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EXPERTISE & CAPABILITY FOR PUBLIC TOILETS

Environmental Management has developed a strong expertise in the design of on-site wastewater management systems for difficult and environmentally sensitive sites. As such, our standards are very high and we never compromise on the environment.

We are also known for our innovative approaches to wastewater design, and the fact we incorporate environmental, social and economic expertise in on-site wastewater design and management.

Please refer to Table 1 for a selection of past projects undertaken by Environmental Management in the area of public toilets.

With each design project or management strategy, our approach is to:

- *Investigate the site* to ascertain constraints such as soil type, soil chemistry, permeability, available area, distance to nearest watercourses, depth to groundwater and environmental sensitivity of the site and surrounding areas.
- *Investigate and study options and systems applicable for the project.* We generally consider a range of sustainable, low-maintenance alternatives, including composting toilets, micro-flush toilets and evapotranspiration-assisted trenches. We also consider how best to reduce vandalism.
- *Assess the available options.* We use a range of evaluation criteria, including lifecycle cost analysis, environmental analysis and for larger jobs, a social analysis to identify the most suitable option (which may not necessarily be the cheapest option).
- *Liaise with all relevant authorities* regarding the proposed on-site system: local councils, utilities, Department of Health, EPA.
- *Develop options* suitable to the needs of our client and expected usage volumes, as well as the environmental and locational constraints. As part of this, we try to build in flexibility to allow for changes in circumstances, such as increased usage.
- *Develop Environmental Plans of Management* including maintenance plans and contracts designed to ensure the sustainable operation of the system and performance to the design expectations.

To give you an idea of some of the problems we have dealt with in the process of designing public toilet systems, please refer to Table 2.

TABLE 1 ENVIRONMENTAL MANAGEMENT PROJECT HISTORY - PUBLIC TOILETS

DATE	CONTRACT NAME & LOCATION	CONTRACT SCOPE	CLIENT / PRINCIPAL
2003	Gosling Creek Reserve Public Toilets	Design of wastewater treatment system for land application, and Environmental Management Plan for whole system.	Nigel Hobden, Orange City Council
2002	Lake Canobolas Public Toilets	Design of wastewater treatment system for land application, and Environmental Management Plan for whole system.	Nigel Hobden, Orange City Council
2001	Eastlake Golf Club, Sydney	Design of on-site wastewater treatment in high water table area adjacent to the Botany Wetlands. Objective of the treatment system is to prevent any percolation of wastewater to the groundwater system.	Eastlake Golf Club
2001 - 2002 (current)	Myall Lakes National Park, Banksia Green Camping Area	Design of on-site wastewater treatment system for proposed hybrid toilet installation with safety features to reduce the environmental risk of failure to almost zero. REF and EMP for the proposed toilet. Monitoring performance	Jamie Maslen, NPWS Hunter District
2000 - 2001	Myall Lakes Toilet Strategy	Investigate all possible toilet options for 19 sites at Myall Lakes National Park and develop assessment system using appropriate environmental, social and economic criteria. Important criteria used include risk of each toilet type to receiving environment and impact on Recreational Opportunity Spectrum.	Jamie Maslen, NPWS, Hunter District
2000	Warrumbungle National Park	Options study for treating wastewater generated at the Camp Blackman amenity block, then detailed design of chosen option.	NPWS, Coonabarabran
1999 - 2002	Kiritimati (Christmas) Island Water Supply and Sanitation Project, Republic of Kiribati	Development of greywater and compost toilet strategies for Kiritimati (Christmas Island), Republic of Kiribati	Peter Williams Overseas Projects Corporation, Victoria
1999 - 2001	Christian Camp, South Maroota	Wastewater treatment system design and Environmental Management Plan for high-volume, short-stay camping area in an environmentally sensitive area adjoining National Park in the Cattai Creek catchment	Trevor Garlick
1998	Cape Byron Headland Reserve	Design of composting toilet system for public use.	Sean Court Cape Byron Headland
1996	Long Neck Lagoon	Design of on-site wastewater treatment system for education fitness camp	Colin Martin Environment Equipment
1990	Govetts Leap Lookout, Blue Mountains National Park	Design and supply of 4 compost toilets for public use	Gregor Manson NSW National Parks & Wildlife Service
1990	Kaleerwe-Kavule Area, Uganda	Strategy and Action Plan for improving sanitation of a flood-prone slum area in Kampala, Uganda	Canon Job Mukerere Church of Uganda

TABLE 2 ENVIRONMENTAL MANAGEMENT SELECTED PROJECT SOLUTIONS

CONTRACT NAME & LOCATION	CONTRACT SCOPE	PROBLEM AND CONSTRAINTS	SOLUTION
Lake Canobolas Public Toilets	Prepare design and Environmental Plan of Management	Toilet close to a watercourse and treated effluent must not be allowed to pollute.	Used company-developed evapotranspiration-assisted trenches that are designed to guarantee zero pollution
Eastlake Golf Club, Sydney	Prepare design	Site overlaid shallow groundwater in porous sandy soil	Used company-developed evapotranspiration-assisted trenches that are designed to guarantee zero pollution
Myall Lakes National Park, Banksia Green Camping Area	Prepare design	Site on very porous soil, and Park needed guarantee that there would be zero pollution	Used company-developed evapotranspiration-assisted trenches that are designed to guarantee zero pollution
Myall Lakes Toilet Strategy	Investigate toilet options for 19 sites in National Park and produce options report. Once preferred options have been decided on, detailed report to be produced.	The sensitive nature of Myall Lakes, and the recent algal bloom on the lake, have meant that great concern is attached to the input of toilets and greywater into the lake.	Our study has looked at all toilet types approved in NSW. We have also assessed every site and categorised them according to access, distance from lake and if affected by flooding. This enabled a risk assessment to be made of every toilet type at individual sites.
Warrumbungle National Park	Options study for treating wastewater generated at the Camp Blackman amenity block. To be followed by a detailed design of the chosen option	The existing wastewater system consists of a septic tank taking combined wastewater flows (from showers and toilets). From the septic tank wastewater is pumped to effluent treatment ponds 1.2km away. The ponds are unlined and are leaking to the groundwater system. The camp area experiences very high peak loads (700+ people) during Easter, but has a constant no. of visitors the rest of the year. The amenities block is an architecturally significant building which cannot be altered.	The preferred toilet option at each site was chosen according to degree of risk, effect on ROS, visual impact, capital costs and maintenance costs. Options considered were replacement with composting toilets, and increased treatment of the greywater by reed beds or trenches. CT's do not suit the building due to structural changes required. It was not feasible to install an alternative wastewater treatment system (ie trenches) to meet the peak loads experienced over Easter. The best solution is to implement a water-demand strategy. Then, separating the wastewater and pretreating blackwater prior to pumping to the ponds. Our investigations showed that the leakage from the ponds is slow enough for the water to be well treated before it reaches the groundwater. By improving the quality of the water going to the ponds, this enhances the water quality leaving the ponds.

<p>Kiritimati (Christmas) Island Water Supply and Sanitation Project, Republic of Kiribati</p>	<p>Development of greywater and compost toilet strategies for Kiritimati (Christmas Island), Republic of Kiribati</p>	<p>Kiritimati is a coral atoll located in the Pacific. The water supply is from groundwater which is a lens not far below ground level. Many parts of the islands do not have adequate sanitation, and as a result the groundwater supply is being contaminated, and people are getting sick. Vandalism is a problem with toilets on the island, as is low maintenance by locals and high usage of toilets. The constraints are cultural, environmental, remoteness, and high groundwater.</p>	<p>We developed a number of designs for a composting toilet that is easy to construct and maintain. Developed construction and maintenance manuals so the locals can continue to use the composting toilets and develop more as needed. Prepared community-awareness strategy and education campaigns on the use and maintenance of the composting toilet. Develop greywater-treatment systems, using septic tanks and lined trenches, to treat greywater before it reached the groundwater.</p>
<p>Christian Camp, South Maroota</p>	<p>Wastewater treatment system design for high-volume, short-stay camping area in an environmentally sensitive area adjoining National Park in the Cattai Creek catchment</p>	<p>The site will experience two 4-day camps in January when there will be approx 500 visitors. As the site is within a sensitive catchment, and there are nearby neighbouring properties concerned about the volumes of wastewater produced, EIM needed to develop an innovative solution.</p>	<p>The chosen solution was to provide amenities blocks which are flush toilets and showers. The combined wastewater will pass through small septic tanks at each amenity block, then stored in large wastewater storage tanks. This wastewater is then pumped to a subsurface irrigation system which irrigates lemon trees over the next couple of months. An Environmental Management Plan was also developed for the site.</p>
<p>Byron Bay Headland Options Study</p>	<p>Prepare options report, recommending preferred option, for Byron Bay Headland toilet block.</p>	<p>Site receives very high usage, restricted amount of land available for land-application. Heritage issues.</p>	<p>Investigated wastewater options according to environmental, social (including heritage) and financial criteria to arrive at preferred option. Maintenance issues were of great importance in this study.</p>



ENVIRONMENTAL MANAGEMENT - KEY PERSONNEL

DR TERRY LUSTIG, *DIRECTOR*

BSc, BE (Civil) (Hons 1), MEngSc (Water Engineering), PhD (Ecological Economics), FIEAust

Dr Terry Lustig was a member of the Standards Committees for the new Australian/New Zealand Standard AS/NZS1547 for On-Site Wastewater Management, Septic Tanks (AS/NZS1546.1), Waterless Composting Toilets (AS/NZS1546.2) and Aerated Wastewater Systems (AS/NZS1546.3). He is also a member of the Technical Advisory Panel for the Septic Safe Program of the Department of Local Government.

Terry has been instrumental in the design of new composting toilets for the Kiritimati Island Water and Sanitation Project in the Republic of Kiribati. With his experience in evaluation of the life cycle, social and ecological aspects of a variety of projects, as well as over 10 years experience in designing on-site wastewater systems, he is well qualified to develop the most appropriate strategy for any on-site sewerage system.

FIRAS NAJI, *SENIOR ENVIRONMENTAL ENGINEER*

MES (Env Eng) MIE Aust CPEng

Firas is the director of Aquaconsult and has 17 years experience in floodplain management, natural resource management and total watercycle management. Nowadays, he specialises in developing sustainable total watercycle management systems, and rehabilitating degraded waterways.

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