

Water Savings Action Plan

2006



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1 Introduction

The NSW Government released the *Metropolitan Water Plan for Sydney* (MWP) in late 2004 in response to the current drought and increasing uncertainties of future water supplies. The MWP highlights the fact that ‘Sydney is using more water than is sustainable’.

The MWP and the introduction of the *Energy Administration Amendment (Water and Energy Savings) Act 2005* (the Act) allocate responsibility to the Department of Energy, Utilities and Sustainability (DEUS) to promote improvements in the water and energy efficiency of key businesses, local government and NSW government agencies. A key recommendation of the MWP and the Act is that local councils who are within Sydney Water’s area of operations are legally required to develop a Water Savings Action Plan (WSAP). Draft WSAPs are to be submitted to the Minister of Utilities for approval prior to finalisation.

Woollahra Council’s WSAP has been prepared in accordance with the *Guidelines for Water Savings Action Plans* (Guidelines) prepared by DEUS in October 2005. The WSAP determines how much water is being used in Council’s top ten water using sites and identifies and prioritises actions to conserve water usage.

2 Woollahra Council local government area

The Woollahra local government area (LGA) is located on the southern foreshores of Sydney Harbour, extending from South Head in the east to Rushcutters Bay in the west. Woollahra is the most northerly of the Eastern Suburb councils and adjoins Waverley, Randwick and Sydney City local government areas. The total area of Woollahra is 1219 hectares or twelve square kilometres including sixteen kilometres of harbour foreshore, consisting of rocky headlands, coastal cliffs and beaches.

At the time of the 2001 census the population of the Woollahra LGA was 49,911 living in 25,086 dwellings. The most common type of landuse in Woollahra is urban – residential (2a and 2b). This land use consumes approximately 651 hectares of the total Woollahra LGA.

Woollahra Council, as an organisation, is structured into four divisions, Planning and Development, Technical Services, Corporate Services and Community Services, with an additional Communications section reporting directly to the General Manager. The services provided by Council include development assessment, urban planning, environmental protection, health and regulation, asset management, infrastructure and open space management, capital works, parks and street trees, property and projects, and waste management.

According to data provided by Sydney Water, Council’s five year (98/99 – 02/03) average water use breakdown for the years prior to the introduction of water restrictions in October 2003 shows that 65% of water was used in parks and public reserves. The remaining water was used in the operation of Council’s properties. Refer to pie chart.

Council has 20 major and 40 minor parks in the LGA totalling 100 hectares. These include nine sportsgrounds (comprising fourteen fields), 21 playgrounds and 23 hectares of remnant and revegetated bushland (Woollahra Municipal Council 2006a).

Council owns approximately 70 properties, including the historic Woollahra Council Chambers and various offices and depots, libraries, community centres, kiosks in parks, sports field’s buildings and public amenities, and several properties leased to tenants.

3 Historical water conservation initiatives

Woollahra Council is firmly committed to reducing water usage, especially in response to the drought and the introduction of water restrictions in October 2003. Since 2002, Council has been actively implementing a number of water conservation actions largely within the Parks and Street Trees and Property Service sections. These actions include:

- retro fitting Council's building and amenities buildings with AAA rated fixtures,
- investigating the feasibility of rainwater harvesting for use at Council facilities,
- mulching of garden beds to retain soil moisture,
- using bore water instead of mains water to irrigate the majority of ovals,
- the planting of drought tolerant plant species in our public reserves, and
- the voluntary implementation of water restrictions for the irrigation of ovals and reserves.

These actions and the introduction of water restrictions have significantly reduced Council's water use, with water usage from Council's properties and reserves more than halved in the last three years. In 2002/2003, Council used 113,021kL of water. In 2004/2005, Council's chosen base year for the preparation of this plan, Council used 48,266kL of water. This represents a 57% reduction in water use and a saving of over \$77,700 for the twelve month period.

Council has also joined the Sydney Water Every Drop Counts Business (EDCB) Program in April 2005 to further identify and formalise a program of water saving initiatives. The EDCB program is fully supported by Sydney Water staff.

The program involves the following steps:

- joint commitment: a participant must enter into a voluntary business arrangement (memorandum of understanding) with Sydney Water that demonstrates commitment to improving water management practices in the organisation,
- diagnostic to identify critical actions: the diagnostic process evaluates business performance in water resource management,
- improvement plan: the diagnostic process helps to develop a prioritised plan for saving water,
- implementation of improvement plan, and
- review performance.

Council has completed the first two steps of the program and is completing step three as a part of the preparation of the WSAP.

4 Water Savings Action Plan

A Water Savings Action Plan determines base line water use for a nominated year, audits facilities and identifies and prioritises actions that will conserve water. DEUS released the *Guidelines for Water Savings Action Plans* in October 2005. The Guidelines set out the tasks that need to be undertaken to prepare a satisfactory WSAP. Table 1 summarises these tasks.

Table 1: Water Savings Action Plan task outline

	Water Savings Action Plan
Task 1	Determine how much water is used. Collate 12 months of water usage data to determine Council's baseline water use. The chosen base year is to be representative of normal operations. Develop Business Activity Indicators for your site's business sector.

	Water Savings Action Plan
Task 2	Planning at management level. Undertake a Water Management Review. Senior Management commitment is vital for this task.
Task 3	Determine how water is used and efficiency opportunities. The level of technical review will be dependant on the amount of water consumed and whether water efficiency benchmarks have been developed; either a walk-through review or detailed review. It is recommended that councils include the top 10 sites in the plan to capture the bulk of water use.
Task 4	Preparing the plan. The plan is to utilise the outcomes of the assessment of the baseline water use, management review and technical review and be based on templates included in the guidelines.
Task 5	Implementing and reviewing plans. Implementation of the plan is to be reviewed and reported to DEUS annually. The action plan is to be reviewed every 4 years.

Council commenced work on the preparation of the WSAP in November 2005, with a report to Council advising of the requirement to prepare the plan and a request to reallocate staff resources and funds to enable the preparation of the plan. A water management project team was formed to facilitate the investigations, plan preparation and the eventual implementation of the plan. The team consisted of Council staff from Strategic Planning, Property and Projects, Parks and Street Trees and Depot and Waste Services.

Preparation of the WSAP is being project managed by Council's Environmental Protection Coordinator, with assistance from the water management project team. Other related staff have also contributed to the preparation of the plan, including staff from the Finance and Public Open Space sections.

The key objectives of preparing the WSAP as set out in the guidelines are:

- To achieve a 20% reduction in potable water use across Woollahra Council's area of operation.
- To identify water efficiency measures that are highly cost effective for Woollahra Council's top ten water using sites.
- To improve Council's management of water use throughout the organisation.
- To satisfy Council's legislative requirements.

4.1 Task 1 - Baseline water use

Task one for preparing the WSAP was to identify existing water use by collating 12 months of water usage data from a nominated base year. The base year chosen was to accurately reflect normal operating conditions, one that is free of variations. Although the guidelines state that variations from normal operations include water restrictions, DEUS advised Council to adopt a water restriction base year because current drought conditions and water restrictions represent current water usage that is likely to reflect usage in the near future. Therefore, Council chose 2004/2005 as the base year.

Sydney Water provided Council with the water use data for all of Council's sites for 2004/2005. From this information, Council's top ten sites were chosen. These are listed

below in Table 2. The base year and key performance indicators for each of the sites will be discussed further in the report as a part of the information provided for each site.

Table 2: Council’s top ten water using sites

Site number	Sydney Water account number	Level of review conducted	Site location and description
1	4210343	Walk through review	536 New South Head Road, Double Bay. Woollahra Council Chambers.
2	4209573	Walk through review	New Beach Road, Darling Point. Yarranabbe Park, park and small marina facility.
3	4212883	Walk through review	Old South Head Road, Vaucluse. Christison Park, sports fields and amenities.
4	4733586	Walk through review	52-54 O’Dea Avenue Zetland. Site includes main works depot for Council and property leased to Schindlers Lifts Australia as head office and warehouse.
5	4210293	Walk through review	New South Head Road, Rose Bay. Lyne Park oval and amenities block.
6	4210457	Walk through review	Corner of New South Head Road and William Street, Double Bay. Council’s Regulatory Office, Woollahra Kindergarten, Local History Library and Meals on Wheels.
7	4204394	Walk through review	Glenmore Road, Paddington. Trumper Oval, sports field and amenities block.
8	4674495	Walk through review	Marine Parade, Watsons Bay. Watsons Bay Baths and change rooms and the Tea Gardens Café.
9	4213794	Walk through review	O’Sullivan Road Rose Bay. Woollahra Golf Club house, Grimley pavilion and change rooms, Rose Bay Playgroup and care taker’s residence.
10	4208906	Walk through review	Military Road, Watsons Bay. Robertson Park and amenities block.

Of Council’s top ten sites, six are owned and fully operated by Council, two are owned and partially leased to independent operators, one is owned and leased to a number of different operators and one site is mostly owned and operated by Council with a portion of the site owned by State Government and leased to Council.

Business activity indicators (BAI) are to be determined for each site as a part of this task. The Guidelines state that a BAI is a unit of measurement that represents the business operation. Formulation of the BAI and associated key performance indicator (KPI) will enable a comparison of individual site water use to industry benchmarks.

4.2 Task 2 - Water management review

A water management review seeks to establish the current level of sustainability of water management practices in an organisation. Priority actions are identified during the review that ensure water efficiency is incorporated into existing management practices.

The guidelines identify ten management review areas that are to be addressed in the water management review. These are:

1. Senior management commitment,
2. Understanding of water savings potential,
3. Water targets and key performance indicators,
4. Water metering and monitoring,
5. Water management reporting,
6. Water supply management,
7. Operating and maintenance procedures,
8. Accountabilities for water management,
9. Training and procedures awareness, and
10. Compliance with legal and other regulatory requirements.

For each management review area there are five possible sustainability rankings. The descriptor for each of the sustainability rankings changes depending on the management review action being reviewed. Refer to Annexure A for the complete list of sustainability ranking descriptors. In essence the five rankings are:

1. Low, indicating no activity or action in the particular management review area.
2. Moderate, indicating informal action in the management review area.
3. Minimum sustainable, indicating a more formalised approach to managing the review area.
4. Industry leader, indicating a formal and integrated approach to managing the review area.
5. Best practice, indicating a cutting edge approach to managing the review area.

Council carried out a water management review/organisational diagnostic in August 2005 as a part of the Every Drop Counts Business Program. The review was conducted by staff from Sydney Water using specially designed software, *One-2-Five Water*, that determines the level of an organisation's water management systems. The Manager Strategic Planning, Manager Finance, Manager Property and Projects, Manager Parks and Street Trees, Manager Public Open Space and the Environmental Protection Coordinator participated in the review. The review evaluated business performance in water resource management and identified critical organisational actions. All of the management review areas specified in the Guidelines are included in the EDCP review.

Results

Seven of the ten management review areas recorded a moderate or minimal sustainable ranking, indicating an informal response as a minimum ranking, with the remaining three areas recording a low ranking. Council achieved a minimal sustainable ranking for the areas of operating and maintenance procedures and compliance with legal and/or regulatory requirements. The low ranking areas relate to understanding Council's water savings potential, water management reporting and water supply management. Priority actions have been included in the WSAP action table to improve Council's performance in these areas. It is important to note that the review results relate to Council's current management systems and processes and are not an indication of Council's overall performance relating to water conservation as measured by on-ground action and cost savings.

Table 3 presents the water management review results (Template 2). The results should be interpreted with the sustainability ranking descriptors attached as Annexure A. Refer to Annexure B for the water management review actions (Template 3). The actions are based on the review results and were determined by the Sydney Water computer software as having the highest priority at this stage of development in Council's water management activities. These actions need to be implemented first to enable elements of water management to progress.

Table 3: Water management review results – (Template 2)

Management review areas	Low	Moderate	Minimum Sustainable	Industry Leader	Best Practice
A Senior management commitment		x			
B Understanding of water savings potential	x				
C Water targets and key performance indicators		x			
D Water metering and monitoring		x			
E Water management reporting	x				
F Water supply management	x				
G Operating and maintenance procedures			x		
H Accountabilities for water management		x			
I Training and awareness procedures		x			
J Compliance with legal and/or regulatory requirements			x		

4.3 Task 3 - Technical review and monitoring methodology

The level of technical review required for a site is dependant on the amount of water used and whether water efficiency benchmarks are available. The monitoring requirements of the site are then determined by the level of technical review to be carried out.

Technical Review

Walk through technical reviews were undertaken for all of Council's top ten water using sites. This level of review was chosen because all of Council's top ten water using sites consume less than 100 kL of water a day and water efficiency benchmarks are available for the types of site uses. The highest water using site was the Woollahra Council Chambers, recording an average daily water use of 27.4 kL.

Council staff conducted the technical reviews of six of the ten sites; Yarranabbe Park, Lyne Park, Sherbrooke Hall, Trumper Oval, Watsons Bay Baths and Robertson Park. Joint Sydney Water and Council reviews were undertaken of two sites, O'Dea Depot and Christison Park. The results of the reviews were entered into spreadsheets provided by Sydney Water through Council's involvement with the EDCB Program. These spreadsheets are used by Sydney Water to record and calculate the type, number and flow rate of existing fixtures, potential water and cost savings, recommended actions and capital costs and estimated payback periods for the implementation of the actions.

The NSW Department of Commerce (DoC) was jointly commissioned by Council and Sydney Water to undertake the monitoring and review of two sites, the Woollahra Council Chambers and the Woollahra Golf Club. These reviews were facilitated through Council's involvement with the EDCB Program. These sites were chosen for independent reviews because the chamber facility is Council's highest water using site and the Woollahra Golf Club has numerous uses associated with the one site water meter.

Meter monitoring

The Guidelines state that for sites that require a walk through technical review, regular water meter readings should be taken over a four week period to determine usage. Consultation with the Water Saving Specialists at DEUS further clarified the monitoring requirements as being a minimum of three times a week, with at least two readings recorded outside the

normal operating hours of each site to determine if there are any leaks. A water meter monitoring schedule was forwarded to DEUS for approval. A copy of the approved schedule is attached as Annexure C.

The schedule consisted of readings recorded a minimum of three times a week over a four week period during February and March 2006. The intervals and times when the readings were taken varied. Therefore, the average daily use (KL) presented graphically for each site is an approximate value, used to illustrate trends in daily use during the monitoring period. At least two readings were recorded outside the normal operating hours of each site. Every effort was made to take the readings outside of normal operating hours. However, due to resourcing constraints readings may have been taken whilst the sites were still in operation.

The monitoring of the two sites investigated by the DoC consisted of the installation of sub-meters and data loggers to accurately determine water use. The monitoring of the main water meters was conducted over a ten week period from March 2006 to June 2006. The daily kL discussed in the report for these sites are an accurate figure and not an estimate as is provided for the other eight sites.

The following information provides a discussion of each site, including the base year, technical review (audit) and monitoring information and recommended actions.

5 Site 1 - Woollahra Council Chambers

The Woollahra Council Chambers is the main administration and customer service centre for Woollahra Council. The Council Chambers is located at 536 New South Head Road, Double Bay along the southern foreshore of Sydney Harbour. The site includes offices and facilities for staff, customer service area, meeting and function rooms, customer and staff parking and landscaped gardens. The building itself was extensively renovated in 2000/2001 and includes many water and energy efficient features, including dual flushing toilet cisterns and AAA fixtures and a rainwater tank for irrigation of the landscaped gardens.

The water meter for the chambers is located on the site's New South Head Road boundary, directly across from the bus stop. The meter number is FDQJ0006.

A data logger was installed on the main water meter at the Council Chambers to monitor water use during May to June 2006. Sub-meters were installed and monitored on the water line to the irrigation tank and on the line to the lower ground floor of the building to further breakdown water use. The walk through audit was conducted by the DoC Senior Water Savings Engineer Reid Butler and Council's Environmental Protection Coordinator Rebecca Peacock on Friday 19 May 2006.

Results and discussion

The base year (2004/2005) water use at the Woollahra Council Chambers was 10,009kL. Water used during the base year was representative of normal water use. Table 4 presents the base year water use information for the chambers.

Table 4: Woollahra Council Chambers base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	New South Head Road Double Bay 2028	New South Head Road Double Bay 2028
Sydney Water Account Number/s	4210343 FDQJ0006	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per annum (kL)	10009	-
Business Activity Indicator	No of patrons area m ²	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	33669 400	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	10009	-
E = D/B baseline water use key performance indicator (KPI)	0.029 0.9	-
Baseline KPI units	kL/no of patrons area m ²	-

An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 5 presents the inventory information.

Table 5: Woollahra Council Chambers inventory of using fixtures

Site 1 – Woollahra Council Chambers				
Property number - 4210343				
Water meter number – FDQJ0006				
Description	Fixture	Quantity	Flow rate	Comments
Floor 1	Unisex WCs	2	Dual flush 3/6	Rarely used
Historic Redleaf	Unisex basins	2	7L/min	
	Kitchen basins	2	10 and 20L/min	20L/min in staff kitchen, more frequently used
	Dishwasher	1 Dishlex Global 500		AAA water rating, 18L/wash
	Hot/chilled water taps	2	Very low flow rate	
Ground floor	Male WCs	4	Single flush 11L	Cisterns in wall (inaccessible)

Site 1 – Woollahra Council Chambers					
Property number - 4210343					
Water meter number – FDQJ0006					
Description	Fixture	Quantity	Flow rate	Comments	
Historic Redleaf	Male urinals	2	9 L/flush	Push button flush	
Older fixtures in ground floor amenities, all other toilets upgraded in 2000	Male basins	4	20+ L/min		
	Female WCs	3	Single flush 11L		
	Female basins	3	20+ L/min		
	Kitchen basins	1	20 L/min		
	Dishwasher	1 Dishlex Global 450		AAA water rating, 18L/wash	
	Hot/chilled water taps	1	Very low flow rate		
Lower ground	Male WCs	2	Dual flush 3/6		
Corporate Redleaf	Male urinals	2	Sensor flush	Urinal on right leaking	
Staff amenities	Male basins	2	15 L/min		
	Female WCs	4	Dual flush 3/6		
	Female basins	2	12 and 18 L/min		
	Disabled WC	1	Dual flush 3/6		
	Disabled basin	1	20 L/min mix tap		
	Kitchen basins	2	20 L/min		
	Hot/chilled water taps	1	Very low flow rate		
	Showers	2	10 L/min		
	<i>Customer Service Area</i>	Male WCs	1	Dual flush 3/6	Estimated 22,000 customers per year visit the area, of that, less than 40% would use the toilets.
		Male basins	1	5 L/min	
Female WCs		1	Dual flush 3/6		
Female basins		1	5 L/min		
Baby change WC		1	Dual flush 3/6		
Baby change basin		1	5 L/min		
Shower room WC		1	Dual flush 3/6		
Shower room basin		1	9 L/min mix tap		
Basement carpark	No fixtures				
Outdoors	Sub-surface irrigation	4 stations	-	Operated 2 days in a week, for 2 hours per station per day.	

In total 455 kL of water was used at the site during the 10 week monitoring period. The average daily water use from the site is 6.5kL. The DoC state that the water usage from this site is very low and very efficient when compared with other similar buildings.

The readings taken outside of normal working hours to detect leaks recorded a base flow of 0.017 L/second. A leaky urinal located in the lower ground floor staff toilets was identified as being the source of the leak. No other leaks were detected during the audit. The leak has been rectified as a part of Council's regular maintenance program.

The majority of water used at the site is for the operation of the Council Chambers. The irrigation of the surrounding landscaped gardens contributed approximately 30% of the total water used at the site. Most of the landscaped gardens are located on the rooftop of the new corporate office section and are therefore not located on a deep soil landscape. This means that the soil moisture levels of these gardens dry out more readily than gardens with deep soil, and may require more frequent watering.

Historical water use

Sydney Water provided Council with the quarterly water use data for the site for the base year 2004/2005. The 2004/2005 daily average water use was 27.4 kL/day. This was greater than the daily average water use calculated from the monitoring results undertaken for this plan 6.5 kL.

Water use over the base year dropped significantly in the fourth quarter (April, May, June) from an average of 33.3kL in the third quarter to an average of 3.2 kL in the fourth quarter. The DoC attributed the changes in use to changes in irrigation schedules due to increased level of water restrictions and the use of rainwater to supplement the supply.

Water use at the site has increased in the past three years from 8446 kL in 2002/2003 to 10009 recorded in 2004/2005, Council's chosen base year. The monitoring of the use as a part of this project indicates that water use for 2005/2006 will be much lower than the base year amount.

Business activity indicator

Two business activity indicators have been chosen for the Council Chambers site. The number of patrons was chosen to reflect the business function of the site and area m² was chosen to reflect the irrigation of the sites landscaped gardens. The baseline water use key performance indicator for the Council Chambers offices is 0.029 kL/ patron or 29 litres (L). This is lower than the Sydney Water (October 2005) benchmark for civic and administration buildings with more than 200 people per day of 40 L/patron/day. The baseline water use key performance indicator for the Council Chambers landscape gardens is 0.9 kL/area m². This is higher than the Sydney Water (October 2005) benchmark for reserves and parks in the eastern suburbs of 0.2 kL/area m².

Recommended action

1. Install volume restrictors and re-washer the toilet cisterns on the toilets located on the ground floor.
2. Install flow restrictors onto taps.
3. Review the operation of the irrigation network. Reduce times and upgrade network where required.
4. Conduct staff water efficiency training.
5. Monitor water meter readings regularly for irregularities.

The DoC advised that implementation of the recommended actions will potentially reduce water use at the site by 50%.

6 Site 2 - Yarranabbe Park + Olympic legacy berths and hardstand

Site 2 is a combination of Yarranabbe Park and the operation of the Olympic legacy berths and hardstand adjacent to Sir David Martin Reserve. Yarranabbe Park is located on the foreshores of Rushcutters Bay on Sydney Harbour. The predominant character of the park is grassed parkland characterised by large mature trees and wide expanses of open space. Yarranabbe Park forms a part of a wider open space corridor along Rushcutters Bay that is approximately 9.7 hectares in area. The broader area is heavily used as a public recreation area by walkers, dog exercisers, joggers, picnickers and sporting users (Woollahra Municipal Council 2005)

The Olympic legacy berths and hardstand were installed for the sailing events for the Sydney 2000 Olympic Games. NSW Maritime owns the berth and hardstand structures. Council leases these from NSW Maritime and sub-leases these to community uses.

There are four water meters associated with this site. Water meter FDOA0042 located in a long green box next to the driveway entrance to Sir David Martin Reserve, services the Olympic legacy berths and hardstand. Water meters FDPF0021 (New Beach Road boundary, opposite number 61 New Beach Road), BRQC4025 (New Beach Road boundary in garden bed near the playground) and BDJL0217 (northern end of Yarranabbe Park at the end of New Beach Road) service Yarranabbe Park.

Water use at the site was recorded from three of the four water meters (FDOA0042, FDPF0021, BRQC4025), three times a week for four weeks in March 2006. The after hours readings were recorded in the evening of Thursday 23 March 2006 and in the morning of Friday 24 March 2006. The walk through water audit was conducted by Council's, Environmental Protection Coordinator, Rebecca Peacock on Thursday 4 May 2006.

Council determined the top ten water using sites based on property number consumption data provided by Sydney Water. Council was advised that the following meters were associated with this property FDOA0042, FDPF0021, BRQC4025. The fourth water meter (BDJL0217) was not included in the water meter monitoring as Council was only made aware that this meter was a part of this site in May 2006, after the monitoring had been completed.

Water meter BDJL0217 services one tap located at the northern end of the park. Meter readings were taken on two occasions in May 2006 to provide an indication of water use from this tap.

Results and discussion

The base year (2004/2005) water use at Yarranabbe Park was 4,409 kL. Water used during the base year was representative of normal water use. Table 6 presents the base year water use information for Yarranabbe Park.

Table 6: Yarranabbe Park base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	New Beach Road Darling Point 2027	New Beach Road Darling Point 2027
Sydney Water Account Number/s	4209573 BRQC4025 FDOA0042 FDPF0021 BDJL0217	-

Site Description	Normal Operation	With variation from normal operation.
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per annum (kL)	4323	-
Business Activity Indicator	Area m ²	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	27,938	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	4323	-
E = D/B baseline water use key performance indicator (KPI)	0.15	-
Baseline KPI units	KL/square metre	-

The majority of water used on the site is for the operation of the Olympic legacy berths. An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 7 presents the inventory information.

Table 7: Yarranabbe Park inventory of water using fixtures

Site 2 – Yarranabbe Park				
Property number - 4209573				
Water meter number – FDOA0042, FDPF0021, BRQC4025, BDJL0217.				
Description	Fixture	Quantity	Flow rate	Comments
Yarranabbe Park	Taps	2	20 litre/min	Tap locks installed.
	Irrigation network	20 stations	20 litre/min	93 sprinkler heads. Not currently in use.
Olympic legacy berths	Taps	3	20 litre/min	Tap handles are able to be padlocked – though they were not. 5 taps originally, 2 had been disconnected.
	Fire hoses	2		Connected to water meter FDOA0042.

In total 405.1 kL of water was used at the site during the monitoring period and all of this was recorded from the water meter that services the Olympic legacy berths and hardstand, FDOA0042. Water meters FDPF0021, BRQC4025 that service Yarranabbe Park, recorded zero usage for the entire monitoring period. Water meter BDJL0217 was not included in the original monitoring period as discussed previously. However, readings taken in May 2006 (23 May and 30 May) recorded a usage of 0.04 kL or 40 litres.

Water meter FDOA0042

The average daily usage from this meter was 17.61 kL, averaged over the 23 day monitoring period. Usage was consistently high throughout the four week period, except for two distinct troughs in usage. The first trough was recorded mid-week in the second week and the second trough was recorded for the over night reading recorded in the third week.

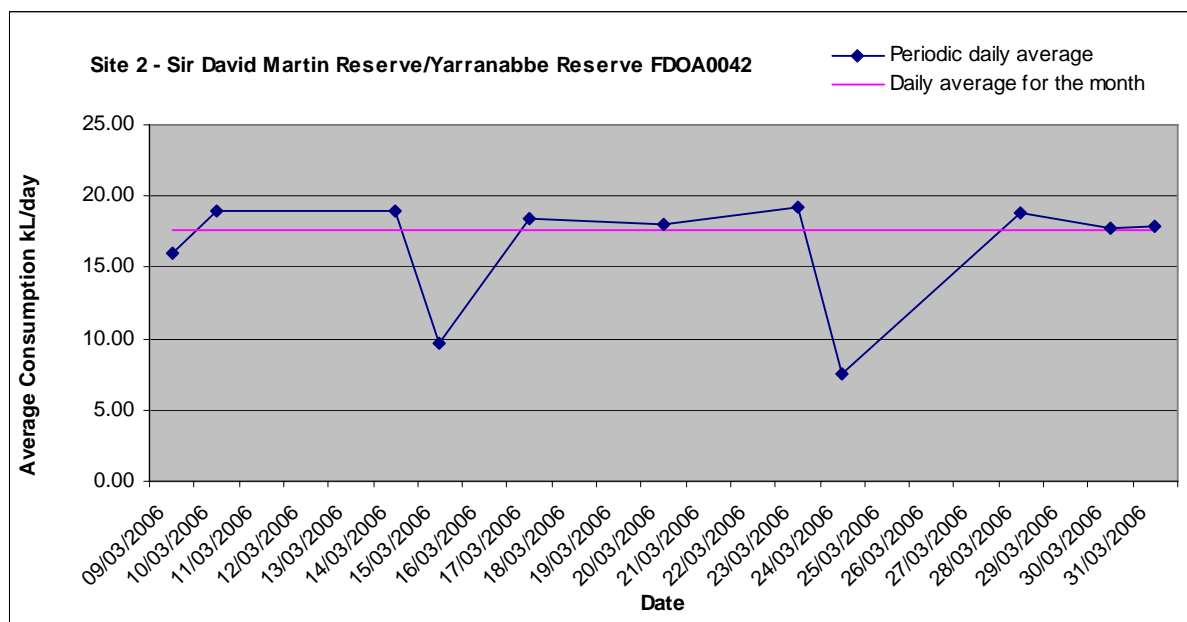
The over night reading, taken on the evening of Thursday 23 March 2006 and in the morning of Friday 24 March 2006, recorded that 7.55 kL of water was used.

The Olympic legacy berths have three taps and two fire hoses connected to this water meter. The berths are open to the public 24 hours a day, seven days a week. Use of these facilities is difficult to monitor as access by the public is required 24 hours a day. To reduce uncontrolled water use from this facility it is recommended that the taps on the berth pontoon be kept locked for use by the sub-lessee. Further investigation is required to determine water use patterns and the source of water used at the site over night.

A joint site visit with Council and Sydney Water on Tuesday 30 May 2006 confirmed that the water meter is an older style meter that is not compatible for the installation of a data logger to more accurately monitor water use over time. A request has been made to Sydney Water to replace the existing water meter with a pulse emitting meter to enable the use of a data logger.

Figure 1 represents graphically the average daily water use recorded in kL during the monitoring period from the Olympic legacy berths and hardstand. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 1: Average daily water use (kL) water meter FDOA0042, March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for the site for the base year 2004/2005. The 2004/2005 daily average water use was 11.8 kL/day, averaged from the total water used from the four water meters located on the site. The base year daily average is less than the daily average recorded from the site during the monitoring period of 17.61 kL. The general trend illustrated by the 2004/2005 data is of higher water use during the cooler Autumn and Winter months of the year.

Water use at the site has reduced significantly in the past three years from 26,919 kL in 2002/2003 to 4,323 kL in 2004/2005.

Business activity indicator

The business activity indicator chosen for the site was area (m²). The baseline water use key performance indicator is 0.15 kL/m². This is consistent with the Sydney Water (October 2005) benchmark for reserves and parks in the Eastern Suburbs of 0.2 kL/m².

Recommended action

1. Enforce the sub-lessee requirement of keeping the taps on the Olympic legacy berths locked at all times.
2. Replace existing water meter FDOA0042 with a pulse emitting water meter.
3. Install a data logger to further monitor water use.

Refer to Annexure E for the water saving measures (Template 4) for each site.

7 Site 3 - Christison Park

Christison Park is a multi- purpose active recreation reserve within a broader linear coastal reserve in Vaucluse. The park is a high use sports reserve incorporating up to three soccer fields, three cricket pitches, two rugby fields, outdoor basketball court, change rooms, grandstand, public toilets, exercise stations and a single floodlight. Four playing fields are generally provided in winter and three in summer (Woollahra Municipal Council 2006b)

The water meter for Christison Park is located on the park's western boundary on Old South Head Road, Vaucluse, adjacent to the park's grandstand and amenities block. The water meter number is GDNL0011. The main water uses on the site are the irrigation of the sport fields and the operation of the public toilets and facilities. The sports fields have not been irrigated since October 2005. The irrigation system needs to be audited and repaired.

Water use at Christison Park was recorded from the water meter three times a week for four weeks in March 2006. The after hours readings were recorded on the evening of Thursday 23 March and in the morning of Friday 24 March 2006. The walk through water audit was conducted jointly by Council's Environmental Protection Coordinator, Rebecca Peacock, the Technical Officer Parks, Phillip Julian and Sydney Water's Water Conservation and Recycling Project Officer, Fernando Ortega on Tuesday 20 December 2005.

Results and discussion

The base year (2004/2005) water use at Christison Park was 4,060 kL. Water used during the base year was representative of normal water use. Table 8 presents the base year water use information for Christison Park.

Table 8: Christison Park base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	Old South Head Road Vaucluse 2030	Old South Head Road Vaucluse 2030
Sydney Water Account Number/s	4212883 GDNL0011	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per Annum (kL)	4060	-
Business Activity Indicator	Area m ²	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	62,394	-

Site Description	Normal Operation	With variation from normal operation.
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	4060	-
E = D/B baseline water use key performance indicator (KPI)	0.7 kL/square metre	-
Baseline KPI units	kL/square metre	-

An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 9 presents the inventory information.

Table 9: Christison Park inventory of water using fixtures

Site 3 – Christison Park				
Property number - 4212883				
Water meter number – GDNL0011				
Description	Fixture	Quantity	Flow rate	Comments
Amenities	Toilets	4	Dual flush 3/6	
	Hand basins	2	12 litre/min	
	Urinals	1	-	Waterless urinal
	Taps	2	16 litre/min	Cleaners tap – rarely used.
Change rooms	Toilets	2	Dual flush 3/6	
	Hand basins	2	6 litre/min	
	Showers	12	9 litres/min	
	Taps	2	16 litres/min	Cleaners tap – rarely used.
Work shed	Toilets	1	11 litre	
	Hand Basins	2	11 litre/min	
	Taps	2	16 litre/min	
Outdoor area	Taps	1	16 litre/min	
	Bubbler	1	2 litre/min	
	Irrigation	23 stations	20 litre/min	92 sprinkler heads. Not currently in use due to the need for major repairs.

In total 4.8 kL of water was used at the site during the monitoring period. The average kL/day usage for the site was 0.2kL/day averaged over the 24 day monitoring period. Water use was fairly consistent throughout this period ranging from 0.1 kL (100 litres) to 0.35kL (350 litres). Overall there was low use of water from this site that relates to the use of the public toilets and amenities. The park's sports fields were not irrigated during the monitoring period.

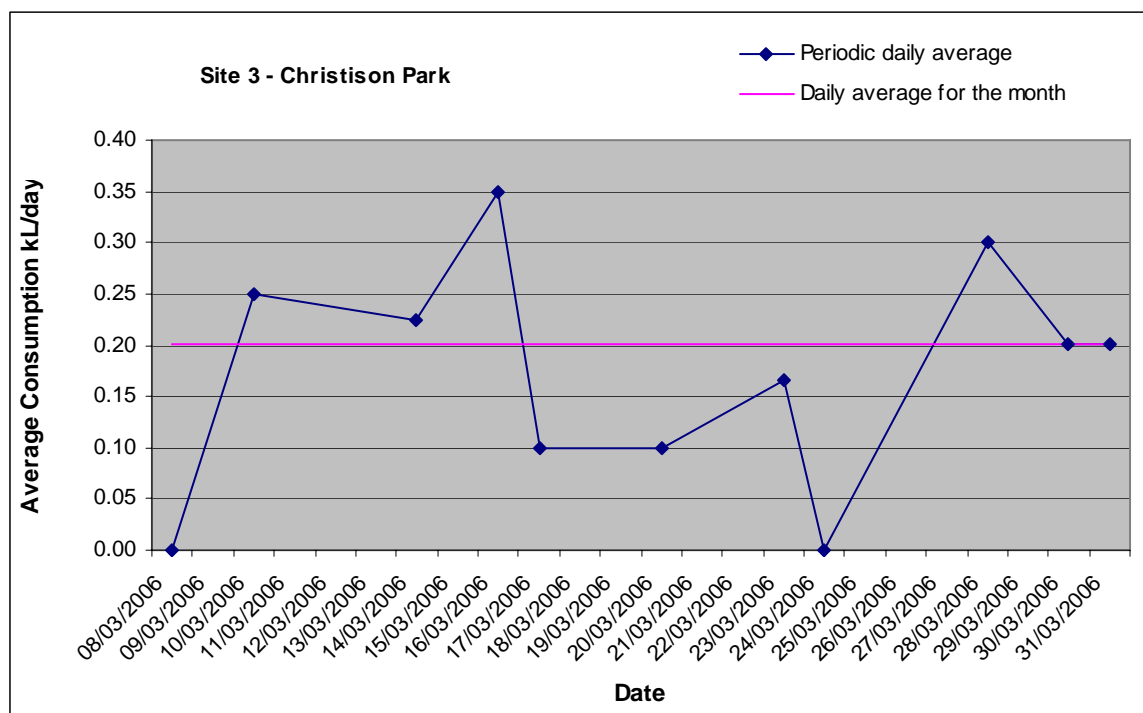
The readings taken outside of normal working hours to detect leaks recorded that water was not being used at the park overnight.

Figure 2 represents graphically the average daily water use recorded in kL during the monitoring period from Christison Park. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

As the park is not currently being irrigated, the majority of water used on the site relates to the use of the amenities and associated facilities. The public toilets and change rooms have mostly been fitted with water saving fixtures, including dual flushing toilet cisterns, low flow shower heads and a waterless urinal. The majority of taps on the site have high flow rates. Therefore, the installation of low flow fixtures and tap locks will further reduce water use at the site.

A comparison of the monitoring results and base year usage concludes that the irrigation system, when functional, is the main source of water used at the site. Therefore, it is recommended that when the irrigation system is upgraded, the most water efficient system suitable for the parks active recreational uses is installed.

Figure 2: Average daily water use (kL) Christison Park, March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for Christison Park for the base year 2004/2005. The 2004/2005 daily average water use was 11.1kL/day. This was far greater than the average daily water use calculated from the monitoring results undertaken for this plan of 0.2 kL/day.

Water use in 2004/2005 generally appears to be greater in the 2nd and 3rd quarters, corresponding to the warmer months of Spring and Summer. There was a definite peak in water use during the 3rd quarter (January, February, March) where on average 16.9 kL of water were used per day.

Water use at the site has reduced in the past three years from 22,548 kL in 2002/2003 to 4,060 kL in 2004/2005.

Business activity indicator

The business activity indicator chosen for this site was area (m²). The baseline water use key performance indicator is 0.07kL/area m². This is less than the Sydney Water (October 2005) benchmark for ovals in the Eastern Suburbs of 0.4kL/area m².

Recommendation actions

1. Upgrade irrigation system to the most water efficient system suitable for the sites active recreational uses.
2. Investigate alternative sources of water for irrigation of Christison Park.
3. Retrofit time flow taps and tap locks to the public toilets and amenities at Christison Park.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it was estimated that implementation of the refit actions will potentially reduce water use from the site by 3 % from base year water use. It must be noted that recommencement of the irrigation of the park may result in an increase in site water use. Refer to Annexure E for the water saving measures (Template 4) for each site.

8 Site 4 - O'Dea Depot

Site 4 is referred to as O'Dea Depot, but the site itself consists of two separate uses:

- Council's main works depot, where the waste collection/management and trades are operated from. Water uses at the depot include the washing down of waste collection vehicles and amenities for staff, and
- Schindler Lifts Australia Pty Ltd, a private company that leases the site from Council. The company specialises in the supply and maintenance of elevators, escalators and moving walks. The head office and warehouse is located on the site.

The O'Dea Depot site is located within the boundaries of the City of Sydney LGA at 52-54 O'Dea Avenue, Zetland. The operating hours of the Council depot are 4am - 6pm Monday to Friday and 4am – 10am Saturday and Sunday. Schindler Lifts Australia operates during business hours Monday to Friday.

There are two water meters located at the O'Dea Depot site. Water meter ERVF0009 is located at the rear of the property next to the Amelia Street entrance. This water meter records the water use from Council's depot. Water meter ERVB0077 is located in the garden bed on the O'Dea Avenue boundary. This meter records the water use from the leased property, Schindler Lifts Australia. The walk through water audit was conducted jointly by Council's Environmental Protection Coordinator, Rebecca Peacock and Sydney Water's Water Conservation and Recycling Project Officer, Fernando Ortega on Tuesday 14 March 2005.

Results and discussion

The base year (2004/2005) water use at O'Dea Depot was 2,786 kilo litres (kL). Of this amount 1,485 kL was used from Council's depot and 1,301 kL was used by Schindler Lifts Australia. Water used during the base year was representative of normal water use. Table 10 presents the base year water use information for the whole O'Dea Depot site.

Table 10: O’Dea Depot site base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	52-54 O’Dea Avenue Zetland 2017	52-54 O’Dea Avenue Zetland 2017
Sydney Water Account Number/s	4733586 ERVB0077 ERVF0009	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per Annum (kL)	2786	-
Business Activity Indicator	No of patrons	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	51,725	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	2786	-
E = D/B baseline water use key performance indicator (KPI)	0.05	-
Baseline KPI units	KL/patrons	-

Water is used on the site for the operation of the Council depot and Schindler Lift Australia. An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 11 and 12 present the inventory information for each meter separately.

Table 11: O’Dea Depot, Council depot inventory of water using fixtures

Site 4 – O’Dea Depot site, Council depot.				
Property number - 4733586				
Water meter number –ERVF0009.				
Description	Fixture	Quantity	Flow rate	Comments
First floor	Toilets	7	11 litre	
	Hand basins	7	14 litre/min	
	Urinals	5	11 litre	Pull flush urinals.
	Showers	7	16 litres/min	
Depot area	Toilets	2	11 litre	
	Hand basins	2	12 litre/min	
	Outdoor taps	4	16 litres/min	
	Hand washing sink	4	16 litres/min	
	Washing machine	1	68 litre/wash	Used approximately once a day.
	Truck wash bay	7	20 litre/min	Used approximately 10 times a day. Includes 6 taps and 1 gurney.
	Street sweepers	3	-	Street sweeper trucks use bore water for dust suppression.
Kitchen	Taps	2	15 litre/min	

Table 12: O’Dea Depot site, Schindler Lift Australia inventory of water using fixtures

Site 4 – O’Dea Depot site, Schindler Lift Australia				
Property number - 4733586				
Water meter number – ERVB0077				
Description	Fixture	Quantity	Flow rate	Comments
Offices	Toilets	12	11 litre	
	Hand basins	19	12 litre/min	
	Urinals	6	11 litre	Operate on a 12 minute flushing cycle.
	Showers	4	16 litre/min	
Kitchen	Taps	2	12 litre/min	
	Taps	1	7 litre/min	

In total 243kL of water was used at the site during the monitoring period. The depot (water meter ERVF0009) used 149kL and the Schindler Lift Australia (water meter ERVB0077) used 94kL. The sites combined average daily water use was 10.3kL.

Water meter ERVF0009

The average daily use from this meter was 6.21 kL averaged over the 24 day monitoring period. Two definite peaks in water use were recorded on Thursdays in the first and fourth weeks of the monitoring periods. Mid-week peaks reflect the weekly peak in Council operations at the depot. Generally less water was used on the weekends at the depot. The end of week peaks may be attributed to the number of trucks washed. The Manager Depot and Waste Services advised that generally the washing of trucks and other vehicles is concentrated towards the end of the working week.

The readings taken outside of normal working hours to detect leaks recorded that no water was being used at the depot overnight.

Figure 3 represents graphically the average daily water use recorded in kL during the monitoring period from water meter ERVF0009. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Water meter ERVB0077

The average daily use from this meter was 3.92 kL averaged over the 24 day monitoring period. Water use from this meter was more consistent than the water use from Council’s depot. The peaks were not as extreme. However, they fell at approximately the same time as the depot peaks, consistent with the Monday to Friday operation of the Schindler Lift Australia site.

The readings taken outside of normal working hours to detect leaks recorded that no water was being used at the Schindler Lift Australia property overnight.

Figure 3: Average daily water use (kL) water meter ERVF0009, February - March 2006.

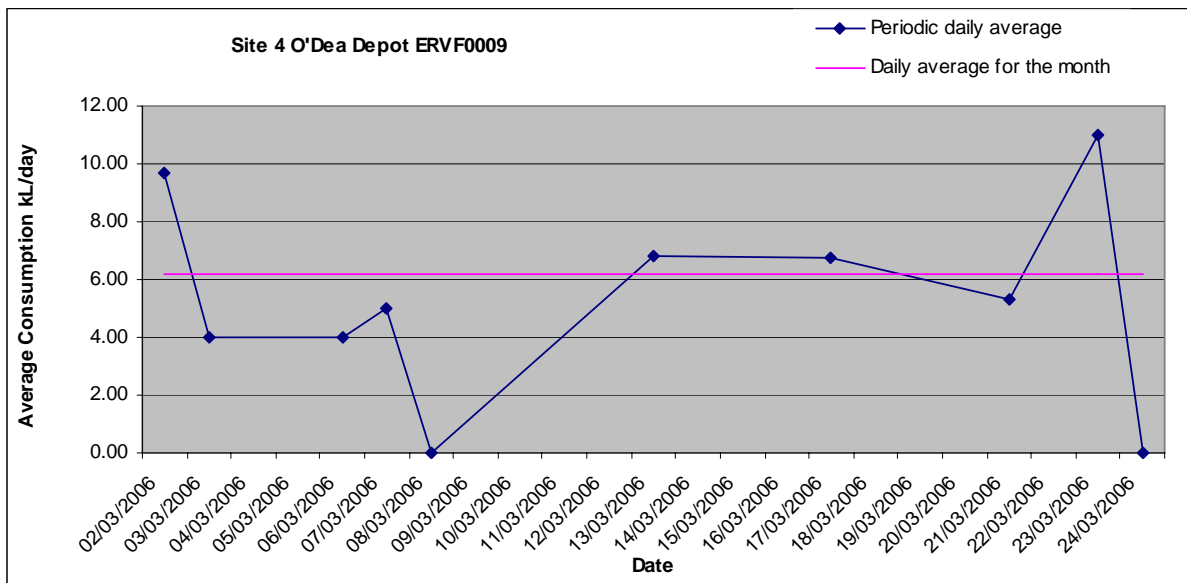
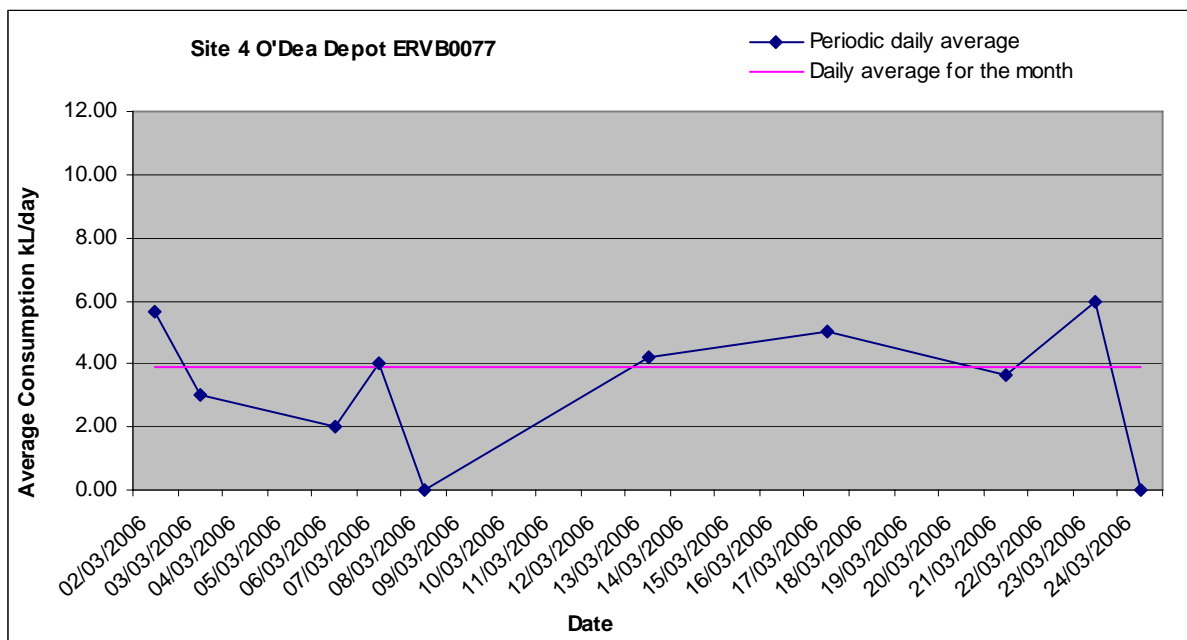


Figure 4 represents graphically the average daily water use recorded in kL during the monitoring period from water meter ERVB0077. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 4: Average daily water use (kL) water meter ERVB0077, February - March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for the O’Dea Depot site for the base year 2004/2005. The 2004/2005 daily average water use was 7.6kL/day. Three of the four quarter readings were consistently around the average. Average daily water use peaked during the 3rd quarter (January, February, March) at 8.5 kL. The yearly and quarterly averages were less than the average daily water use calculated from the monitoring undertaken for this plan of 10.3kL/day.

Water use at this site has remained relatively stable in the past three years, with 2,964 kL used in 2002/2003 and 2,786 kL used in 2004/2005.

Business activity indicator

The number of patrons was chosen as the business activity indicator for the O’Dea Depot site. This was calculated from average numbers of staff for both the operations on the site. The baseline water use key performance indicator is 0.05kL or 50L/patron/day. This amount is less than the Sydney Water (October 2005) benchmark for civic and administration buildings with less than 200 people per day of 75L/patron/day.

Recommended action:

1. Replace existing 11 litre toilet cisterns with dual 6/3 flush cisterns at Council’s depot.
2. Install cistern valves to reduce water flow on the urinals at Council’s depot.
3. Install flow restrictors on existing bathroom, kitchen and workshop area taps at Council’s depot.
4. Replace existing showerheads with AAA rated showerheads at Council’s depot.
5. Replace existing 11 litre toilet cisterns with dual 6/3 flush cisterns at Schindler Lift Australia.
6. Reduce urinal flushing cycles at Schindler Lift Australia.
7. Install flow restrictors on existing bathroom and kitchen taps at Schindler Lift Australia.
8. Replace existing showerheads with AAA rated showerheads at Schindler Lift Australia.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it is estimated that implementation of the retrofit recommended actions will potentially reduce water use from the site by 40%. Refer to Annexure E for the water saving measures (Template 4) for each site.

Water use will be further reduced from the site with Council successfully receiving a Commonwealth Government Community Water Grant for the installation of three rainwater tanks at Council’s O’Dea Depot. The tank water will be used to wash Council’s heavy vehicle fleet.

9 Site 5 - Lyne Park

Lyne Park is located on the Sydney Harbour foreshore at Rose Bay and is characterised by playing fields and open space. The park is bounded on three sides by Sydney Harbour with New South Head Road forming the southern boundary. Lyne Park provides a range of local and regional recreational opportunities as well as providing access to the commercial seaplane operations and to commercial and recreational ferry services from Rose Bay Wharf (Woollahra Municipal Council 2003).

The water meter for Lyne Park is located on the park’s southern boundary on New South Head Road, opposite number 685 New South Head Road, Rose Bay. The water meter number is EDKH0069.

Water use at Lyne Park was recorded from the water meter three times a week for four weeks in March 2006. Two sets of after hour readings were recorded at the site. One on the evening of Thursday 16 March 2006 and the morning of Friday 17 March 2006 and on the evening of Thursday 23 March 2006 and the morning of Friday 24 March 2006. The walk through water audit was conducted by Council’s Environmental Protection Coordinator, Rebecca Peacock and the Technical Officer Parks, Phillip Julian, on Friday 7 April 2006.

Results and discussion

The base year (2004/2005) water use at Lyne Park was 2,743 kL. Water used during the base year was representative of normal water use. Table 13 presents the base year water use information for Lyne Park.

Table 13: Lyne Park base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	New South Head Road Rose Bay 2029	New South Head Road Rose Bay 2029
Sydney Water Account Number/s	4210293 EDKH0069	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per annum (kL)	2743	-
Business Activity Indicator	Area m ²	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	45,981	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	2743	-
E = D/B baseline water use key performance indicator (KPI)	0.06kL/area m ²	-
Baseline KPI units	kL/area m ²	-

The main water uses on the site are the irrigation of the playing fields and the operation of the public toilet facilities. The oval is irrigated by a combination of potable and bore water. An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 14 presents the inventory information.

Table 14: Lyne Park inventory of water using fixtures

Site 6 – Lyne Park				
Property number - 4210293				
Water meter number – EDKH0069				
Description	Fixture	Quantity	Flow rate	Comments
Male toilet	Toilets	2	Dual flush 3/6	
	Hand basins	2	17 litre/min	
	Urinals	1	-	Waterless urinal
Female toilet	Toilets	3	Dual flush 3/6	
	Hand basins	3	17 litre/min	
	Taps	1	20 litres/min	Vandal proof tap head installed.
Disabled toilet	Toilet	1	Dual flush 3/6	
	Hand basins	1	17 litre/min	

Site 6 – Lyne Park				
Property number - 4210293				
Water meter number – EDKH0069				
Description	Fixture	Quantity	Flow rate	Comments
	Taps	1	20 litre/min	
Change Rooms	Showers	8	6 litre/min	Not currently being used.
	Toilets	2	Dual flush 3/6	
	Hand basins	4	20 litre/min	
Outside	Taps	1	20 litre/min	Tap lock installed.
	Bubbler	1	-	Spring loaded handle.
	Irrigation	26 stations	20 litre/min	Operated on Mondays only, for 30 minutes each station.

In total 466.42 kL of water was used at the site during the monitoring period. The average kL/day usage for the site was 18.66kL averaged over the 25 day monitoring period. Water use peaked at the site during the first week of monitoring, with a daily average of 50.69kL recorded for two days (8 and 9 March 2006).

Council received an exemption from Sydney Water to use potable water for the irrigation of the sports field at Lyne Park to establish rye grass for the winter sport season. The exemption was from the 9 February 2006 to the 6 April 2006.

Council operated the irrigation system for 50 minutes every day (20 minutes during the night and 3 x 10 min blocks during the day) from February until the 10 March 2006. From the 10 March until 6 April 2006, the irrigation of the sports field was reduced to three days per week, for 30 minutes each session. From the 6 April 2006, the irrigation of was reduced to conform to the current water restrictions, being Mondays only for 30 minutes each session.

The high water usage results recorded during the monitoring period coincides with Council's exemption for increased irrigation of the sports field. The peak recorded during the first week of monitoring corresponds to the intensive daily irrigation schedule of the exemption. The general trend of reducing use over the monitoring period reflects the irrigation schedule of the park.

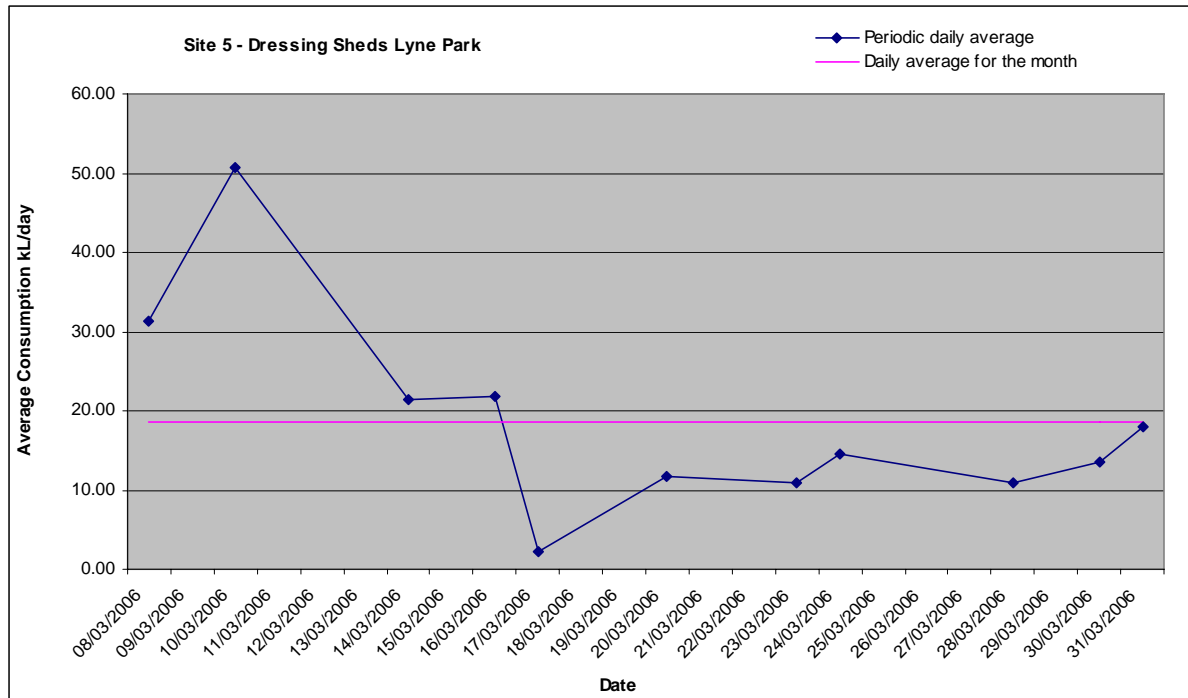
Two sets of readings were taken outside of normal working hours to detect leaks, with each set recording different usage rates. The first set taken on the evening of Thursday 16 March and the morning of Friday 17 March, recorded that 2.17kL of water was used over night. The second set, taken on the evening of Thursday 23 March and the morning of Friday 24 March, recorded that 14.49 kL of water was used over night. Due to the large volume of water used, it is assumed that the park was irrigated on the evening of the 23 March.

No leaks were detected during the walk through site review. The base flow may be attributed to a leak from the irrigation network in the park. It is recommended that the irrigation network be checked for leaks.

Council is currently undertaking a review of the facilities provided at public reserves through the implementation of the Property Assets Study and the Recreational Needs Strategy. The review specifically for Lyne Park involves the provision of change rooms at the park. The retro fit actions recommended for Lyne Park should be incorporated into any upgrades undertaken on the site.

Figure 5 represents graphically the average daily water used in kilo litres (kL) during the monitoring period. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 5: Average daily water use (kL) Lyne Park, March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for Lyne Park for the base year 2004/2005. The 2004/2005 daily average water use was 7.5 kL. This was more than half the daily average calculated during the monitoring period of 18.66 kL.

Water use during the base year was erratic, ranging from 3.1 kL per day during the fourth quarter (April, May, June) to a peak of 12.2 kL per day during the third quarter (January, February, March). The erratic nature of water used on the site may reflect the use of both bore and potable water for the irrigation of the sports field. The bore typically runs dry during the dry months of the year due to the park's location below natural mean high water. Potable water is then used to irrigate the park.

Water use at the site has reduced in the past three years from 8,295 kL in 2002/2003 to 2,743 kL in 2004/2005.

Business activity indicator

The business activity indicator chosen for this site was area (m²). The baseline water use key performance indicator is 0.06kL/area m². This is less than the Sydney Water (October 2005) benchmark for ovals Eastern Suburbs of 0.4kL/m².

Recommended action

1. Replace existing taps with time flow taps in the amenities block.
2. Check the irrigation network for leaks.
3. Replace existing water meter FDOA0042 with a pulse emitting water meter.
4. Install a data logger to further monitor water use.

5. Audit the efficiency of bore and potable water for irrigation. Opportunities for sourcing more reliable bore water in the Rose Bay area are investigated.
6. Ensure that future park upgrades incorporate water efficient fixtures.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it is estimated that implementation of the retrofit recommended actions will potentially reduce water use from the site by 50%. Refer to Annexure E for the water saving measures (Template 4) for each site.

Water use will be further reduced from the site with Council successfully receiving a Commonwealth Government Community Water Grant for the installation of a rainwater tank at the Lyne Park amenities block. The tank water will be used to flush the toilets in the public facility.

10 Site 6 - Sherbrooke Hall

The Sherbrooke Hall site is located on the corner of New South Head Road and William Street, Double Bay. The site contains a number of uses within different sections of the one property. The bottom floor contains Council's Local History Library and the Meals on Wheels kitchen and office. The middle floor contains the Woollahra Preschool and the top floor contains Council's Regulatory Offices.

Water meter EDJF0152, located on the William Street boarder of the site to the left of the entrance, services the whole Sherbrooke Hall site.

Water use at Sherbrooke Hall was recorded from the water meter a minimum of three times a week for four weeks in March 2006. Two sets of after hour readings were recorded at the site, one on the evening of Thursday 16 March 2006 and the morning of Friday 17 March 2006 and the second on the evening of Thursday 23 March 2006 and the morning of Friday 24 March 2006. The walk through water audit was conducted by Council's Environmental Protection Coordinator, Rebecca Peacock on Monday 15 and Wednesday 17 May 2006.

Results and discussion

The base year (2004/2005) water use at Sherbrooke Hall was 2,035 kL. Water used during the base year was representative of normal water use. Table 15 presents the base year water use information for Sherbrooke Hall.

Table 15: Sherbrooke Hall base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	New South Head Road Double Bay 2028	New South Head Road Double Bay 2028
Sydney Water Account Number/s	4210457	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per Annum (kL)	2035	-
Business Activity Indicator	No of patrons	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	29,074	-
Is baseline representative of normal	YES	-

Site Description	Normal Operation	With variation from normal operation.
water use YES/NO		
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	2035	-
E = D/B baseline water use key performance indicator (KPI)	0.07	-
Baseline KPI units	KL/person	-

Water used on the site is for the operation of the Regulatory Office, Local History Library, Meals on Wheels and the Woollahra Preschool. An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. The inventory information is presented separately for each site use in the following tables (Table 16 Regulatory Office, Table 17 Meals on Wheels, Table 18 Local History Library and Table 19 Woollahra Preschool).

Table 16: Regulatory Office inventory of water using fixtures

Site 6 – Regulatory Office				
Property number - 44210457				
Water meter number – EDJF0152				
Description	Fixture	Quantity	Flow rate	Comments
Male toilet	Toilets	1	11 litre	
	Basin taps	1	20 litre/min	
	Shower	1	16 litre/min	
	Taps	1	20 litres/min	
Female toilet	Toilets	1	Dual flush 3/6	
	Basin taps	1	20 litre/min	
	Basin taps	1	7 litre/min	
Kitchen	Taps	1	20 Litre/min	Cold water tap
	Taps	1	10 litre/min	Hot water tap
	Bubbler	1	-	
	Hot water urn	1	-	

Table 17: Meals on Wheels inventory of water using fixtures

Site 6 – Meals on Wheels				
Property number - 44210457				
Water meter number – EDJF0152				
Description	Fixture	Quantity	Flow rate	Comments
	Toilets	1	11 litre	
	Basin taps	3	20 litre/min	
	Shower	1	9 litre/min	Rarely if ever used
	Bath	1 (2 taps)	20 litres/min	Rarely if ever used
	Washing machine	1	75 litres/wash	Used once a week/fortnight. 5.5kg capacity.
	Tap	1	15 litre/min	
Kitchen	Taps	1	20 Litre/min	Cold water tap
	Taps	1	10 litre/min	Hot water tap

Table 18: Local History Library inventory of water using fixtures

Site 6 – Local History Library				
Property number - 44210457				
Water meter number – EDJF0152				
Description	Fixture	Quantity	Flow rate	Comments
Male toilet	Toilets	1	11 litre	Cistern located behind wall.
	Basin taps	2	20 litre/min	
	Urinal	1	11 litre/min	Pull flush.
	Taps	1	20 litres/min	
Female toilet	Toilets	2	11 litre	
	Basin taps	2	20 litre/min	
	Tap	1	20 litre/min	
Kitchen	Taps	1	20 Litre/min	

Table 19: Woollahra Preschool inventory of water using fixtures

Site 6 – Woollahra Preschool				
Property number - 44210457				
Water meter number – EDJF0152				
Description	Fixture	Quantity	Flow rate	Comments
Children's bathrooms	Toilets	8	11 litre	
	Basin taps	5	15 litre/min	
	Basin taps	1	6 litre/min	
	Basin taps	1	20 litre/min	
	Taps	2	18 litres/min	
Staff bathroom	Toilets	1	11 litre	
	Basin taps	2	20 litre/min	
	Taps	1	18 litre/min	
	Shower	1	9 litre/min	Rarely used
Kitchen	Taps	3	20 litre/min	
	High pressure hose	1	20 litres/min	Used approximately 5 times per day for 15 seconds each.
	Dishwasher	1	21 litres/wash	1 wash per day. Vulcan Dishlex 1005.
	Hot water urn	1	-	
Class rooms and craft room	Taps	3	20 litre/min	
	Taps	3	16 litre/min	
	Taps	3	8 litre/min	Hot water taps.
Outside, including playground and shed.	Taps	3	7 litres/min	Located in playground. Pull timers installed.
	Taps	2	20 litres/min	1 has a tap lock installed and the other has a hose attached.
	Toilets	1	Dual flush 3/6	
	Basin taps	2	20 litres/min	

In total 57.58 kL of water was used at the site during the monitoring period. The average daily water usage for the site was 2.3 kL, averaged over the 25 day monitoring period. The troughs and peaks in water use correspond to lower weekend use and higher weekday use respectively.

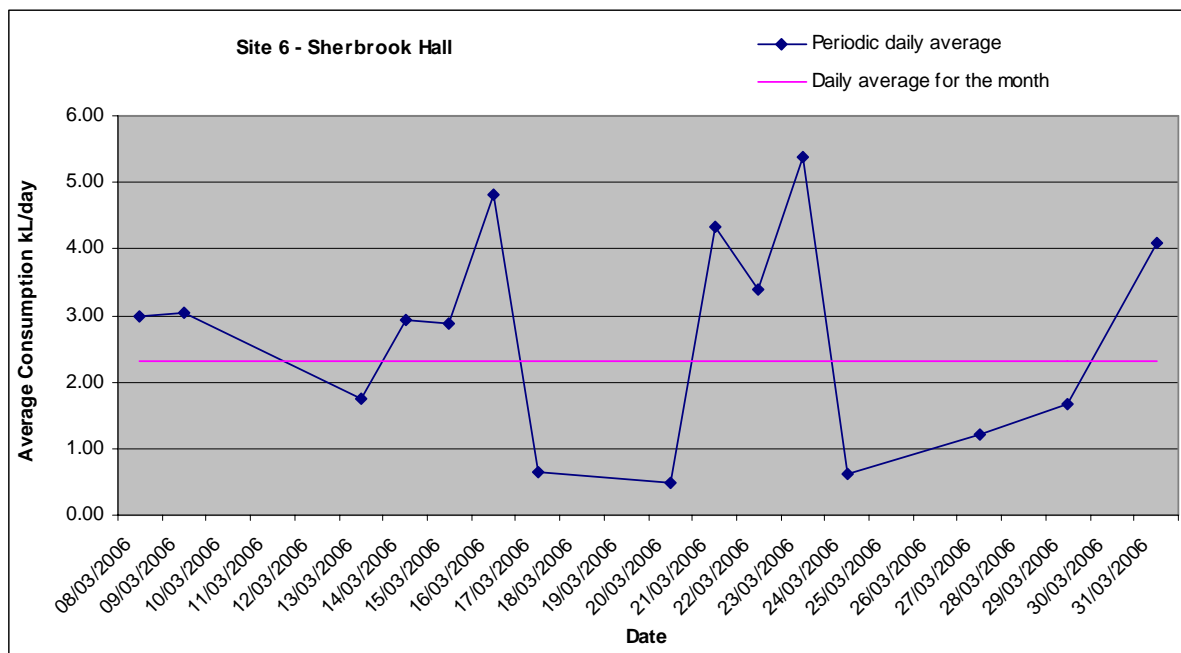
Two sets of readings were taken outside of normal working hours to detect leaks, with similar volumes of water used over night. The first set taken on the evening of Thursday 16 March and the morning of Friday 17 March, recorded that 0.64 kL (or 640 litres) of water was used

over night. The second set, taken on the evening of Thursday 23 March and the morning of Friday 24 March, recorded that 0.62 kL (or 620 litres) of water was used over night.

The over night usage may be attributed to the use of the fixtures in the outdoor areas that do not have tap locks and are open to use 24 hours a day, seven days a week. The base flow may also be attributed to a leak from the fixtures on the site. No leaks were detected during the walk through site review. The base flow requires further investigation.

Figure 6 represents graphically the average daily water used in kL during the monitoring period. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 6: Average daily water use kL at Sherbrooke Hall, March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for Sherbrooke Hall for the base year 2004/2005. Water use from this site was consistent throughout the base year, ranging from 5.3 to 5.8 kL per day.

The 2004/2005 daily average was 5.6 kL. This is double the daily average water use calculated from the monitoring results undertaken for this plan of 2.3 kL/day.

Water use at the site has increased in the past three years from 740 kL in 2002/2003 to 2035 kL in 2004/2005.

Business activity indicator

The number of patrons was chosen as the business activity indicator for the Sherbrooke Hall site. This was calculated from average staff and pupil numbers. The baseline water use key performance indicator is 0.07kL or 70L/person/day. This amount is consistent with the Sydney Water (October 2005) benchmark for civic and administration buildings with less than 200 people a day of 75L/patron/day.

Recommended action

1. Install tap flow restrictors and dual flush toilet cistern into the Regulatory Office.
2. Install cistern valves and flow valves into the Local History Library.
3. Install dual flush toilet cisterns, low flow taps and tap locks into the Woollahra Preschool, including the outdoor areas.
4. Install a dual flush toilet cistern and tap flow restrictors into the Meals on Wheels office.
5. Investigate possible causes for the increase in water use at the site.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it is estimated that implementation of the retrofit recommended actions will potentially reduce water use from the site by 26%. Refer to Annexure E for the water saving measures (Template 4) for each site.

11 Site 7 - Trumper Oval

Trumper Oval is a major active recreation reserve located in Glenmore Road, Paddington. The park is a multi-purpose sports oval that caters for AFL, cricket and athletics. Park facilities include toilets, change rooms, grandstand, canteen, floodlighting, playground and a walking track.

There are two water meters that service Trumper Oval. Water meter DDOG0359 is located at the end of Royston Street, near the boundary fence with 1 Royston Street and services the taps located around the oval. Water meter DDQB1123 is located along the parks Hampden Road boundary, next to the grandstand. This meter services the amenities block, change rooms, work shed and the canteen.

Water use at Trumper Oval was recorded from both water meters three times a week for four weeks in March 2006. The after hours readings were recorded in the evening of Thursday 23 March and in the morning of Friday 24 March 2006. The walk through technical review (audit) was conducted by Council's Environmental Protection Coordinator, Rebecca Peacock, and the Technical Officer Parks, Phillip Julian, on Friday 7 April 2006.

Results and discussion

The base year (2004/2005) water use at Trumper Oval was 1,947 kilo litres (kL). Water used during the base year was representative of normal water use. Table 20 presents the base year water use information for Trumper Oval.

Table 20: Trumper Oval base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	Glenmore Road Paddington 2021	Glenmore Road Paddington 2021
Sydney Water Account Number/s	4204394 DDOG0359 DDQB1123	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per annum (kL)	1947	-
Business Activity Indicator	No of patrons	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	32,760	-

Site Description	Normal Operation	With variation from normal operation.
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	1947	-
E = D/B baseline water use key performance indicator (KPI)	0.06	-
Baseline KPI units	kL/no of patrons	-

The oval is irrigated using bore water and not potable water. Therefore the majority of potable water used on the site is for the operation of the amenities block and facilities. An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 21 presents the inventory information.

Table 21: Trumper Oval inventory of water using fixtures

Site 7 – Trumper Oval				
Property number - 4204394				
Water meter number – DDOG0359, DDQB1123.				
Description	Fixture	Quantity	Flow rate	Comments
Male toilet	Toilets	2	Dual flush 3/6	
	Hand basins	3	12 litre/min	
	Urinals	2	11 litre	Pull flush.
	Taps	1	18 litres/min	Vandal proof tap head installed.
Female toilet	Toilets	2	Dual flush 3/6	
	Hand basins	2	12 litre/min	
	Taps	1	18 litres/min	Vandal proof tap head installed.
Change Rooms including umpire shed	Showers	13	6 litre/min	
	Toilets	5	Dual flush 3/6	
	Hand basins	5	20 litre/min	
	Taps	3	20 litre/min	1 tap has a vandal proof head.
Work shed	Hand basins	1	12 litre/min	
Canteen	Basins	1	9 Litre/min	Hot/cold mixer tap, aerator installed.
	Taps	1	20 litre/min	Vandal proof tap head installed.
Outside	Taps	5	20 litre/min	2 taps have vandal proof tap heads.

In total 19.53kL of water was used at the site during the monitoring period, with the majority of water used from the DDQB1123 water meter (19.38kL) and 0.15kL of water used from water meter DDOG0359. The sites combined average daily water use was 0.78kL.

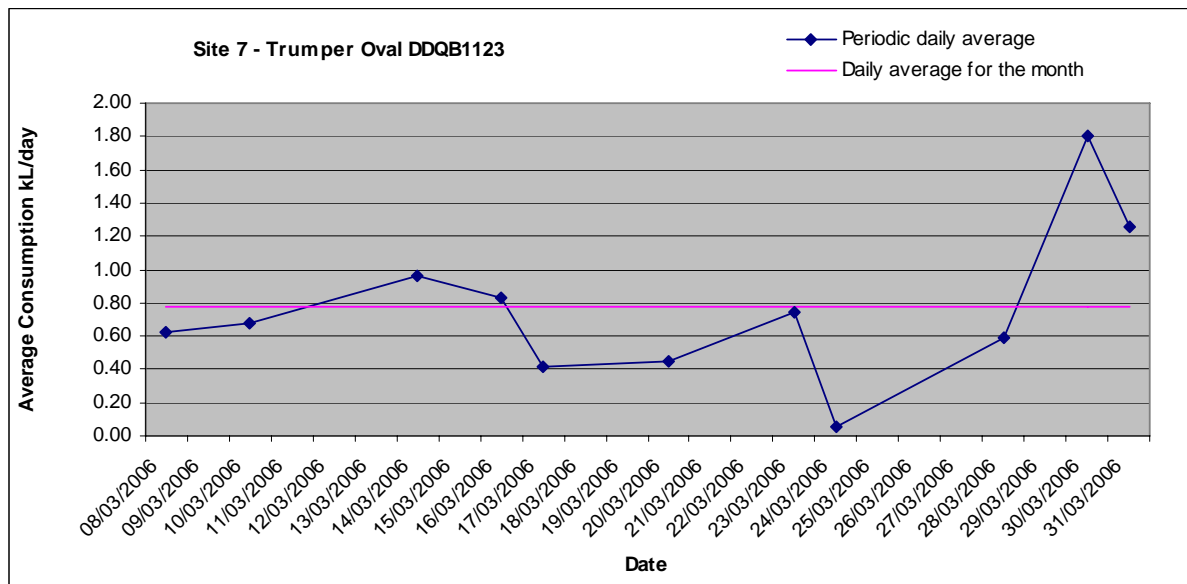
Water meter DDQB1123

The average daily use from this meter was 0.78kL or 780 litres, averaged over the 25 day monitoring period. Usage is consistent throughout the monitoring period, with a peak of 1.8kL recorded between Tuesday and Thursday of the final week.

The readings taken outside of normal working hours to detect leaks recorded that 60 litres of water was used at the meter overnight. This may be attributed to the use of the taps located around the amenities block that do not have tap locks and are open to use 24 hours a day, seven days a week. The base flow may also be attributed to a low flow leak from the fixtures on the site (approximately 0.5 L/hour). As no leaks were detected during the walk through site review, the base flow was not investigated further.

Figure 7 represents graphically the average daily water used in kilo litres (kL) during the monitoring period. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 7: Average daily water use (kL) water meter DDQB1123, March 2006.



Water usage of the site recorded during the monitoring period was compared to the oval's booking schedule during this time. The peak in water use corresponds to a peak in park sports bookings, where over the two day period, there were six bookings. The most the oval was booked during the monitoring period.

The majority of water used on the site relates to the use of the amenities and associated facilities. Although there are a number of showers and toilets on the site, these have mostly been fitted with water saving fixtures, including low flow shower heads and dual flushing toilet cisterns. The majority of taps on the site have high flows. Therefore the installation of low flow fixtures and tap locks will further reduce water use at the site.

Water meter DDOG0359

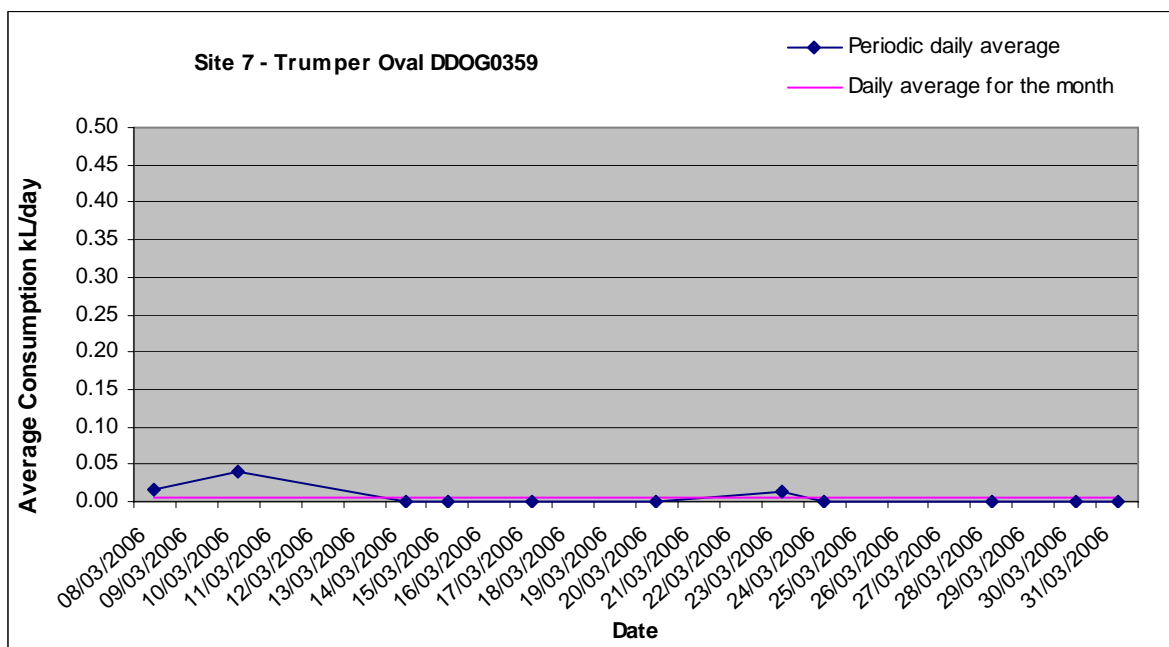
In total 0.15kL or 150 litres, of water was used from this water meter during the monitoring period. The average daily use from this meter was 0.006kL or 6 litres averaged over the 25 day monitoring period. Eight of the twelve readings taken during the monitoring period recorded no use at all.

The readings taken outside of normal working hours to detect leaks recorded that no water was used at the meter overnight.

Figure 8 represents graphically the average daily water used (kL) during the monitoring period. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

The water used from this meter is negligible. It is recommended that tap locks be installed on the taps located around the oval to reduce the potential for future over use.

Figure 8: Average daily water use (kL) water meter DDOG0359, March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for Trumper Oval for the base year 2004/2005. The 2004/2005 daily average water use was 5.3kL/day. This was far greater than the average daily water use calculated from the monitoring results undertaken for this plan of 0.78 kL/day.

The general trend illustrated by the 2004/2005 data is of a decreasing use of water at the site, with an average of 6.2 kL of water used per day during the 1st quarter of the year (July, August, September) compared with an average of 3.4kL during the 4th quarter (April, May, June).

Water use at the site has reduced in the past three years from 3,736 kL in 2002/2003 to 1,947 kL in 2004/2005.

Business activity indicator

The business activity indicator chosen for this site is the number of patrons. Although Council does not record accurate visitation numbers, an estimate was calculated from the oval bookings and the number staff based at the site. The baseline water use key performance indicator is 0.06kL/no of patrons. This is consistent with the Sydney Water (October 2005) benchmark for swimming pools and leisure centres for 0-500 patrons of 60L/person/day.

Recommended action

1. Install low flow basin taps and tap locks on the fixtures in the amenities block.
2. Install tap locks and/or low flow taps on the remaining taps located around the oval.
3. Install urine flush valve.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it is estimated that implementation of the retrofit recommended actions will potentially reduce water use from the site by 32%. Refer to Annexure E for the water saving measures (Template 4) for each site.

12 Site 8 - Watsons Bay Baths

The Watsons Bay Baths are an enclosed harbour swimming area located on the southern foreshore of Sydney Harbour. As a part of the baths facilities, change rooms, including toilets and showers, are available to the public. The change rooms are located across Marine Parade in the grounds of the Teagardens Café, 8 Marine Parade, Watsons Bay. The site also includes the water used at the Teagardens Café. This is a small café with limited table seating, the majority of which is located outdoors in the grounds of the property.

The water meter for Watsons Bay Baths is located at 8 Marine Parade on the property's north eastern corner, near the boundary with 2 Robertson Place. The water meter number is DDOF1159.

Water use at Watsons Bay Baths was recorded from the water meter three times a week for four weeks in March 2006. The after hours readings were recorded in the evening of Thursday 23 March and in the morning of Friday 24 March 2006. The walk through water audit was conducted by Council's, Environmental Protection Coordinator, Rebecca Peacock, and the Trades Supervisor, Michael Homann, on Thursday 23 March 2006.

Results and discussion

The base year (2004/2005) water use at Watsons Bay Baths was 1,904 kL. Water used during the base year was representative of normal water use. Table 22 presents the base year water use information for Watsons Bay Baths.

Table 22: Watsons Bay Baths base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	Marine Parade Watsons Bay 2030	Marine Parade Watsons Bay 2030
Sydney Water Account Number/s	4674495 DDOF1159	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per annum (kL)	1904	-

Site Description	Normal Operation	With variation from normal operation.
Business Activity Indicator	No. of patrons	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	36,500	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	1904	-
E = D/B baseline water use key performance indicator (KPI)	0.05	-
Baseline KPI units	KL/person	-

The majority of water uses on the site are associated with the toilets/change rooms and the Teagardens Café kitchen. An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 23 presents the inventory information.

Table 23: Watsons Bay Baths inventory of water using fixtures

Site 8 – Watsons Bay Baths				
Property number - 4674495				
Water meter number – DDOF1159				
Description	Fixture	Quantity	Flow rate	Comments
Male toilet and change room.	Toilets	2	11 litre	
	Toilets	1	Dual flush 3/6	
	Hand basins	2	15 litre/min	
	Urinals	1	11 litre	Pull flush urinal.
	Taps	1	20 litres/min	Vandal proof tap head installed.
Female toilet and change room.	Showers	3	16 litres/min	2 have push timers installed and 1 has a lever handle.
	Toilets	2	11 litre	
	Toilets	1	Dual flush 3/6	
	Hand basins	2	15 litre/min	
Café kitchen	Showers	3	16 litres/min	2 have push timers installed and 1 has a lever handle.
	Hand basin	1	6 litre/min	Hot water.
	Hand basin	1	17 litre/min	Mixer tap.
	High pressure trigger hose	1	20 litre/min	Used approximately 16 times a day for 1 minute.
	Tap/hose	1	20 litre/min	Located outside at the back of the kitchen.
Outside	Dishwasher	1	3 litres/cycle	Washtech Model no. UD2884. Used on average 5 times a day.
	Taps	1	20 litre/min	Tap lock installed.
	Bubbler	1		Spring loaded handle.

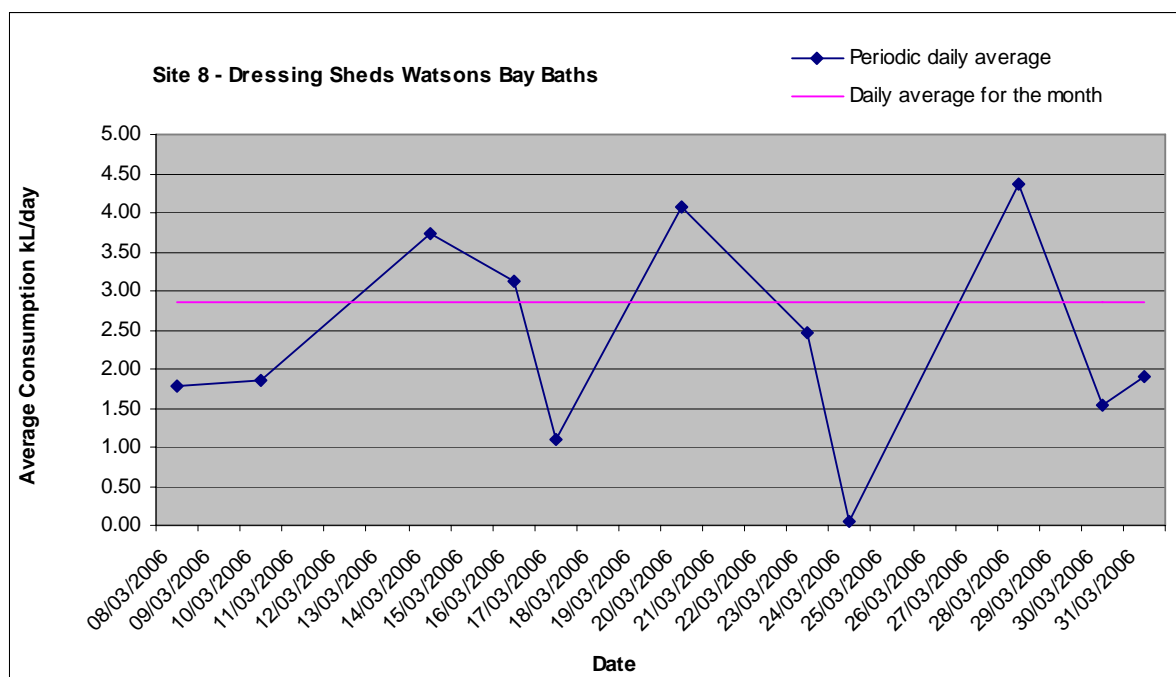
Site 8 – Watsons Bay Baths				
Property number - 4674495				
Water meter number – DDOF1159				
Description	Fixture	Quantity	Flow rate	Comments
Baths	Shower	1	9 Litre/min	Water efficient shower head installed. Push timer operated.
	Taps	1	20 litre/min	

In total 71.5 kL of water was used at the site during the monitoring period. The average kL/day usage for the site was 2.86kL/day averaged over the 25 day monitoring period. Peaks in water use consistently occurred early in the week (Monday or Tuesday) and incorporate water usage over the weekend.

The readings taken outside of normal working hours to detect leaks recorded that 60 litres of water was used at the site overnight. This may be attributed to the shower and tap located in the baths enclosure and the tap and bubbler located in the grounds of the café that do not have tap locks and are open to use 24 hours a day, seven days a week. The base flow may also be attributed to a low flow leak from the fixtures on the site (approximately 0.5 L/hour). As no leaks were detected during the walk through site review, the base flow was not investigated further.

Figure 9 represents graphically the average daily water used in kilo litres (kL) during the monitoring period. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 9: Average daily water use (kL) Watsons Bay Baths, March 2006.



The majority of water used on the site relates to the use of the toilets and shower facilities, and the use of water for the operation of the café. As peak usage of the baths coincides with the warmer months, it is assumed that the operation of the toilets and amenities constitute the majority of water use at the site. It is recommended that the toilet cisterns be replaced with dual flushing cisterns (6/3 litres) and the taps be replaced to low flow taps in the amenities

block. A tap lock should also be installed on the tap located in the baths enclosure. Implementation of these actions will further reduce the amount of water used at the site.

Historical water use

Sydney Water provided Council with the quarterly water use data for the Watsons Bay Baths change rooms for the base year, 2004/2005. The 2004/2005 daily average water use was 5.2kL/day. This was greater than the average daily water use calculated from the monitoring results undertaken for this plan of 2.9 kL/day.

There is a definite peak in average daily water use during the summer months, where the daily average increased by 2 kL/day from 4.7kL/day used during the 2nd quarter (October, November, December) to 6.7kL/day used during the 3rd quarter (January, February, March). This correlates with the warmer summer months, schools' summer holidays and the alfresco style dining favouring the warmer months of the year.

Water use at the site has reduced in the past three years from 2,326 in 2002/2003 to 1,904 kL in 2004/2005.

Business activity indicator

The number of patrons was chosen as the business activity indicator for Watsons Bay Baths Dressing Sheds. It was calculated that approximately 100 use the site per day. The baseline water use key performance indicator is 0.05kL/person or 50 litres/person. This is less than the most applicable Sydney Water (October 2003) benchmark for this site would be swimming pools and leisure centres (0-500 persons) of 60 L/person/day.

Recommended action

1. Replace existing toilet cisterns with dual flush (6/3 litre) cisterns.
2. Install low flow taps in the amenities block.
3. Install a tap lock on the outdoor tap located in the baths area.
4. Install urinal flush valve.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it is estimated that implementation of the retrofit recommended actions will potentially reduce water use from the site by 24%. Refer to Annexure E for the water saving measures (Template 4) for each site.

13 Site 9 - Woollahra Park building complex

The Woollahra Park building complex is a multi use located on O'Sullivan Road, Rose Bay. The site consists of the Woollahra Golf Club house, the Grimley Pavilion (golf pro shop, change rooms, public toilets and East Suburbs Rugby Club gym), the Rose Bay Playgroup and a golf course care takers cottage. The Woollahra Golf Course and surrounding gardens and sports field are irrigated with bore water. None of the water use associated with this site is used for irrigation.

The water meter for the Woollahra Park building complex is located on the sites boundary with O'Sullivan Road, on the edge of the member's driveway, opposite 153 O'Sullivan Road. The meter number is EEHE0090.

A data logger was installed on the main water meter at the golf club to monitor water use during May to June 2006. A sub-meter was installed and monitored on the water line to the Grimley Pavilion to further breakdown water use. The walk through audit was conducted by

the DoC Senior Water Savings Engineer Reid Butler on Thursday 18 May 2006 and Thursday 1 June 2006.

Results and discussion

The base year (2004/2005) water use at Woollahra Park building complex site was 1,483 kL. Water used during the base year was representative of normal water use. Table 24 presents the base year water use information for the Woollahra Park building complex.

Table 24: Woollahra Park building complex base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	O'Sullivan Road Rose Bay 2029	O'Sullivan Road Rose Bay 2029
Sydney Water Account Number/s	4213794 EEHE0090	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per annum (kL)	1615	-
Business Activity Indicator	Number of patrons	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	24,300	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water use (i.e. variation from normal kL per annum.	0	-
D = A-C baseline water use corrected for variation (kL)	1615	-
E = D/B baseline water use key performance indicator (KPI)	0.07	-
Baseline KPI units	kL/patron	-

An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 25 presents the inventory information.

Table 25: Woollahra Park building complex inventory of water using fixtures

Description	Fixture	Quantity	Flow rate	Comments
Club House				
	Male toilets	1	Dual flush 3/6	
	Male urinals	2	Waterless	
	Male basins	2	2 taps 12L/min	1 tap dripping
	Female toilets	3	Dual flush 3/6	
	Female basins	4	2 taps 12L/min	
	Disabled WCs	1	Dual flush 3/6	
	Disabled basins	1	2 taps 9L/min	
Grimley Pavilion				

Description	Fixture	Quantity	Flow rate	Comments
<i>Members Change Room</i>	Male toilets	3	Dual flush 3/6	
	Male urinals	2	Sensor flush	Sensor switched off
	Male basins	3	10 L/min	1 tap dripping slightly
Toilets	Male toilets	1	Dual flush 3/6	
	Male basins	1	18 L/min mix tap	
	Female toilets	2	Dual flush 3/6	
	Female basins	2	9 L/min	Dripping tap being replaced
Change Rooms	Showers	9	12-15 L/min	
	Toilets	2	1 dual flush 9/4.5L, 1 single flush 9L	
	Urinals	2	9L pull chain cisterns	
	Basins	2	6 L/min	1 tap dripping
Gym	Toilet	1	Dual flush 9/4.5L	
	Basin	1	10 L/min	
Residence				
	Toilet	1	Single flush 11L	
	Basin	1	10 L/min	
	Shower	1	12 L/min	
Day Care Centre				
	Toilets	2	Dual flush 9/4.5L	
	Basins	4	10 L/min	

In total 280 kL of water was used at the site over the ten week monitoring period. The average daily water use was calculated to be 4 kL/day. The DoC advise that the water usage from this site is very low.

The readings taken outside of normal working hours to detect leaks recorded no water usage and no leaks were detected during the audit.

The majority of water used at the site is for the operation of the change rooms located in the Grimley Pavilion, which contributed approximately 47% of the total water used at the site.

Historical water use

Sydney Water provided Council with the quarterly water use data for the site for the base year 2004/2005. The 2004/2005 daily average water use was 4.4 kL/day. This was consistent with the daily average recorded during the monitoring period of 4 kL.

Water use over the base year was consistent throughout the base year ranging from a daily average of 4.1 kL to 4.8 kL.

Water use at the site has been declining in the past three years from 2179 kL in 2002/2003 to 1615 recorded in 2004/2005, Council's chosen base year.

Business activity indicator

The business activity indicator chosen for the Woollahra Golf Course is the number of patrons. The baseline water use key performance indicator is 0.07 kL/ patron. This is slightly greater than the Sydney Water (October 2005) benchmark for swimming pools and leisure centres with 0-500 patrons/day of 60 litres or 0.06kL/parton, the most applicable benchmark for the activities undertaken on the site.

Recommended action

1. Regularly repair and monitor fixtures (both Council and lessee responsibility).
2. Install flow restrictors on high flow taps.
3. Work with the lessees to further reduce water use.
4. Conduct staff water efficiency training.
5. Monitor water meter readings regularly for irregularities.

The DoC advised that implementation of the recommended actions will potentially reduce water use at the site by 7%.

14 Site 10 - Robertson Park

Robertson Park is located at Watsons Bay, an eastern harbour front residential area in Sydney's Eastern Suburbs. The park forms a significant recreational and tourist destination for both local residents and visitors from Australia and overseas. The park is the focus of the public domain of Watsons Bay and provides open space and visual link between The Gap and Sydney Harbour (Woollahra Municipal Council 2004).

The water meter for Robertson Park is located on the parks northern boundary on Marine Parade, near the beginning of Military Road, Watsons Bay. The water meter number is CDOD1399.

Water use at Robertson Park was recorded from the water meter three times a week for four weeks in March 2006. The after hours readings were recorded in the evening of Thursday 23 March and in the morning of Friday 24 March 2006. The walk through water audit was conducted by Council's, Environmental Protection Coordinator, Rebecca Peacock, and the Technical Officer Parks, Phillip Julian, on Friday 7 April 2006.

Results and discussion

The base year (2004/2005) water use at Robertson Park was 1,483 kL. Water used during the base year was representative of normal water use. Table 26 presents the base year water use information for Robertson Park.

Table 26: Robertson Park base year water use (Template 1)

Site Description	Normal Operation	With variation from normal operation.
Address	Robertson Place Watsons Bay 2030	Robertson Place Watsons Bay 2030
Sydney Water Account Number/s	4208906 CDOD1399	-
Baseline start date	1 July 2004	-
Baseline end date	30 June 2005	-
A = baseline water use per Annum (kL)	1483	-
Business Activity Indicator	No of patrons	-
B = Quantity of Site Business Activity Indicator per annum (corrected for variations)	73,000	-
Is baseline representative of normal water use YES/NO	YES	-
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc).	-	-
C = Impact of variation on water	0	-

Site Description	Normal Operation	With variation from normal operation.
use (i.e. variation from normal kL per annum.		
D = A-C baseline water use corrected for variation (kL)	1483	-
E = D/B baseline water use key performance indicator (KPI)	0.02	-
Baseline KPI units	kL/patron	-

An inventory of the water using fixtures at the site was compiled as a part of the walk through audit. Table 27 presents the inventory information.

Table 27: Robertson Park inventory of water using fixtures

Site 10 – Robertson Park				
Property number - 4208906				
Water meter number – CDOD1399				
Description	Fixture	Quantity	Flow rate	Comments
Male toilet	Toilets	3	11 litre	Cisterns located behind a false wall.
	Hand basins	4	7 litre/min	Time flow taps installed.
	Urinals	1	-	Waterless urinal.
	Taps	1	20 litres/min	Vandal proof tap head installed.
Female toilet	Toilets	4	11 litre	3 of the Cisterns are located behind a false wall.
	Hand basins	4	7 litre/min	Push timers installed for all taps.
	Taps	1	20 litres/min	Vandal proof tap head installed.
Outside	Taps	2	20 litre/min	

In total 132 kL of water was used at the park during the monitoring period. The average kL/day usage for the site was 5.28kL/day averaged over the 25 day monitoring period. Peaks in water use consistently occur early in the week (Monday or Tuesday) and incorporate water usage over the weekend. This is consistent with predictions of peak usage times, with the park being a particularly popular weekend destination. The park is a very popular destination for tourists visiting a number of Sydney landmarks, including The Gap, Camp Cove and South Head and the restaurants and the hotel at Watsons Bay.

The park is not irrigated and therefore the majority of potable water used on the site is for the operation of the amenities block and facilities. The toilets located at Robertson Park are all 11 litre flow cisterns and therefore it can be assumed that the majority of water is used for this use. Six of the seven toilets have cisterns located behind the amenities block wall. The costs associated with retrofitting these toilets is greater than a standard dual cistern conversion, as structural works need to be undertaken as a part of the works. It is estimated that five days work for two Council trade staff will be required to replace the toilets at Robertson Park.

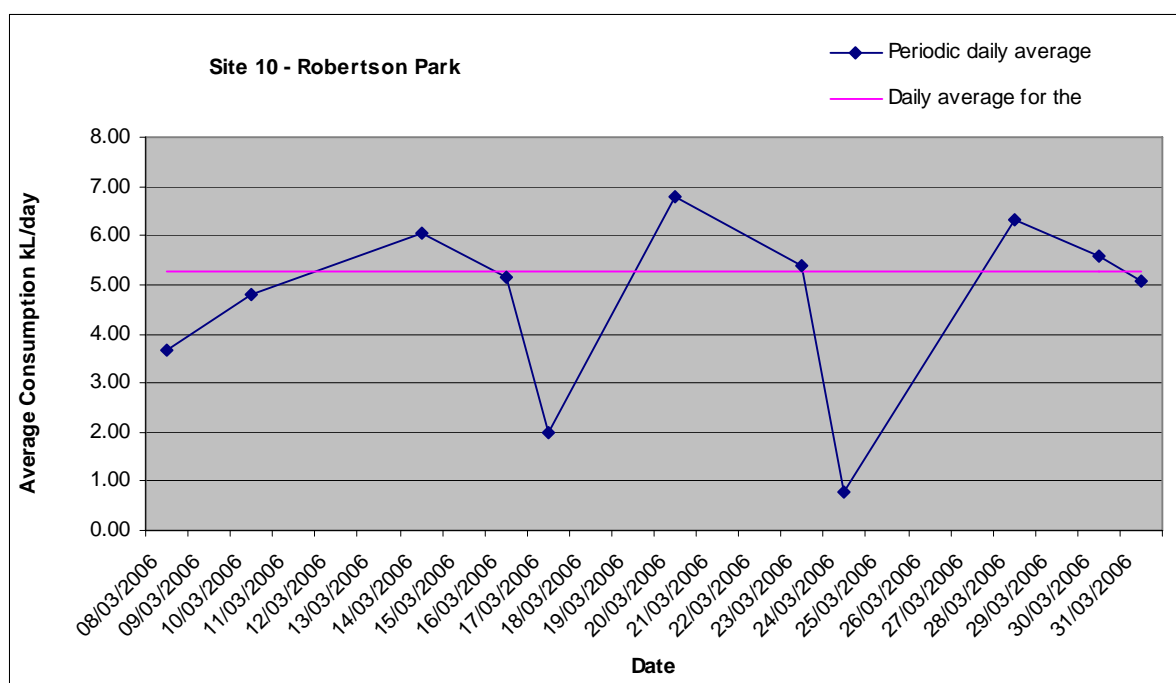
The flow rates of the hand washing basins are good (7 litres/min) and push timers have been installed. It is recommended that tap locks be installed on the two outdoor taps located in the park. This will further reduce the amount of water used at the site.

The readings taken outside of normal working hours to detect leaks, recorded that 0.78 kL or 780 litres of water was used at the site overnight. This equates to an approximate 55 litre/hour base flow rate.

The overnight water usage or base flow may be attributed to the use of the taps located in the park that do not have tap locks. It was observed on a number of occasions that the taps located in the reserve were regularly used by park users and no leaks were detected during the walk through review of the site.

Figure 10 represents graphically the average daily water used in kilo litres (kL) during the monitoring period. The water meter readings recorded during the four week monitoring period have been included as Annexure D.

Figure 10: Average daily water use (kL) Robertson Park, March 2006.



Historical water use

Sydney Water provided Council with the quarterly water use data for Robertson Park for the base year, 2004/2005. Over the year there is a general trend of increasing water use. The 2004/2005 daily average water use was 4.1kL/day. This was less than the average daily water use calculated from the monitoring undertaken for this plan of 5.3kL/day.

Water use at the site has remained relatively stable in the past three years, with 1,525 kL used in 2002/2003 and 1,483 kL used in 2004/2005.

Business activity indicator

The business activity indicator chosen for the site is the number of patrons. It was estimated that approximately 200 people a day would use the facilities in Robertson Park. This estimate was calculated through the Sydney Water EDCB program spreadsheet, where by the number of fixtures and use rates were calculated for the amount of water used during the base year. The baseline water use key performance indicator is 0.02kL or 20 litres per patron. This is less than the Sydney Water (October 2005) benchmark for swimming pools and leisure centres with 0-500 patrons/day of 60 litres or 0.06kL/parton.

Recommended action

1. Install dual flush (6/3) toilet cisterns.
2. Install low flow tap heads on the two outdoor taps located in the park.

The *Robertson Park Plan of Management 2004* (PoM) recommended the relocation of the toilet block in Robertson Park. If the recommendation from the PoM is implemented within 10 years, there will be no cost benefit in implementing recommendation 1 of this plan. Any future upgrades to the site are to include water efficient fixtures.

The technical review information was entered into the Sydney Water EDCB program spreadsheet. The spreadsheet calculates potential water and cost savings, depending on the action chosen. From this spreadsheet it is estimated that implementation of the recommended actions will potentially reduce water use from the site by 44%. Refer to Annexure E for the water saving measures (Template 4) for each site.

15 Conclusion

Preparation of the WSAP has involved the detailed review and investigation of water use at Council's top ten water using sites. The process has involved the audit and investigation of facilities and consumption patterns, the calculation of key performance indicators and comparisons to industry benchmarks. For the majority of Council's sites, usage is consistent with, or lower than, industry standards. Only the irrigation portion of the Council Chambers usage exceeded the industry benchmark for parks and reserves in the eastern suburbs. A recommendation to review and reduce irrigation rates from this site has been included in the water savings measures table, Annexure E.

Further actions have been identified for each site. Implementation of these actions has the potential to reduce Council's water use by 5,610.15 kL per year and save approximately \$6,732. The total cost to implement the recommended actions is approximately \$15,500. It is proposed to stage the implementation of the cost effective actions over a two year period. The proposed timing of the implementation of the actions was prepared in consultation with the Manager Property and Projects.

The actions implemented to date have reduced Council's total yearly water use by 57%, from 113,021 kilo litres (kL) in 2002/2003 to 48,266 kL used in 2004/2005 (WSAP chosen base year). Implementation of the recommended actions will further reduce Council's water use by an additional 5,610 kL per year. The additional savings equate to an approximate reduction of 12% of the total water used for all of Council's facilities in 2004/2005. When this figure is combined with the savings already achieved by Council, 69% of Council's annual water use will have been saved on 2002/2003 use levels. This is far greater than the Guidelines aim of achieving a 20% reduction in potable water use.

A number of critical management actions have also been identified through the preparation of the WSAP. Implementation of these actions will ensure the integration of water management into Council's existing management practices.

Preparation of the WSAP has confirmed that the water conservation initiatives being implemented by Council since 2002 are conserving water. These initiatives are consistent with the actions recommended in this WSAP.

16 Integration of the plan into existing business operations

The preparation of the plan included a review of Council's organisational management practices in relation to water efficiency and management. Critical management actions were identified and have been incorporated into the plan. The water management project team involved with the preparation of the plan included the managers responsible for the operation of Council's top ten water using sites. The actions included in the WSAP will be incorporated into the responsible manager's works program and actioned according to priority.

Implementation of the plan will be reported annually in Council's State of the Environment Report, prepared as a part of Council's annual report requirements specified by the *Local Government Act 1993*. As required by the Guidelines, the WSAP will be reviewed every four years.

17 References

Woollahra Municipal Council (2006a) Woollahra Municipal Council Management Plan 2006/2009.

Woollahra Municipal Council (2006b) Recreational Needs Assessment and Strategy.

Woollahra Municipal Council (2005) Rushcutters Bay Park, Yarranabbe Park and Plantation Reserve Plan of Management.

Woollahra Municipal Council (2004) Robertson Park Plan of Management.

Woollahra Municipal Council (2003) Lyne Park Plan of Management

Signoff of the WSAP

“I certify that this Savings Action Plan has been prepared in accordance with the Guidelines issued by the Minister for Utilities. I am authorised to submit this Plan, on behalf of the designated user, to DEUS.”

Gary James
General Manager
Woollahra Municipal Council