



*Improving Facility Sustainability –
Water & Waste Management*

Presenter: Tim Saxby

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Overview

- > Past Practices
- > Current Regulatory Environment
 - o Australia
 - o South East Queensland
- > Water Services Context in 2009
- > Maximising Water Efficiency
 - o Case Study
- > Improving Sustainability – Waste

Past Practices

- > Water efficiency
 - o Generally not regarded as priority
 - o 'Abundance' of resource
 - o No charges / costs for excess use
 - o Evidenced through type of fittings installed



Past Practices

- > Waste / Wastewater Management
 - Wastewater – not specifically considered
 - Released to sewer
 - No consideration given to possible reuse
 - Contaminated waste appropriately managed



Current Regulatory Environment



> Australia

- Best practice – min. 3-Star water efficient appliances
- Green Star Efficiency Assessment Tool – Water Efficiency
 - Green Star Council currently conducting Health Care Pilot
 - Sub-Metering on equipment
 - » Renal Dialysis units
 - » Autoclaves
 - Assessment of need for potable water
 - Green Star Assessment Tool internationally recognised & allows for comparison

Current Regulatory Environment



- > South East Queensland
 - o Min. 3-star water efficient fittings
 - o All businesses required to prepare Water Efficiency Management Plan (WEMP) – response to drought
 - o Must outline plan to achieve 25% water consumption reduction, or ‘best practice’



Current Regulatory Environment

> Wastewater / Trade Waste

- Most Councils have Trade Waste Policies
 - Fixed or variable charge (classification dependent)
 - Typically based on water consumption, with regular sampling

| Trade Waste Categories | Classification | Charge |
|------------------------|---|--|
| Category A | Minor Trader | \$70.25/qtr |
| Category B | >268kL/annum, Domestic strength | \$1.05/kL |
| Category C | >268kL/annum, Weaker than domestic strength | \$0.79/kL |
| Category D | Large Discharge, high strength | Assessed quality charged on: Flow - \$0.66/kL BOD - \$0.82/kg SS - \$0.63/kg TKN - \$1.35/kg TP - \$1.15/kg |

- Encourages wise water use, as it affects charges at both ends!

Water Services Context in 2009



- > By 2009, SEQ's Water Supply will be composed of:
 - o Surface Water
 - o Groundwater (North Stradbroke)
 - o Desalinated Water
 - o Water Supply Replenishment (Highly Treated Recycled Water)

- > Impacts:
 - o Composition of water supply could vary significantly throughout the year and between locations
 - Consistent product (in terms of meeting quality requirements) but with subtle differences in taste
 - o May be further pushes for gains in water efficiencies
 - o Likely to result in harsher trade waste regulations

Maximising Water Efficiency

- > Numerous opportunities exist for achieving a water efficient operation
 - o Existing Facilities
 - Retrofitting
 - Modifying work practices
 - Utilising alternate water sources
 - Education programs
 - o New Facilities
 - Incorporate water efficient appliances / fittings
 - For larger facilities – implement integrated water solutions



Case Study – QHSS

- > Queensland Health Scientific Services – Coopers Plains



Case Study – QHSS

- > Centralised analysis & research facility
- > 9 Multi-Level buildings,
 - o constructed from 1980's to present
- > Employment
 - o 2004/05 – 450 persons
 - o 2005/06 – 500 persons
 - o 2006/07 – 550 persons

(20%+ growth)



Case Study – QHSS

- > Potable Water Consumption
 - 2004/05 – 35.83 ML (~140kL/day)
 - 2005/06 – 40.27 ML (~155kL/day)
- > Unquantified wastewater generation rate (but would be in proportion to water consumption)
- > Onsite Trade Waste Treatment Plant: 60kL/day
- > Required to reduce consumption by 25% from 2004/05 to achieve QWC regulatory requirements



Case Study – QHSS

- > Installation of water efficient fittings to non-process water taps
 - o Aerated tap outlets
 - o Water efficient shower heads



Case Study – QHSS

- > Installation of Rainwater Tanks
 - o 4 No. tanks installed to capture rainwater
 - o Diversion of chiller condensate to tanks
- > Water captured currently used for:
 - o Evaporative Cooling System make-up water
 - o Onsite RO Plant Feedwater
 - o Investigating other uses
 - Toilet Flushing
 - Non-potable use



Case Study – QHSS

- > Evaporative Cooling System – Make-Up Water

| | 2005/06 | | 2006/07 | |
|------------------------|----------------------|-------------|----------------------|-------------|
| | Water Use (ML/annum) | % of Total | Water Use (ML/annum) | % of Total |
| Potable | 6.14 | 27% | 0.195 | 2% |
| Condensate / Rainwater | 16.413 | 73% | 9.01 | 98% |
| TOTAL | 22.553 | 100% | 9.205 | 100% |

- > Significant variation in water consumption due to climatic conditions
- > Can reduce potable water demand significantly through use of onsite water tanks

Case Study – QHSS

- > Modification to Autoclave Control System
 - Previous water consumption: 1,300 L/cycle (6.5kL/day) per unit
 - 10.14ML/annum (six units)
 - New system: 70 L/cycle (0.35kL/day) per unit
 - 0.637ML/annum
 - Reduction in consumption of over 93%



Case Study – QHSS

- > Long Term Experiments
 - Present use of potable water for cooling of flue gases on experiments
 - Proposed modification: substitute with recirculated chilled water
 - Current water consumption: 1.2kL / test (0.874 ML/annum)
 - Expected Savings: 0.874 ML/annum



Case Study – QHSS

- > Equipment Washers
 - Commercial Units Installed (Miele)
 - 10 No. on site
 - Already classified as ‘water efficient’ appliances
 - Machine selection can be important!



Case Study – QHSS

- > New Facility – Queensland Bone Bank
 - o Efficient appliances incorporated as part of construction
 - o Demonstrates best practice in new buildings



Case Study – QHSS

- > Expected water consumption
 - o 2006/07 – 31.4 ML (12.5% reduction from 2004/05)
 - o 2007/08 – 22.1 ML (38% reduction from 2004/05)
- > Savings to date achieved whilst increasing employment and productivity
- > Savings achieved through initiative of facilities management team and support of facility director
- > Water efficiency can be achieved, but there is a cost!



Improving Sustainability – Waste

- > Quantity of Wastewater Released
 - Water efficiency reduces wastewater volumes
 - Implementation of water efficiency actions are key!

- > Reuse opportunities
 - Onsite Recycled Water Plant (Sewer Mining)
 - Limited number of possible uses within health facility
 - Require Class A+ for flushing toilets
 - Lower class for irrigation / site beautification
 - Plant high capital, high operating costs for minimal benefit, can represent compliance risk

- > SEQ: State Government opted for larger scale water recycling



Improving Sustainability – Waste

Water Efficiency Issues

- > Trade Waste
 - Lower water use results in more concentrated trade waste
 - Could result in change in trade waste classification for facility
 - May require additional onsite treatment

- > Expected that trade waste controls will become more stringent in the near future



Improving Sustainability – Waste

- > Opportunities to improve sustainability
 - Segregation of waste products at source
 - Incorporate separate plumbing systems for specific areas
 - Easier to treat higher concentration waste streams
 - Good management procedures
 - Materials handling and disposal
 - Staff Education Programs
 - Internal compliance auditing
 - Consider facility lifespan, and design for possible alternative uses for specific areas



Summary

- > Water Efficiency required to be implemented
- > Opportunities available for both new and existing facilities
 - o Good design
 - o Retrofitting of existing facilities
- > Improving water efficiency can impact on trade waste
- > Opportunities for making collective representations to relevant government authorities



Discussion



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