

# Responding to the Changing Training Needs of On-site Wastewater Management Professionals

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# RESPONDING TO THE CHANGING TRAINING NEEDS OF ON-SITE WASTEWATER MANAGEMENT PROFESSIONALS

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## Abstract

In recent years, there have been significant changes in the local, state and national regulations affecting on-site wastewater management in Australia. At the same time, major advances in the scientific, engineering, public health and management aspects of on-site wastewater management have occurred. An increasing range of professions are involved in on-site wastewater systems; amongst them planners, surveyors, engineers, catchment managers, geoscientists, environmental consultants and environmental health officers. In responding to the increasing and changing demand for training in this area, the Centre for Environmental Training has established itself as the leading provider of on-site wastewater management training in Australia.

*Careful needs analysis, on-going revision and updating have ensured that the programs offered have developed to provide training in the appropriate skills for a range of participants from varied backgrounds. Key elements of the programs have been the practical laboratory and field workshops which impart the requisite skills for participants from specific disciplinary backgrounds to play an effective part in what has become a multidisciplinary industry. Amongst the skills imparted are those of site assessment, soil analysis, catchment management, wastewater characterisation, system selection, system sizing, system performance assessment and environmental health impact evaluation.*

This paper reviews the recent trends in training and the background of trainees, and identifies possible future directions.

## Keywords

AS/NZS 1547, catchment management, environmental training, on-site wastewater management, regulatory guidelines, site assessment, soil analysis, training curriculum,

## 1 Changes in Legislation

Over the past few years there have been significant changes in the legislation affecting the management of on-site wastewater systems. In September 1994, AS 1547-1994 *Disposal Systems for Effluent from Domestic Premises* (Standards Australia, 1994) was revised and since then there have been amended legislation and revised codes of practice introduced in many States. In October 1997, the NSW Environment Protection Authority released its findings into the Coastal Zone Sewage Management Inquiry (EPA, 1997) which found that an “effective whole-of-government co-ordination and leadership is essential to long term strategies for management of sewage in the coastal zone”.

In April 1998, the NSW Government *Environment & Health Protection Guidelines On-site Sewage Management for Single Households* (DLG, 1998) was released and the publication of AS/NZS 1547 *Domestic On-site Wastewater Management* (Standards Australia / Standards New Zealand, 1999) is imminent. Both of these latter two documents follow the current trend away from a prescriptive approach and towards a performance-based approach for on-site wastewater management. In April 1999, NSW Health Department released its “Greywater Reuse in Sewered Single Domestic Premises” for public comment (NSW Health, 1999).

## **2 Advances in On-site Wastewater Management**

Over the same period there have been significant advances in the scientific, engineering, public health and management approaches to on-site wastewater systems.

Little sound scientific data on the performance of on-site systems existed and concern over the poor performance and failure of systems has resulted in the publication of an increasing number of studies which more clearly define various aspects of on-site systems. These studies have, in many cases, argued strongly for a performance-based approach to replace the prescriptive approach currently applied to site assessment and system sizing. A major shift in emphasis has been away from the previously widely used percolation test for the determination of long term absorption rates (LTAR) in disposal areas to the assigning of loading rates based on determination of soil textural analysis.

Engineering and technological advances have significantly improved the performance of on-site systems, many improvements based upon requirements for quality assurance and certification of performance. New technologies in the areas of tank filters, aerobic systems, composting toilets, wetland systems and nutrient removal have been introduced as legislative changes have made it possible to try innovative and alternative approaches.

*The public health and environmental health implications of on-site systems have been brought to the fore with concerns over the possible contribution of on-site systems to elevated nutrient loadings and algal blooms. The 1996 outbreak of hepatitis in Wallis Lake, NSW has resulted in close scrutiny of poorly performing on-site systems as a potential source of microbiological contamination. In recent years, with the advent of the use of molecular probes and advances in public health, our understanding of the health risks associated with on-site disposal has improved markedly. We are now in a better position to understand the microbiology of disease and wastewater treatment at a level never, until recently, thought possible. Of major importance is the occurrence of parasitic and pathogenic organisms (eg Cryptosporidium, and Giardia) contaminating potable water supplies which can be attributed to the cumulative effect of failing on-site treatment systems and sewage overflows from high rainfall incidents (Atherholdt et al, 1998). Our understanding of the viability of microbes outside their natural hosts and their resistance to disinfection processes are two areas of major advance.*

Significant attempts have been made by regulators to improve aspects of the management of on-site systems. These have ranged from public and householder education initiatives, such as those of ACTEW and the Hawkesbury-Nepean Catchment Management Trust to individual Councils which have implemented improved recording of regular service reporting on aerated systems and others who have prepared Development Control Plans (Shoalhaven City Council, 1998) for on-site wastewater management. Elsewhere, Councils are putting in place studies to provide better quality strategic planning for rural residential land releases. In some regions, State Government agencies are training their staff to better equip them to fulfil their regulatory role (Centre for Environmental Training, 1998). Commonly, management approaches change as a result of regulatory changes brought about in response to technical advances or to environmental or public health problems. This reactive pattern in the rapidly evolving on-site wastewater management environment means that legislation continually battles to keep pace with changes in expectations.

## **3 Range of Professionals Involved in On-site Wastewater Management**

As the discipline of on-site wastewater management has matured and expanded, so the range of professionals involved in aspects of on-site wastewater management has broadened. The range of professionals spans planners, surveyors, catchment managers, State Government regulators, Council officers in environmental health and building surveying, soil scientists, environmental, geotechnical and engineering consultants, systems designers, manufacturers, installers, plumbers and drainers, and service technicians along with third party inspectors and systems auditors working on behalf of Councils.

These professionals bring with them different levels of prior experience, some from a trades background, some from a technical background, some with graduate qualifications and others with little formal education but often a lifetime of experience. This wide ranging group of professionals is expected to work in an environment of increasing technical and regulatory complexity, where often great demands are placed on their professional judgement. In many cases, their training did not equip them fully for the wide range of tasks expected of them. In some cases their training only covered a limited number of the required skills, while in others their training was broad but on-site wastewater related work was only a small part. Frequently, they find themselves having to interact professionally with others from amongst the list, as their work becomes increasingly interdisciplinary. It is common that those charged with the responsibility for aspects of on-site wastewater management possess a less than comprehensive range of skills in the subject and would benefit from further training.

## **4 Responding to the Changing Training Needs**

The On-site Wastewater Management Training Program, as developed over the past five years, caters for the ever changing and ever growing training needs of the wide range of on-site wastewater professionals. The first courses were of one day duration gradually expanding through one and a half days to two days, three days and now in total four days (two two-day sessions). To date the courses have catered for in excess of 700 participants.

Courses have been offered at various venues throughout NSW and Queensland including Newcastle, Windsor, Orange, Nowra, Coffs Harbour, Wollongong and Cleveland and repeated on several occasions at some of these locations.

Various versions of the course have catered for the needs of participants from specific backgrounds, eg Environmental Health Officers, Wastewater Technicians, State Government Regulators and Surveyors. Others courses catered for those specifically involved in Phosphorus Reduction Programs, the management of coastal lake and estuarine catchments, the evaluation of rural residential planning applications, and for regional groups who have sought emphasis on local problems.

The demography of the course participants has changed from the earlier courses that were attended mainly by Local Government Health Inspectors who had extensive hands-on experience with little formal training in on-site systems management. Recently, the trend has been for participants to have tertiary qualifications with low practical skills and only cursory academic training in the field of on-site wastewater management, if at any at all. More importantly, plumbers and technicians who are developing business enterprises in holistic wastewater management and other trades persons setting up for maintenance, and inspection contractors are now attending the course in greater numbers.

Surveyors have been conspicuous on the courses, and these professionals, often involved in rural residential development, are seeing the requirements and benefits of implementing sound on-site wastewater management strategies at this basic land development stage.

The course has increasingly encompassed hands-on practical training with laboratory, field and workshop based exercises designed to impart the skills required of proficient on-site wastewater professionals. New technology, the results of recent research, overseas technologies, new management approaches and legislative changes have been incorporated in successive revisions of the course. Participant evaluations and feedback have been particularly valuable in refining the course content and have been combined with extensive and comprehensive training needs analyses undertaken for the target audience. The course has been refined and developed in consultation with the appropriate regulatory agencies and has been developed to fulfil the training needs they identify in the target audience.

Skills imparted during the course include physical, chemical and bacteriological wastewater characterisation by laboratory and field testing, basic soil assessment, site evaluation, system selection, design and sizing. Along with improved scientific literacy and interdisciplinary interaction, each participant completes several

individual and small group exercises. These exercises provide participants with the ability to critically review the literature, the regulations and their own practice, giving them confidence to make well informed judgements from first principles. The course sets out to impart understanding of on-site systems which enables participants to design, construct, maintain and oversee systems based on system performance rather than a cookbook approach.

A field-based design exercise affords participants the opportunity to reinforce the practical skills they have learned by assessing a site for an on-site wastewater management system, selecting an appropriate system and determining system size. This exercise calls on the full range of skills and often for the first time, introduces course participants to aspect of on-site wastewater management not regularly encountered in their day to day work.

A further recent development has been the introduction of the two-part program with two, two-day components separated by a period of two to three months. Basic concepts are covered in the first part of the program, along with the practical skills required to complete the field design exercise. Before attending the second part of the program, participants are required to keep a logbook of site assessments they have undertaken and this becomes the basis of a short participant presentation in the second part of the program. This work, subject to both peer and expert review, helps to generate both participant interaction and discussion, together with a substantial component of information exchange as participants are exposed to the day to day problems encountered by their peers operating in other districts. The second part of the program also includes sessions on more advanced concepts and extensive coverage of planning and management aspects of on-site wastewater management systems.

A comprehensive set of notes (Centre for Environmental Training, 1999), exceeding 500 A4 pages and covering all aspects of on-site wastewater management, accompanies the course.

The benefits of the two stage program have been that, through the requirement for individual presentation, participants have exchanged valuable first-hand experience with their colleagues, as well as examining their own roles within the overall management of on-site systems. A difficulty with the program has been the balancing of practical and theoretical components across the first and second parts. The first part essentially covers those skills participants need to take back to the work place, while the second part covers more advanced and more theoretical aspects of planning and on-site options, and less hands-on exercises. Even with the two part course, there is a problem covering the extensive range of scientific, technical, regulatory and practical skills of on-site wastewater management. While feedback from the participants has been positive, the range of prior experiences will always require individual course variations to meet course objectives.

Currently a certificate, which identifies the course components in detail, is issued to successful participants on completion. Attendance at this course and possession of the certificate is required by some local authorities for approval to operate in on-site related work in their areas.

The On-site Wastewater Management Training Program is currently being updated to incorporate the training requirements of AS/NZS 1547 *Domestic On-site Wastewater Management* and will be offered throughout Australia and New Zealand once the new Standard is released. This revised program will address competencies with clearly defined learning outcomes and assessment criteria. Currently the Centre for Environmental Training is seeking Registered Training Organisation status and it is intended that the On-site Wastewater Management Training Program will become formally accredited.

## **5 Conclusion**

The On-site Wastewater Management Training Program formalises professional training for on-site wastewater practitioners and offers an important measure of quality assurance for the industry, local government and the general public.

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