Administrative Buildings Water Efficiency Report

October 2009

SOUTHAMPTON CITY COUNCIL®

1. Introduction

1.1 *Why are we concerned with water?*

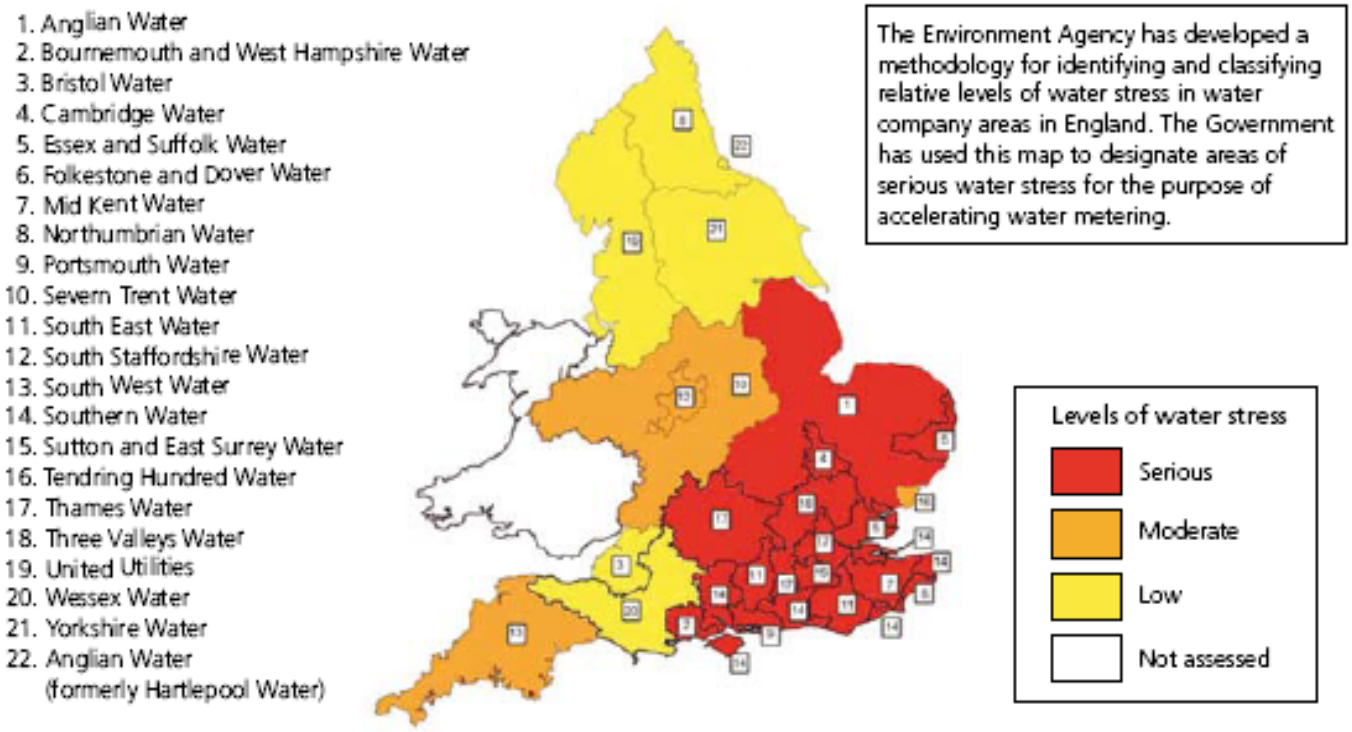
Water resources in the UK are a precious commodity that many take for granted. However, our water resources are coming under continual pressure due to the lack of supply coupled with a growing demand.

> *'The UK has less available water per person than most other European countries. London is drier than Istanbul, and the South East of England has less water available per person than the Sudan and Syria.'* (Waterwise, 2009)

The situation is set to worsen in the near future due to the impacts of climate change. The South East is projected to experience warmer drier summers and milder wetter winters, which will reduce the amount of water available for us to use (UKCP09).

> *'Despite this, the underlying trend is that we are all using more and more water - around 150 litres a day, each, with a third of that water being flushed down the toilet.'* (Waterwise, 2009)

In fact, in southern regions of England, where rainfall is comparatively low to the rest of the UK, consumption tends to be higher than elsewhere (Defra, 2008). Obviously this puts greater pressure on the already strained water resources in the south of England (Figure 1).



Source: Environment Agency, 2007

Figure 1: Areas of relative water stress (Defra, 2008)

In comparison to other countries throughout the EU, it seems there are many that already use less than our average of 150 litres a day (Figure 2).

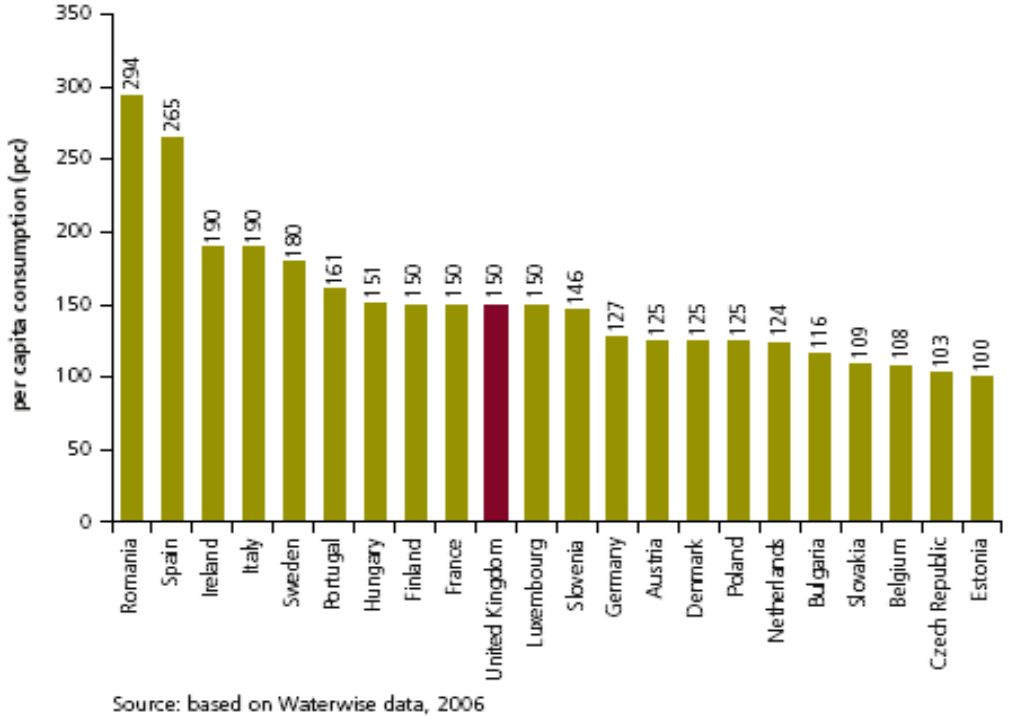


Figure 2: EU per capita water consumption litres/person/day (Defra, 2008)

The demand for household water has increased steadily since the 1950's, with household use now comprising over half of the public water supply use (Figure 3). The abstraction of water (Figure 4) must be closely monitored because although some industries, such as power generation, rely on direct, non-consumptive abstractions and the water is readily discharged back to the environment with limited associated environmental costs, the totality of water abstractions can still be unsustainable (Defra, 2008).

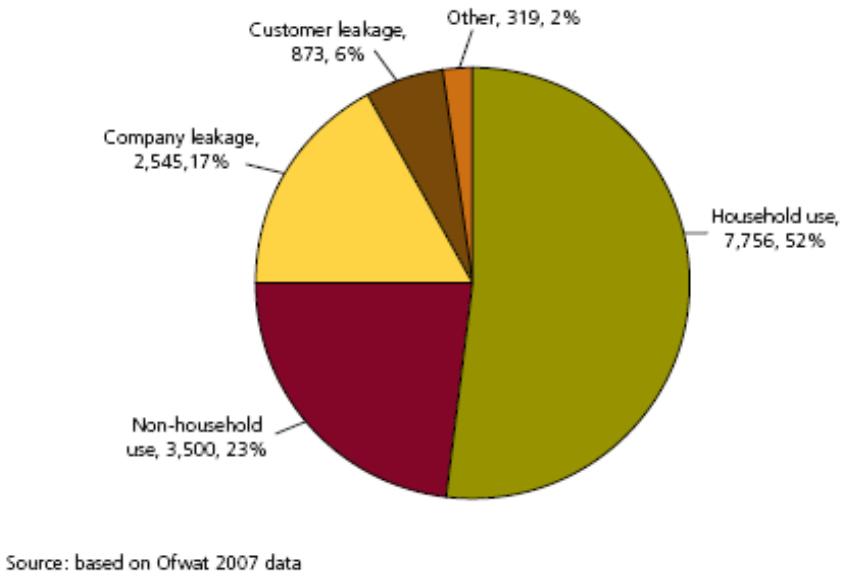
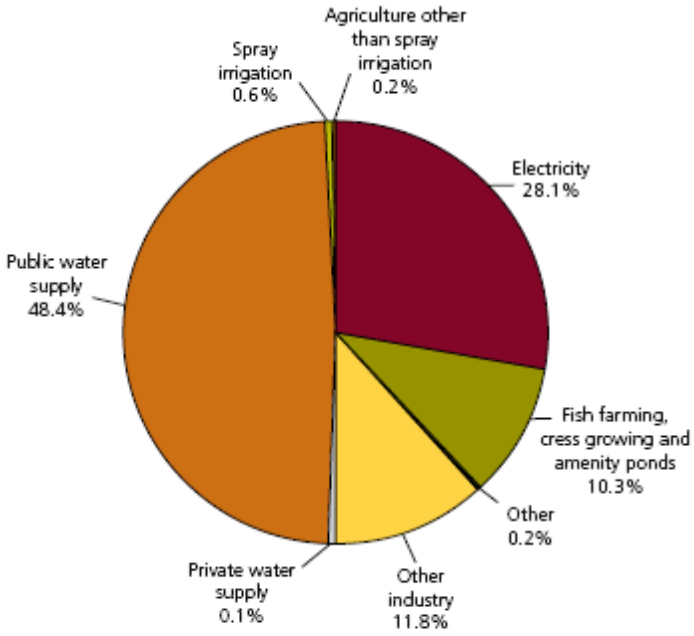


Figure 3: Public water supply in England & Wales (megalitres/day & %) (Defra, 2008)



Source: based on Environment Agency 2005 data

Figure 4: Licensed abstractions in England & Wales (Defra, 2008)

1.2 *Hidden Impacts*

> *'To make matters worse, the water we use has a significant carbon footprint, which is adding to climate change. Water company treating, pumping and other processes make up almost 1% of total UK greenhouse gas emissions.'* (Waterwise, 2009)

The activities associated with water supply (abstracting, pumping, treating and heating) and wastewater treatment (pumping and treating) consumes energy and releases greenhouse gas emissions (Figure 5). The UK water industry used almost 7,900 GWh of energy in its total operations during 2006/07, and emitted over 5 million tonnes of greenhouse gases, as carbon dioxide equivalents (CO_2e) (Defra, 2008).

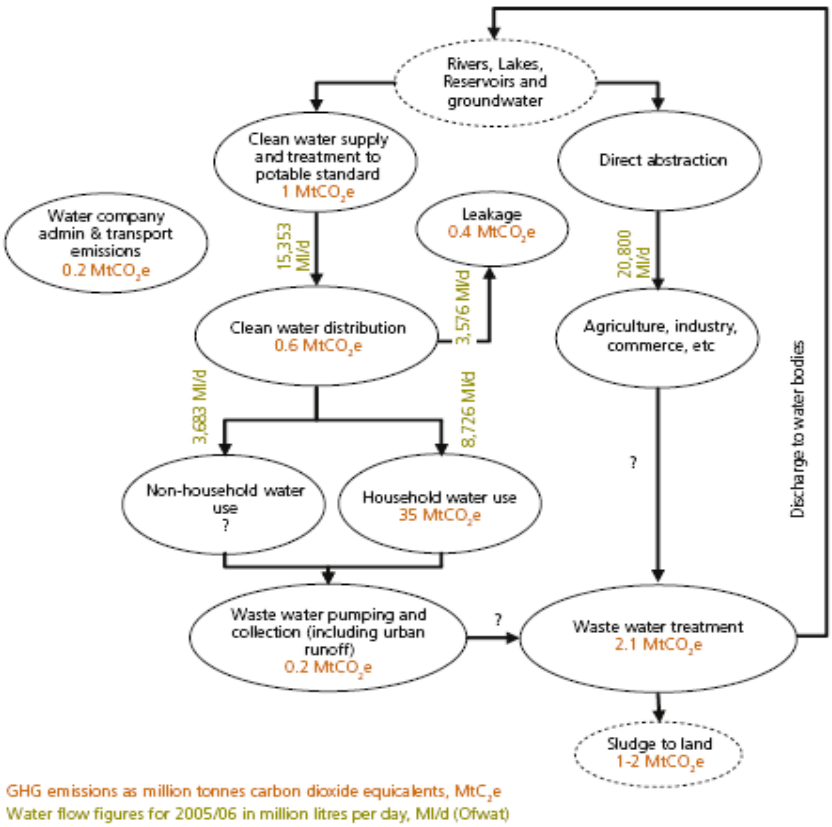


Figure 5: Water sector greenhouse gas emissions, 2005/2006 (Defra, 2008)

Therefore, a reduction in water consumption will not only reduce capital costs but contribute towards delivering carbon reduction commitments which will help alleviate climate change in the future. It is estimated that for every one cubic metre of water saved, there is an additional saving of approximately 1kg of carbon dioxide equivalent (Water UK, 2007).

2. Performance Analysis and Benchmarking

2.1 *2008/2009 Financial Year*

Southampton City Council's water consumption across their 5 administrative buildings for the 2008/2009 financial year totalled 33,150 cubic metres (m^3), amounting to a cost of £78,338.

2.2 Benchmarking

Where the consumption data was available for individual administrative buildings for the 2008/2009 financial year, it was divided by the approximate number of staff within the relevant building to give a performance indicator (PI) of m^3/person/per annum. The PI for each building was then compared with the "good practice" PI of 4m^3/pp/pa, to identify the variance and thus potential to lower consumption and cost (Table 1).

Table 1: Benchmarking of Administrative Buildings for the Financial Year 2008/2009

Admin Building	*Annual Cost £*	*Consumption m^3/pa*	*Staff Numbers (approx.)*	*Performance Indicator m^3/pp/pa*	*Variance m^3/pa*	*Variance £/pa****
Civic Centre	61,416	27,658	761	**18.17***	7,739**	**£17,800**
Marland House	6,601	2,642	295	**8.95**	1,460	**£3,350**
Southbrook Rise	6,362	1,866	253	**7.38**	855	**£1,965**
Castle Way	984	313	77	**4.06**	0	**£0**
TOTAL	75,363	32,479	1386	---	10,054	**£23,115**

*The PI for the Civic Centre assumes staff usage amounts to 50% of the water consumption (It is assumed that catering and general public use accounts for the remaining 50% which has not been included in the benchmarking calculations)

**A "good practice" PI of 8m^3/pp/pa was used to calculate the variance in the Civic Centre due to the potential restrictions on implementing water efficiency measures due to the nature of the regulations on the building (Grade II listed building)

*** The cost variance is an approximation to be used as a guide as it is dependent on the current unit cost of water and wastewater charged by the supplier (Southern Water)

The total variance from good practice performance in 2008/2009 was 10,054 m^3 and £23,115 respectively. These figures represent an approximation of the potential water consumption reductions and cost savings that could be made, however the actual reductions and savings will be dependent on efficiency

measures being introduced and good practice being exercised among the staff within these buildings.

As highlighted in Table 1, the Civic Centre has a particularly poor performance compared to the other administrative buildings. However, when compared to other office based services the water consumption of 18.17m^3 per employee was below average (Figure 6). Regardless of being below average, the water usage within the Civic Centre falls closer to the poor performance end of the scale which leaves plenty of room for improvement.

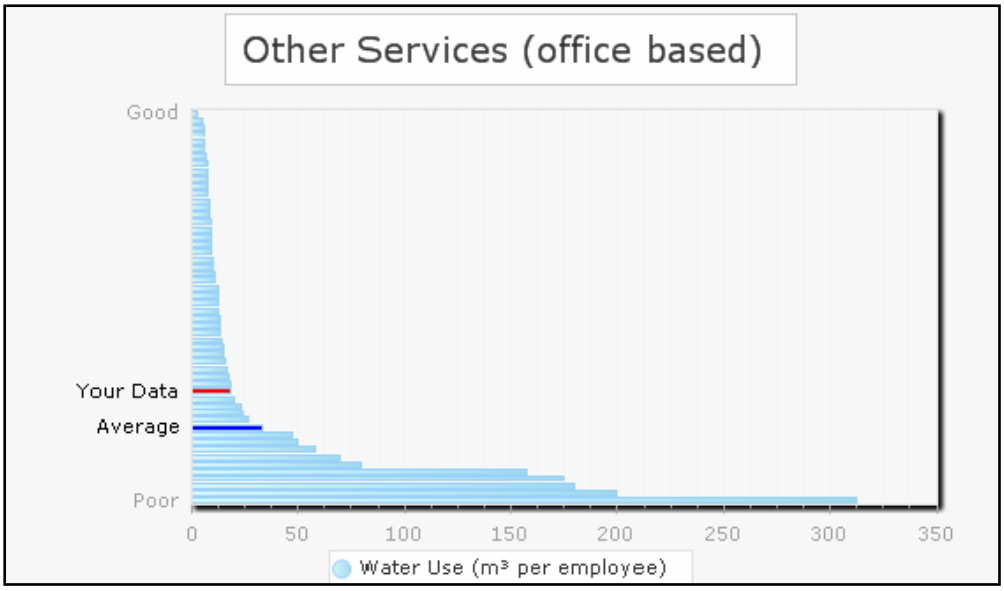


Figure 6: Comparison of Civic Centre water usage with the industry sector average (Envirowise)

The water usage of Marland House (Figure 7) and Southbrook Rise (Figure 8) falls closer towards the good performance end of the scale with 8.95 m^3 and 7.38 m^3 per employee respectively; however there is room to improve performance even further.

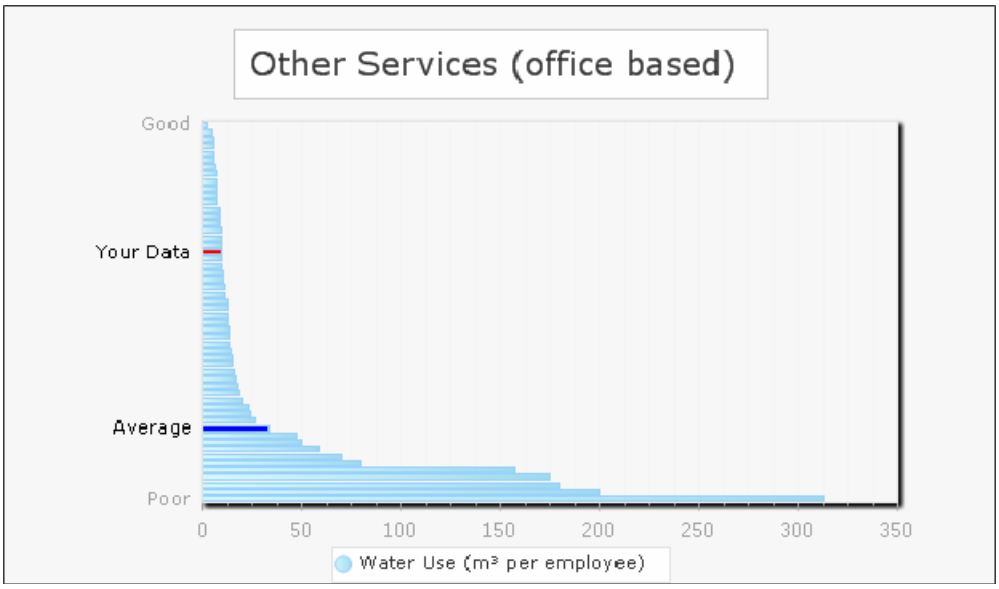


Figure 7: Comparison of Marland House water usage with the industry sector average (Envirowise)

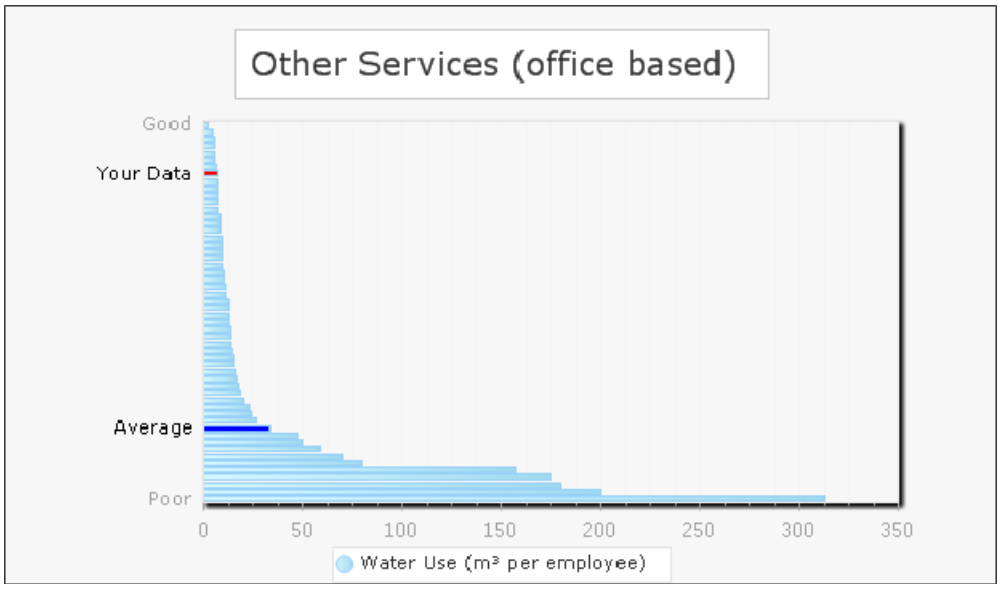


Figure 8: Comparison of Southbrook Rise water usage with the industry sector average (Envirowise)

Water usage within Castle Way achieved the "good practice" performance indicator of 4m^3/pp/pa during the 2008/2009 financial year (Figure 9). It is unclear why water consumption within Castle Way is so low compared to the other administrative buildings, but it proves that staff can reduce their water usage to potentially bring the other buildings in line with Castle Way's good performance.

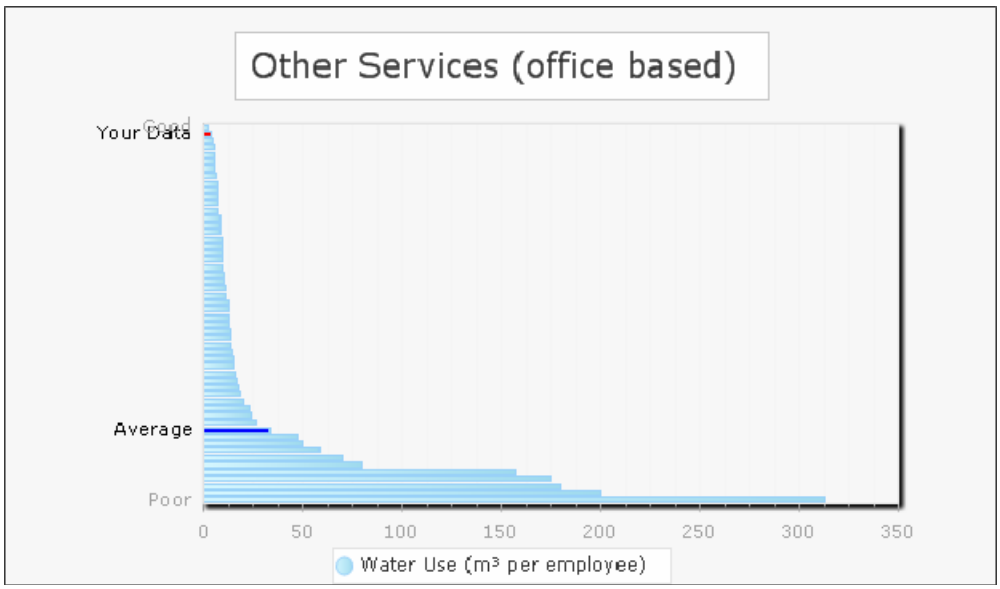


Figure 9: Comparison of Castle Way water usage with the industry sector average (Envirowise)

3. Recommendations

3.1 *Water Management*

There are a range of measures which can be introduced throughout the administrative buildings to manage the water usage with the aim to reduce total consumption which has the potential to provide substantial financial savings for the council each year. Since the administrative buildings and staff will be subject to the 'Accommodation Strategy Action Programme' (ASAP) from early 2010 until January 2014, the recommendations have been developed to reflect any future changes outlined in the programme. The key stages of the programme are illustrated in Table 2.

Table 2: ASAP key stages timetable

Building	***Stage***
Municipal Block East Wing	Refurbishment Aug 2010 to Aug 2011
Municipal Block West Wing	Refurbishment Aug 2011 to Aug 2012
North Block	Refurbishment Aug 2012 to Jun 2013
Frobisher House	will be vacated September 2010
Southbrook Rise	will be vacated September 2012
Castle Way	will be vacated in January 2014

Since three of the currently occupied administrative buildings will be vacated at various dates in the future, the input of major resources to reduce consumption would be wasted. Therefore, the recommendations were tailored to introduce measures which will reduce water consumption while the buildings were occupied, but at little upfront cost.

3.2 *Short-Term Recommendations*

The short-term recommendations, detailed in Table 3, are designed to give small water consumption reductions at a minimal one-off upfront cost. It is important to note that the potential reductions and savings figures are estimated and solely for guidance purposes.

It would be beneficial to determine how the good practice performance of Castle Way has been achieved for the 2008/2009 financial year and whether the performance is consistent. If examples of good practice could be identified, they could be rolled out and implemented in the other administrative buildings.

An important part of the process to reduce water consumption will be educating staff within these buildings to influence their attitude towards the way they use water. Many people take water for granted and assume it will always be available, however with increasing pressure on already stressed water resources in the South East of England it is important that we reduce our use and prevent unnecessary waste. Therefore, the key message to get across to staff should be not to stop using water but to stop wasting it. Understanding these issues can be achieved through poster campaigns, visual awareness campaigns and recruiting champions within departments to disseminate the necessary information.

Table 3: Short-term recommendations to reduce water consumption

Building	*Short-Term Recommendations*			*Potential Reduction* m^3/pa*	*Approx Upfront Cost of Equipment*	*Year 1 Potential Savings ** £/pa*
	Toilets	*Sinks, Basins & Showers*	*Leaks*			
Permanent Administrative Buildings						
Civic Centre***	Install Save-a-Flush bag in each toilet cistern		Regular meter readings to reveal irregular water usage to detect potential leaks early	**250**	£0	**£575**
Marland House	Install Save-a-Flush bag in each toilet cistern upon drainage upgrade	Install tap aerators on all taps	Regular meter readings to reveal irregular water usage to detect potential leaks early	**212**	£300	**£185** (£485 - £300)
Regional Business Centre	Install water efficient products during development of the building, such as dual flush toilets, urinal flush controls fitted to urinal cisterns, percussive or infra-red taps on basins in bathrooms, reduced flow taps on sinks in kitchens and showers in changing rooms. It would be advisable to install leak detectors to enable an early warning system.					
Temporary Administrative Buildings						
Castle Way	Install Save-a-Flush bag in each toilet cistern	Install tap aerators on all taps	Regular meter readings to reveal irregular water usage to detect potential leaks early	**42**	£90	**£6** (£96 - £90)
Southbrook Rise	Install Save-a-Flush bag in each toilet cistern	Install tap aerators on all taps	Regular meter readings to reveal irregular water usage to detect potential leaks early	**180**	£350	**£64** (£414 - £350)
			TOTAL	**684**	**£740**	**£830**

* The potential reductions are based on estimated usage. The actual water consumption reductions for each administrative building will be dependent on the number of staff located on site and their attitude towards water efficiency.
** Year 1 savings take into account the one-off cost of purchase of any equipment needed. Hence, the savings amounted through a reduction in water consumption over subsequent years (year 2 onwards) would be greater in comparison to the 2008/2009 baseline or year 1.
*** The implementation of recommendations for the Civic Centre will be subject to potential restrictions due to the nature of the regulations on the building (Grade II listed building)

3.3 *Medium to Long-Term Recommendations*

It is advised that the recommendations detailed in Table 4 should be implemented over the medium to long-term, as and when upgrades or refurbishments are scheduled for the facilities within the permanent administrative buildings. This will reduce any unnecessary upfront costs for equipment purchase as the cost should already be factored into the resource implication of the refurbishment/upgrade project. Any potential difference in cost of purchase of water efficient products should have a short pay-back period through the potential savings achieved by reducing water consumption. The extent of the potential water usage reductions and therefore the potential savings will be dependent on the number of measures implemented, the number of staff located in each building and the attitude of staff towards water efficiency. Hence, no attempt has been made within this report to determine the extent of consumption reductions and savings which could be experienced over the medium to long-term.

Table 4: Medium to long-term recommendations to reduce water consumption

Building	*Medium to Long-Term Recommendations*			
	Toilets	***Urinals***	***Sinks/Basins/ Showers***	***Leaks***
Permanent Administrative Buildings				
Civic Centre*	Install water efficient dual flush toilets when cistern upgrades are scheduled	Install urinal flush controls	Install percussive or infra-red taps on basins in bathrooms	Install leak detectors and regular meter readings to reveal irregular water usage and detect potential leaks early
Marland House	Install water efficient dual flush toilets when cistern upgrades are scheduled	Install urinal flush controls	Install percussive or infra-red taps on basins in bathrooms	Install leak detectors and regular meter readings to reveal irregular water usage and detect potential leaks early
Regional Business Centre	Install water efficient products during development of the building, such as dual flush toilets, urinal flush controls fitted to urinal cisterns, percussive or infra-red taps on basins in bathrooms, reduced flow taps on sinks in kitchens and showers in changing rooms. It would be advisable to install leak detectors to enable an early warning system.			

*The implementation of recommendations for the Civic Centre will be subject to potential restrictions due to the nature of the regulations on the building (Grade II listed building)

3.4 *Monitoring and Reporting*

It is recommended to introduce a simple target system to encourage staff to get involved in reducing the water consumption of the administrative building in which they are located. Targets could be set for each building with an aim to achieve the good practice performance indicator of 4m^3/pp/pa over an agreed set period of time, in order to allow the introduction of water efficient technology where it is required. Water consumption is currently recorded in a database held by the Sustainability team so a target and monitoring process could be easily developed. The monitoring process, through regular meter readings could be used to highlight irregular changes in consumption as a result of leakage or excessive wastage, which could then be reported for the necessary action. Targeting and monitoring could be used to present a regular league table of performance which could highlight the good practice that occurs within buildings in their aim to achieve good performance.

It is recommended that annual water performance reports are produced to allow appropriate management of water performance throughout the administrative buildings within the council.

4. References

Defra. (2008). Future Water: The Government's water strategy for England.

Envirowise: Benchmark your water use. http://www.envirowise.gov.uk/uk/Topics-and-Issues/Water/Water-Tools/Water-account-tool/Benchmark-your-water-use.html

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