

Water Group

An Integrated Approach to Water Conservation for Large Users

3rd Regional African Water Summit 2013

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WATERGROUP PTY LTD

- August 2013 -

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Scoping/Understanding

Integrated approach

Options

Implementation

And then?

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Global Outlook

No need for fancy graphics

Increasing population

+

Growing standards of living +

Changing climate =

BIG PROBLEM =

We have to look for new ways and EVERYBODY has to do their bit

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Scary!

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Deserved to be there
No new infrastructure
Some of highest water use in the world
No awareness
Wasteful water cycle

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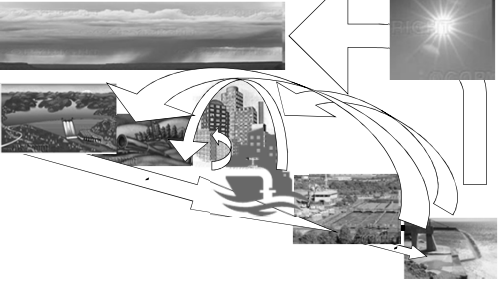
Why are we doing it?



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Modern Water Cycle



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Saving Water – How?




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KISS!

Start with basics

- **What data is there?**
- **Does it make sense?**
- **Why?**
- **How?**
- **Who?**
- **When?**



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Sanity check – KPI's

- **Offices** 0.8m³/m².yr
- **Shop Centres** 1.5m³/m².yr
- **Hospitals** 0.5m³/patient.yr
- **Universities** 2.5m³/student.yr
- **Cooling towers** 600-800L/m².yr
- **Defence** too hard
- **Industry, e.g.:**

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Sub and Smart Metering Options

Water use

PC displaying water consumption

Shower monitor

Smart Water Meter

Data log and transfer unit with internet connection via GPRS or cable

Water meter

Permanent smart meter

Temporary smart meter: 'Minilogger'

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Permanent Smart Metering

Home Remote Water Quality Demo On-line Water Consumption Demo

Water Consumption Monitoring

Choose time range for trend

Start Time: 7/11/2007 12:00:00 AM End Time: 7/18/2007 12:00:00 AM

How to get value for money

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How to go about it

- what will happen to the report?
- prepare water management plan
- check past water use, cost, discharge factors
- single line diagram
- KPI's
- water balance
- savings options and cost
- implementation plan
- buy in

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Site Water Use Balance Model

Site Water Balance Model

Part 1: Sanitary Water Uses

User information	Description	No. of users	Usage pattern	%Female	Water	Total uses per day	Annual Tot uses per day	Kitchen uses per day	Shower uses per day
User Type 1	Office worker	100	12/16 hour shift	50%	50%	2.5	2.5	0	0
User Type 2	Office worker	20	7/16 hour shift	50%	50%	2.5	2.5	0.5	0.5
User Type 3	Shift worker	200	12/16 hour shift	10%	50%	4	4	2	0.2

ADD A NEW USER

Details of fittings

Taps	T type	No. of site	Flow full flush	Flow half flush
Toilet Type 1	Single flush	10	10	10
Toilet Type 2	Dual flush	20	9	4.5

ADD A NEW TAP

Urinals	T type	No. of site	Flow per flush	Time between flushes
Urinal Type 1	Manual flush	3	6	10
Urinal Type 2	Timer	10	6	10

ADD A NEW URINAL

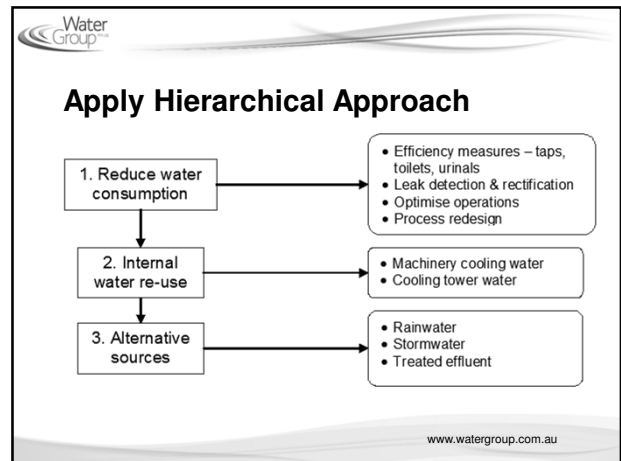
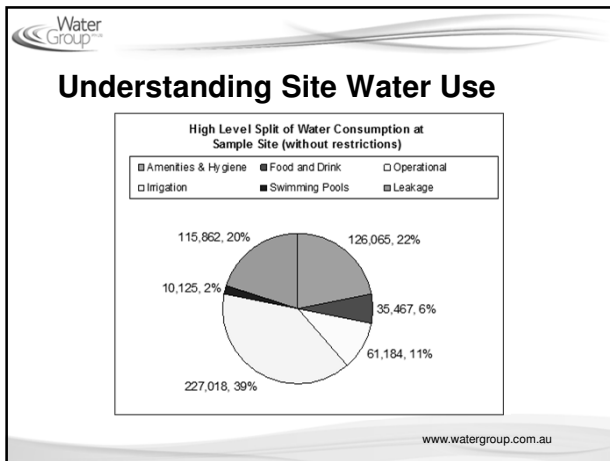
Faucets	T type	No. of site	Flow rate
Assembly Tap Type 1	Level mixer	5	10
Assembly Tap Type 2	Single tap	10	10
Assembly Tap Type 3	2 taps	20	9
Assembly Tap Type 4	Level mixer	4	10

ADD A NEW FAUCET

Showers	T type	No. of site	Flow rate	Shower duration (min)
Showers Type 1	Unisex shower head	5	10	4
Showers Type 2	Low-flow head	5	9	4

ADD A NEW SHOWER

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- ### How to save water
- leak reduction through smart meters & water management
 - efficiency gains through
 - flow and flush reduction
 - process optimisation for e.g. pool backwash, cooling tower
 - different technology and energy savings
 - better irrigation application and control
 - potable water replacement through
 - rainwater harvesting
 - stormwater capture
 - grey water or black water recycling and sewer reuse

Think beyond simple measures ...

- Technology can only go so far
- Users have a big role to play but must be informed
- City-wide approach to water management is

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Fit for Purpose Reuse Matrix

Key: ● Preferred use ● Compatible use ○ Non-preferred use ⊘ Requires high level treatment

	Amenities/ Bathroom	Kitchen/ Food Prep.	Hot Water System	Toilet flushing	Laundry	Irrigation	Vehicle/Gear Washing	Cooling Tower	Pool Top Up Water	Other Process Water
Potable Water Supply	●	●	●	○	○	○	○	○	○	○
Own Water Supply (eg bore water)	●	●	●	○	○	○	○	○	○	○
Rainwater (from roof only)	○	○	○	○	○	○	○	○	○	○
Stormwater (roof and ground)	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘
Treated greywater	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘
Treated wastewater	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘

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Recycling

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Rain- and stormwater harvesting

... but you will run out of water

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Summarising it all

Item	Measure	Water Savings kL/yr	Total Savings \$/yr	Budget Cost	Paybackyrs
Amenity Taps	Reduce flow, fix taps	271	\$797	\$6,175	7.7
Toilets	Modify cistern, reduce flush	680	\$1,651	\$3,507	2.1
Urinals	Modify/manage flush, some waterless	581	\$1,412	\$11,086	7.9
Showers	Modify high/med flow showers	2,100	\$8,491	\$7,920	0.9
Food Preparation	Low rinse showers	158	\$607	\$840	1.4
Leakage	Find and address leaks	945	\$2,646	\$8,400	3.2
Smart Metering	Main meter, 3 sub meters	850	\$2,193	\$10,800	4.9
Water Mang'mnt	Active monitoring and alerting	350	\$903	\$5,000	5.5
User Awareness/ Training	PR campaign, suport materials	200	\$537	\$5,200	9.7
Rainwater Harvesting	From Building 3 for use in amenities & hot water	4,263	\$10,353	\$183,000	17.7
Total		10,398	\$29,590	\$241,928	8.2
% Water Saved		58%			

- Implementation, cross-subsidisation, funding support

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Account for all costs + & -

- Water
- Wastewater
- Trade waste
- Safety
- Quality
- Productivity
- Energy
- Chemicals
- O&M

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Delivery Mechanisms

- But how to get it done?
 - Traditional: Audit-Specify-Contract-Implement
 - Larger users: EPC
- Beware the extra contractual costs!
- Why audit if you can't go forward from there?
- So why not some alternatives?
 - Easy wins
 - Leak insurance
 - Identify feasible options, attack them first

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Water Management

- Get the basics right first
 - Billing information available and monitored
- Gather the data you need
 - Smart metering of all main & key sub-meters
- Make the right people accountable
 - For consumption in high use areas
 - Senior management commitment
 - Contractors and sub-contractors as well as internal staff
- Measure and report on performance
 - KPIs relevant to site developed, measured and publicised

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Do it the right way!

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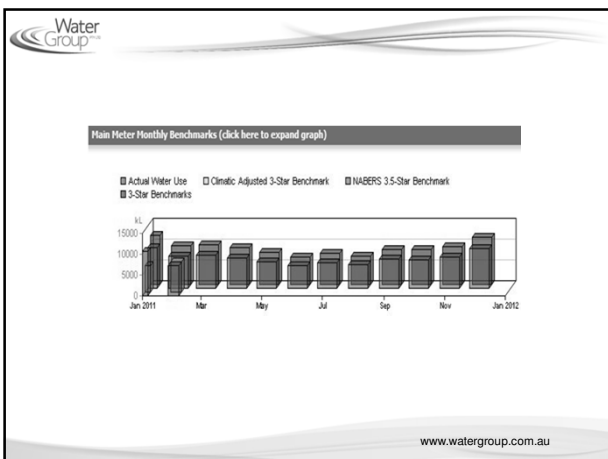
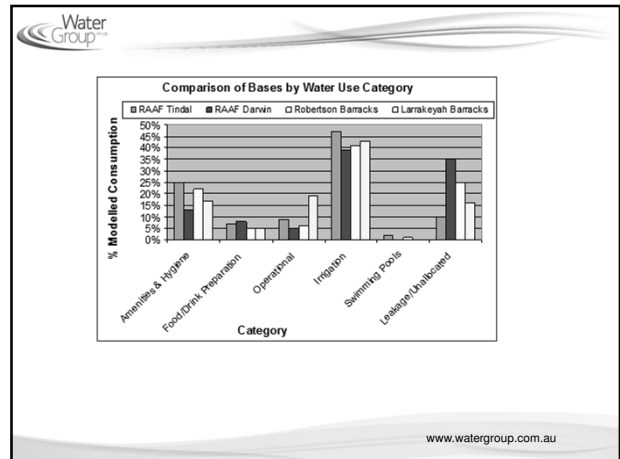
Not this way....

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Examples

Item	Description	Leak (L/min)	Projected Water Saving (kL/year)	Projected Cost Saving (\$/year)	Estimated Cost to Repair	Payback (yrs)
Bucking Bull Water Meter	Repair leak of 1 L/min	1	526	\$1,419	\$250	0.2
Gilhooley's Water Meter	Repair leak of 9 L/min, from Kitchen water and Amenities cold water	9	4,730	\$12,772	\$250	0.0
Hog's Breath Café Water Meter	Repair leak of 9.5 L/min	9.5	4,993	\$13,482	\$250	0.0
Piazza Cooling Tower Feed Water Meter	Cease baseflow of 6 L/min	6	3,154	\$8,515	\$400	0.0
SR4 Cooling Tower Feed Water Meter	Meter does not send pulses for Smart Metering		300	\$810	\$1,200	1.5
SRS Bleed Water Meter	Bleed Water Meter's display is broken		300	\$810	\$1,200	1.5
WEMP compliance Actions	Jamaica Blue Main Tap, Myer Toilets to Dual Flush, Pressure reduction at Café Metzo		300	\$810	\$2,000+	NA

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Possible Water Savings, Costings & Payback

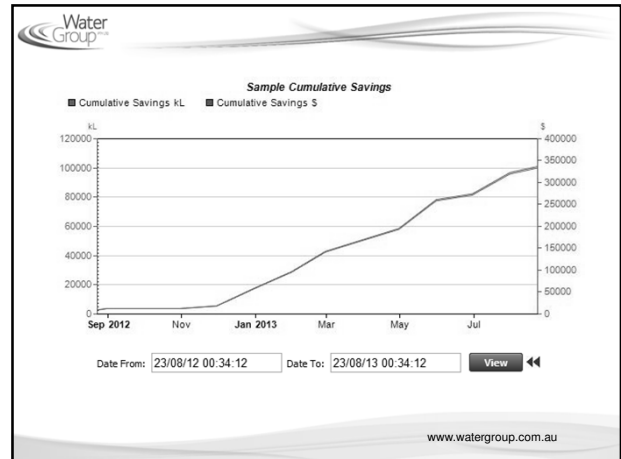
Project: RABT OVERALL

Item	Measure	Water Savings kL/yr	Total Savings \$/yr	Budget Cost	Payback (yrs)
Amenity Taps	Install flow restrictors to reduce flows	1,126	\$3,939	\$10,216	4.0
Showers (non Sports Centre)	Upgrade showerheads to water efficient proof models	12	\$53	\$2,261	42.4
Cafes	Install new signage, user awareness training	66	\$230	\$4,578	19.9
Staff Kitchens/ettes	Install flow restrictors to reduce flows	165	\$567	\$4,338	7.7
Sports Centre	Upgrade showerheads to water efficient proof models	706	\$2,778	\$12,936	4.7
Cooling Towers	Install sub metering to better manage operation of Bundoro West Cooling Towers, Remove Bundoro West Cooling Towers	1,903	\$6,145	\$10,715	1.7
Sub Metering	Install sub and smart metering at key locations at each campus (costs for smart metering included in overall management system proposed for site)	2,101	\$5,471	\$38,820	6.0
Water Management	On the basis of smart metering data, implement water management plan including DPI testing, identification of any unaccounted for water, etc.	999	\$3,148	\$30,710	9.8
User Awareness/ Training	Run user awareness program including signage and a Water Efficiency Day	780	\$2,387	\$13,320	5.6
Rainwater Harvesting - Building 011	Harvest rainwater from the roof of Brunsvik Campus Building 011 for use in toilet flushing	128	\$409	\$31,894	77.9

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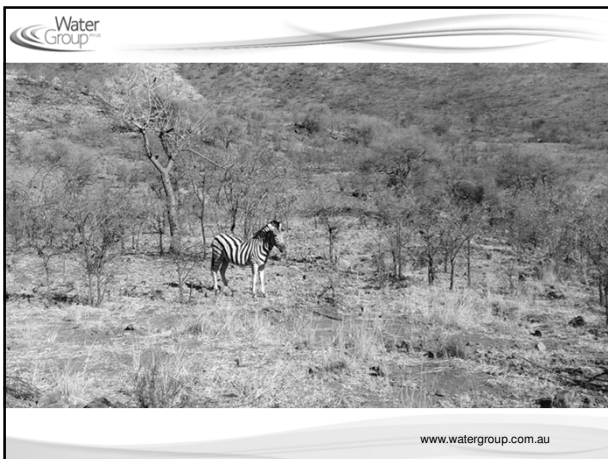
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Laboratories	Reuse reject water from water purification unit	105	\$458	\$17,500	38.2
Bundora East-West Pump	stormwater from Bundora East to Pumping Bundora West Lake to supply Cricket Field	5,077	\$35,470	\$198,262	5.6
TOTAL FOR TIER 1 MEASURES		13,221	\$62,960	\$384,263	6.2
Amenity Tap Upgrade	Upgrade square to new water efficient models (Bundora East: Building 231; Bundora West Building 201; Bundora West: Building 202; Bundora Ok: Building 514)	15	\$687	\$76,150	10.9
Toilets: Male	Upgrade toilet flushing systems to dual flush	5,414	\$16,500	\$143,024	8.5
Toilets: Female	Upgrade toilet flushing systems to dual flush	1,990	\$6,154	\$103,302	10.8
Waterless Urinals	Upgrade urinals to waterless units (Building 224)	22	-\$12	\$4,895	N/A
Building 203 Rainwater Harvesting	Install rainwater harvesting system to collect water from Building 203 and flush toilets in Building 201	911	\$2,530	\$65,059	25.7
Car Park Rainwater Harvesting	Install rainwater harvesting system to collect water from multi-level carpark roof use for irrigation	45	\$125	\$29,822	238.0
Irrigation System Upgrade	Expand use of harvested stormwater for irrigation in the Bundora West Campus. Upgrade control	1,575	\$7,375	\$270,371	37.5
Stormwater Harvesting: Cooling Towers	Harvest water from synthetic sports fields and use to supply cooling towers in Building 201				
Fire Water Recycling	Install FOW of storage in the Bundora West Campus. Recycle water from fire incidents for reuse				
TOTAL FOR TIER 2 MEASURES		15,231	\$47,693	\$1,094,927	
OVERALL TOTALS		28,462	\$109,752	\$1,479,490	

Contractually guaranteed savings



- ### Obstacles
- Too busy – energy is key focus
 - We're doing all we can
 - No money (maintenance budget vs. capital)
 - Does not pay
 - The “system”
 - Past sins

- ### Lessons
- Don't wait for the crisis – act now! It takes time!
 - Standards, rules, regulations can work well
 - Provide assistance but be clear why you are doing it and demand monitoring and access to data
 - Trial different options – but monitor them carefully
 - Think more holistically, think in systems
 - Trading off water efficiency vs. energy efficiency/savings
 - Using stormwater or recycled water is not necessarily “better”
 - Find a solution that fits the budget rather than the technology





Some good web sites

- www.savewater.com.au – Savewater Alliance
- www.smartwater.com.au – lots of case studies
- google Sydney Water “Every Drop Counts” program
- www.citywestwater.com.au – Best Practice Guidelines for Saving Water
- google .au KPI's for Commercial and Industrial Water Users
- www.watergroup.com.au

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Freebies

- sample specifications and work methodologies

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Leakage & Cost Calculator


Scenario 1		Scenario 2	
Enter Flowrate	4	Enter Flowrate	45000
Select Unit	kl/hr	Select Unit	kl/yr
Cost of Water	\$2.10 \$/kl	Cost of Water	\$3.42 \$/kl

Leakage / Water Use	Cost	Leakage / Water Use	Cost
1.1 L/s		1.6 L/s	
67 L/min		93 L/min	
4.0 kl/hr	\$8.40 \$/hr	5.6 kl/hr	\$19 \$/hr
96 kl/day	\$202 \$/day	134 kl/day	\$459 \$/day
672 kl/wk	\$1,411 \$/wk	940 kl/wk	\$3,214 \$/wk
2,920 kl/mth	\$6,132 \$/mth	4,083 kl/mth	\$13,965 \$/mth
8,760 kl/qtr	\$18,396 \$/qtr	12,250 kl/qtr	\$41,895 \$/qtr
35,040 kl/yr	\$73,584 \$/yr	49,000 kl/yr	\$167,580 \$/yr
35 ML/yr		49 ML/yr	

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Summary guenterhd@watergroup.com.au

- Cost effective savings everywhere!
- Large potential inside industrial/commercial users
- Industry has money – and it pays (1-2 yr payback)
- Start with end in mind! Taylor your approach

 thing
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