Municipal Wastewater

PROJECT OVERVIEW
Sydney Olympic Park Authority (SOPA) has developed an integrated water cycle strategy and concepts aimed at water conservation, pollution reduction and implementation of large scale urban water reclamation based on beneficial reuse of stormwater and wastewater resources. A whole-of-catchment approach has been built into the design of the Sydney Olympic Park’s infrastructure and links management of potable water, recycled water, rainwater, irrigation water, building design, landscape plantings and aquatic habitats.

The SOPA’s Water Reclamation and Management Scheme (WRAMS) commenced operation in July 2000 and was Australia’s first large-scale urban water reclamation scheme. WRAMS recycles water from sewage and stormwater to supply high quality recycled water for many applications including irrigation, ornamental fountain, clothes washing, and toilet flushing across SOP and in the suburb of Newington. Office buildings, sporting and entertainment venues and Newington residences are all connected to this recycled water, which is supplied to customers through separate pipe network and water meters.

WRAMS saves more than 850 million litres of potable water annually by avoiding its use for non-drinking purposes. In addition, the sewer-mining function of WRAMS treats approximately 550 million litres of sewage each year, which would otherwise be discharged to ocean outfalls.

UGL was awarded the contract to design, construct, and to operate the WRAMS to serve the Olympic precinct and adjacent 2,000 dwelling residential suburb of Newington in Western Sydney. The contract also included a 25 year long term operations and maintenance agreement.

THE CHALLENGE
As a part of the construction of a world renown sporting hub, SOPA also wanted to showcase during the 2000 Sydney Olympic Games, a leading integrated approach to urban water management.

The challenge for SOPA was to develop a large scale integrated urban water system scheme incorporating:

- Collection and treatment of sewage
- Collection, treatment and storage of stormwater

“Water Reclamation and Management Scheme (WRAMS) at SOP is the showcase of integrated urban water recycling projects on an international scale. The unparalleled success of WRAMS over the last 13 years relies on incomparable performance and expertise of UGL particularly in the areas of process and plant management.”

—DR ANDRZEJ LISTOWSKI, MANAGER, WATER & ENERGY, SYDNEY OLYMPIC PARK AUTHORITY
• Supply of recycled water for non-drinking uses to all residents, commercial premises and sporting venues
• Capability of servicing a population of approximately 20,000 people

THE SOLUTION
UGL implemented the unique water recycling concept at Olympic site through two contracts. The first was to design, construct and commission the entire Water Reclamation and Management Scheme (WRAMS). The second was the on-going operations and maintenance of the entire Scheme for 25 years. This involves continual supply of recycled water to all customers in accordance with the water quality requirements set by the NSW Health and EPA guidelines.

Design, construction and commissioning of WRAMS
The design and construction contract consisted of the:
• Design and construction of a sewage mining pump station
• Design and construction of a 2.1MLD sewage treatment plant complete with Ultra Violet disinfection system
• Design and construction of a 7.5MLD Microfiltration/Reverse Osmosis water treatment plant
• Design and construction of a stormwater harvesting and storage system

Operations and maintenance of the entire scheme for 25 years
After the delivery of the scheme, UGL’s whole-of-life approach was employed for WRAMS assets with the aim of maximising efficiency, optimising performance and sustaining reliability through a rigorous preventative maintenance program.

A comprehensive solution for water reclamation and management
UGL was able to deliver a solution highly suitable for new urban developments and instrumental in resolving and sustainably managing many of the stresses on urban water infrastructure. The benefit of the integrated water management at Sydney Olympic Park includes:
• A saving of approximately 850 million litres of drinking water each year by reducing drinking water consumption at Sydney Olympic Park and Newington by around 50%
• Treats and re-uses almost 100% sewage contributing to reduction in the discharge of sewage effluent to waterways and the ocean from the area
• Contributes to developing greater public confidence in using recycled water
• Develops understanding of sustainable whole-of-catchment urban water management strategies

KEY OUTCOMES AND BENEFITS
WRAMS successfully demonstrates that large-scale urban water recycling systems are feasible, safe, reliable and beneficial for the community and the environment.

Through every stage of the project lifecycle, UGL collaborated with SOPA to create an optimal solution that considers the right balance between capital expenditure, lifecycle and operational costs, service delivery and efficiency.

UGL’s whole-of-life offering to wastewater treatment plants aimed to enhance SOPA’s return on investment by minimising operational and maintenance costs without compromising compliance standards or the capital investment.

Key outcomes included:
• The alignment of the design and construction solution with the environmental management plan helped reach environmental compatibility
• During the design phase, UGL’s integrated approach considered the evaluation of the plant equipment on a whole of life cost basis rather than just on upfront capital cost
• A sophisticated water cycle model was developed that encompassed hydraulics, water quality, production and cost which enabled the accurate understanding of plant performance in a wide variety of scenarios
• An architect design of the first Water Treatment Plant building in New South Wales which is aesthetically pleasing and applied functional innovation to many aspects of plant design
• By taking full operational responsibility, sharing our knowledge and working collaboratively with SOPA, UGL continually deliver optimal availability and reliability, process integrity, increased safety and sustainability, and reduced lifecycle cost and risk
• UGL completed the project in an environmentally sensitive area without any impact, protecting the green and golden bell frog, an endangered species that inhabits the area
• The site is designed as one of the first water reclamation systems in Australia to achieve high water quality that is comparable with potable water standards
• A totally enclosed wastewater treatment plant achieved effective odour control
• An operations manual was developed as a computer-based interactive system