardware like front loading washing machines; low flow shower head; dual flush toilets; and leak resistant tapware. This may involve developing point of sale information material and possibly joint promotion. We will also be working with the industry – such as Master Plumbers Association – to ensure homeowners are getting good and consistent advice on water efficient choices.

We will consider the costs and benefits of a possible grants scheme to support water efficient hardware over non-efficient hardware. Any such grants could be targeted at new building and renovation projects or alternatively at retrofitting existing equipment. The table in Annex 1 provides indicative costs for these approaches. It shows that retrofitting is likely to be considerably more expensive per unit installed. However, retrofitting may be needed if we are to achieve a wider uptake of water efficient hardware.

Household water conservation and efficiency opportunities are widespread and range from turning off the tap while washing teeth, shaving or washing vegetables to reusing greywater and rainwater for toilet flushing. Individuals may want to pursue their own approaches to reducing water use and the Council supports any such initiatives.

Rainwater tanks allow individuals to make a contribution to water conservation, and their use is generally support by the Council. However, rainwater tanks are unlikely to provide an overall solution to security of supply and water storage during drier periods. They therefore are unlikely to be a high priority under any incentive-based programme.

Measuring outcomes

Council will monitor overall water consumption for Wellington city and the effectiveness of particular measures implemented under this Plan. The Plan may be adapted on the basis of information as it becomes available.

The Council will be reporting back to residents through the Our Wellington page and the Annual Report as to how we are progressing. This will enable us to track successes and see if we can transfer ideas from one area to another. Where we have struggled to make savings or introduce greater efficiency we will also make this known to the community.

Timeframes

The information from Greater Wellington Regional Council indicates that – without further reductions in demand for water - a major decision on managing supply and/or demand will need to be made in about 2014.

If we can 'live within our means' until that date – even as population growth continues or new businesses emerge – we can push that decision out further.

Every year we manage to achieve the goal of using less than 30,300 megalitres the city can save money by not borrowing to undertake large projects like constructing a dam or implementing universal metering.

This means we have almost four years to introduce and implement water conservation measures that maintain our level of consumption. If population growth and business demand increase our annual consumption by, say, 10% over that period our conservation and efficiency efforts must match that increase in demand.

We will be working with the other Councils to ensure a joint effort matches conservation efforts with growth across the region.

Annex 1: Possible water efficiency measures: Indicative costs and benefits and priority for implementation

Priority	Application	Indicative cost relative to "non-efficient" hardware		Estimated water savings per year	Comments	Energy savings
		Installed in new building	Retrofitted			
Possible hardware measures						
High	Low-flow shower head	nil	$200 - $300	30,300 – 60,000 litres p/a per unit*	Good savings are possible. No additional cost if low flow shower head is installed from new (or when renovating). Replacing existing shower heads should still be relatively inexpensive – but this depends on it being a straightforward replacement.	yes
High	Dual flush toilets	nil	$500	33,000 –37,000 litres p/a per unit*	Good savings are possible. No additional cost if a dual flush toilet is installed from new (or when renovating). Replacing existing toilets may be costly as a one-off exercise	
High	Leak resilient taps / water fittings	nil	$500 - $1000 per house	Up to 20,000 litres per year per leaking tap	Good long-term saving potential since this helps eliminate dripping taps and reduces chance for taps to be left running.	yes
High	Front loading washing machine	nil	$1000 - $1500	22,000 litres p/a per unit*	Good savings are possible. No additional cost if a front loader is purchased when an old machine needs replacing. Replacing existing machines within their lifecycle is expensive and may be difficult to justify compared to water savings made.	yes
Medium	Irrigation systems – automatic moisture sensing	$3,000	$3,000	Up to 50% of external water use	Offers good savings but expensive. Probably need other drivers for investing in the upper end of these technologies. Good potential over summer months.	
Low	Rainwater collection and reuse	$1,000 - $3,000+	$1,000 - $3,000+	Variable	Savings are possible, though these may not be at critical times – since tanks will empty quickly during dry-spells. Widespread implementation is expensive compared to "centralised" storage option. Also lack of control over when and how water is used. Very good benefits for emergency (individual) water supply in event of a major natural disturbance, such as a major earthquake.	
Low	Greywater reuse	$3,000+	$3,000+	30,000 litres per year	Good savings are possible, but installing systems is costly compared to alternatives.	
Medium	Hot water recirculators	$500.00	$750 approx	Approx 20,000 litres in a two bathroom, 4 person household or	Good long term savings, provides for good energy savings as well through reduced water heating requirements.	yes

				about 10-20%		
Medium	Water-less urinals	Low additional cost	$1,000 per unit		Dependant on usage – estimates are up to 6 litres per flush not required. Cost depends on style of urinal selected, benefits largely for commercial applications.	
Other possible measures		**Indicative cost**		**Possible savings**	**Comments**	
Medium	Leak detection / repair – home and commercial (includes "free plumber" to help detect and fix leaks	$150,000			Potential for conservation and increased efficiency through these mechanisms is reasonably high but difficult to quantify as the approach is dependant on uptake. Cost is significant and will need to be further assessed.	
High	Leak detection and repair – Council's network	$108,000 (already budgeted)			This work is currently underway.	
High	Information website	$20,000			Potential for conservation and increased efficiency through these mechanisms is reasonably high but difficult to quantify. Other regions that have used these mechanisms have reported reductions up to 10%.	Yes
High	Other education & information initiatives	$50,000				Yes
High	Working with local retailers and service providers – dedicated staff plus support materials	$100,000				Yes

Note that measures that also provide energy savings are likely to provide direct financial benefits to householders.