

NSW ON-SITE SEWAGE MANAGEMENT REFORMS - SEPTIC SAFE - A PROGRESS REPORT

Robert Irvine and Penelope Hood
Department of Local Government. Sydney

Abstract

In March 1998, the NSW Minister for Local Government announced a package of local government regulatory reforms to enable more effective council regulation of decentralised sewage management activity. Performance objectives were specified and landowners responsible for a system of sewage management were required to register details with the council and comply with council operating requirements. Environment and health protection guidelines for decentralised sewage management were issued with input from state agencies responsible for natural resource management, pollution control, public health and land-use planning. The guidelines are intended to assist councils implement the new regulations and to develop new management systems to more effectively monitor decentralised sewage management activity, to provide appropriate levels of operator support and to manage cumulative sewage pollution risks in a more systematic way.

The Department of Local Government administers the *Septic Safe* Program, a NSW Government initiative to raise community awareness about the need for responsible management of septic systems and to provide financial assistance to local councils for strategic supervision of decentralised sewage management activity. This paper describes the NSW decentralised sewage management reforms and discusses progress with and preliminary outcomes of the *Septic Safe* Program.

Keywords

community, wastewater, wastewater management, decentralised, sewage management, septic systems, sewage pollution, water quality

1 Introduction

Septic Safe is a statewide initiative to assist local councils, communities and industry to improve health and environmental outcomes associated with decentralised sewage management. It is administered by the Department of Local Government, supported by NSW Health, Department of Land and Water Conservation and Environment Protection Authority.

In 1998 the New South Wales Government introduced new regulatory requirements for the installation and operation of about 300 000 small sewage management facilities supervised by local councils rather than the EPA. These include household septic systems and other small sewage facilities serving less than 2 500 people that do not discharge effluent directly to water (e.g. tourist accommodation, caravan parks, roadside service stations, small communities). Regulations specify performance objectives to protect public health, the environment and community amenity, and new accountability requirements for landowners and councils. Councils are required to regulate the installation and operation of small sewage management facilities in a systematic way and to manage the cumulative impact of effluent in accordance with the principles of ecologically sustainable development. Councils are required to draft and adopt a decentralised sewage management strategy for their area and to report outcomes in their state of the environment report each year. Landowners are required to operate their septic systems safely, to provide reports and pay fees when reasonably required to do so.

After considering the Wallis Lake Task Force report, the NSW Government funded measures to improve food safety in the NSW oyster industry. Up to \$3.8 million was allocated to assist councils assess on-site sewage management arrangements and implement practical strategies to minimise sewage pollution risks. The Department of Local Government is proceeding with a two-stage implementation plan developed in consultation with councils and with the Department of Health, Environment Protection Authority, Department of Land and Water Conservation and the Treasury.

Stage I of the *SepticOSafe* Program (\$2.6 million) included a community education component (\$100 000), a small research and development grants program (\$410 000), and a statewide council grants program (\$2.1 million) that provided financial assistance to register existing septic systems and develop a basic sewage management strategy.

Stage II of the *SepticOSafe* Program (\$1.2 million) involves a systematic risk assessment of on-site sewage pollution in selected NSW coastal catchments. The On-site Sewage Risk Assessment System (OSRAS) developed for the Department of Local Government by Brown and Root (Brisbane) was recently published on the *SepticOSafe* web site. Three regional projects are proposed, covering south coast, mid-coast and north coast areas. These will be centrally directed and state agencies, councils and consultants will undertake specific tasks.

2 *SepticOSafe* Information and Products

Stakeholder communication and education is a basic element of *SepticOSafe*. Generic communication and education resources were developed to facilitate better understanding of the need for sustainable sewage management. Copies of *SepticOSafe* publications are available from the *SepticOSafe* website: <http://dlg.nsw.gov.au>

OSM Guidelines and Technical Sheets

NSW Health, Environment Protection Authority, Department of Land and Water Conservation and Department of Local Government prepared the document *Environment and Health Protection Guidelines: On-site Sewage Management for Single Households* (DLG et al, 1998). This is to assist councils develop sustainable sewage management strategies and development control plans, and implement subdivision and other regulatory controls for decentralised sewage management. The On-site Sewage Management Guidelines discuss a performance objectives approach to on-site waste treatment issues in subdivision planning and site assessment, the selection and management of waste treatment systems and ecologically sustainable reuse of effluent and treated bio-solids.

OSM Technical Sheets containing information and technical advice on design, installation and operation of small and decentralised sewage management facilities specifically for the environmental conditions of New South Wales are being developed in response to requests from councils and other interested stakeholders. Technical Sheets will compliment the OSM Guidelines and allow specific issues to be addressed.

Technical sheets covering the following subjects are planned:

On-site Sewage Management Technical Sheet

Evapotranspiration Bed Designs for Inland Areas

Consideration of 'soil salinity' when assessing land application of effluent

Consideration of 'soil sodicity' when assessing land application of effluent

Low technology Sand Filtration System

Greywater re-use

Wetlands (FWS, sub-surface, vertical flow - Inc design for safety; management & maintenance)

Composting toilets

Greywater treatment

Septic System and Absorption Trench Design: Modifications and Enhancements
Improving and retrofitting existing systems
Practical Options and Solutions for Small Allotments.
Wet weather Storage for domestic systems
Effluent Disposal Field Sizing, Balancing Nutrients and Water Consumption
Communal Wastewater Reticulation and Treatment
Septage Management
10-2500 EP systems

Communications Strategy and Kit

The communication strategy included a low key, regional community information campaign conducted during 1999 to raise awareness about *SepticōSafe* and the new supervision arrangements for decentralised sewage management. A communications kit with posters, brochures and recorded community service announcements was provided for use by councils.

Easy Septic Guide

The *Easy Septic Guide* is an illustrated, plain language septic system owner's guide. It provides general information for the operation and maintenance of septic systems. This Guide is distributed by councils and was designed to allow addition of local information. The standard version can be obtained in Adobe PDF format from the *SepticōSafe* website. A word processor friendly version, which allows easy amendment and addition of local material, is available under licence to councils and other responsible authorities.

On-site Sewage Management Course - NSW TAFE

A short course in on-site sewage management practice was developed by TAFE in conjunction with industry stakeholders, with *SepticōSafe* funding. The NSW TAFE OSM Course will be included in the TAFE study program from first semester 2002.

The course will provide training for council staff engaged in site assessment and inspection work, for council rangers and for staff responsible for the maintenance of council owned septic systems. It will also provide basic training for septic system maintenance providers, plumbers, septic pumpers and other people servicing septic systems and will provide a qualification acceptable to local councils for third-party certification of septic system performance, and for landowners (especially corporate landowners) seeking to service and certify septic systems on their land.

Information Management Handbook

There are currently about 300 000 septic systems in use in NSW, so cost-effective data management is crucial for affordable and effective council supervision systems. The Department of Local Government commissioned ERSIS Australia Pty. Ltd. to develop platform independent specifications for information management to assist councils with the task of developing a sewage management module within their existing corporate data management system. The handbook includes generic specifications for the development of a sewage management information and decision support system capable of being linked to a geographic information system.

On-site Sewage Risk Assessment System (OSRAS) Handbook

The aim of council supervision of septic systems is better management of sewage pollution risks. To assist councils with the development of sewage pollution risk management strategies, the Department of Local Government commissioned Brown and Root Services Asia Pacific Pty. Ltd to develop the On-site Sewage Risk Assessment System (OSRAS). The starting point for OSRAS is that leaky septic systems are a source of potential public health and environmental harm. Effective management of the risk of sewage pollution means understanding the nature of the hazard, the probability of transmission (the pathway characteristics) and the sensitivity of, or consequences for, the receiving environment.

OSRAS takes a spatial analysis approach incorporating spatial and built environment data overlays and transparent logic matrixes based on current environmental health knowledge, to generate maps that highlight areas where existing septic systems are likely to be exporting concentrations of pollutants capable of harming identified receptors of high value to the community. OSRAS will help transform complex data and knowledge into readily understandable, 'big picture' information. OSRAS is a structured information management system that can be applied at different levels of sensitivity or complexity according to relevant economic, natural resource management and civic values (i.e. cost benefit ratios) and refined according to the availability and cost of reliable data and knowledge.

3 Grants and Services

On-site Sewage Management Strategy (OSMS) Grants

The Minister for Local Government has allocated funding of around \$2.1 million, over a 3 year period, to assist councils to identify septic systems in use and to develop and implement a systematic sewage management strategy. The local government regulations provide a flexible framework for councils to develop and implement a sewage management strategy that reflects local needs and circumstances. A sewage management strategy reflects local circumstances and arrangements for user education, supervision, managing risks and minimising sewage pollution.

Funding for local sewage management strategy projects was notionally allocated in proportion to a council's share of the number of on-site systems under council regulation. Participating councils had to match grant funds dollar for dollar and to comply with conditions of funding previously approved by the Minister. Supervision certificates returned from 142 participating councils identified 283 725 septic systems under supervision at 30 December 1999. The grant represents a subsidy of \$7.40 per septic system to council's costs of identifying the nature and location of septic systems in use and developing and implementing a management strategy for ongoing operator support and performance supervision. One effect of this subsidy was to reduce costs to householders.

OSM strategy grant funding was scheduled as three payments. Recipients have received two instalments with payments totalling \$1 501 018 to May 2001. The final payment of grant funds is due subject to a satisfactory performance review. Local on-site sewage management strategies are public documents available from each participating council.

A survey of SepticSafe councils undertaken in May 2001 found that 88% had prepared a draft on-site sewage management strategy and have commenced implementation of on-site sewage management reforms. The survey also found that about 80% of identified on-site sewage management systems are now being operated with council approval. So far 63% of these councils have formally adopted an on-site sewage management strategy as part of the council management plan for their area.

OSMS Enhancement and Research Project Grants

The Minister for Local Government allocated up to \$500 000 for projects to enhance council sewage management strategies or for research. Funding was provided on an agreed matching basis for 19 projects that enhance basic council sewage management strategies by addressing the ongoing monitoring and management of sewage pollution from septic systems in environmentally sensitive areas, particularly shellfish food production estuaries and drinking water catchments in coastal zones. Funding has also been provided for 5 research projects. The results of the research projects will be posted on the *SepticSafe* web site.

Brief summaries of the SepticSafe OSMS Enhancement Grant Projects and Research Grant Projects are attached as Appendix 1 and 2.

References

Department of Local Government 1998, Environment and Health Protection Guidelines: On-site Sewage Management for Single Households. ISBN 0 7310 9496 4

Department of Local Government 2000. The Easy Septic Guide. Developed by Social Change Media for NSW Department of Local Government, Bankstown, 2000.

Department of Local Government 2001. On-site Sewage Risk Assessment System Handbook (Consultation Draft). Developed by Brown & Root Services Asia Pacific Pty. Ltd. for the NSW Department of Local Government. ISBN 1 876821 19 1.

Department of Local Government 2001. On-site Sewage Information Management Handbook. Developed by ERSIS Australia Pty Ltd for NSW Department of Local Government, Bankstown, 2001

Hogan, R., Marczan, P., & Irvine, R., (1998) *A Sustainable Future for On-site Sewage Management*, in conference proceedings: WaterTECH, Brisbane, April 1998, AWWA, Artarmon.

Irvine, R. (1995) *Regulating On-site Human Waste Management Systems*. In conference proceedings: On-site Sewage Treatment Plants - National Workshop, Sydney, May 1995

Irvine, R., Hillier, H. & Fraser, L. (1999) *NSW On-Site Sewage Management Reforms*, In conference proceedings: On-site 99, Armidale 1999

Standards Australia, AS/NZS 1547:2000 On-site domestic wastewater management.

Internet Sources

Local Government Act 1993 <http://www.austlii.edu.au/databases.html#nsw>

Local Government (Approvals) Regulation 1999 <http://www.austlii.edu.au/databases.html#nsw>

Appendix 1 Overview of OSMS Enhancement Grant Projects

Evaluation of three low-cost options for improving septic tank performance – *Lismore City Council, Rous County Council, the Institute of Sustainable Futures UTS and the Centre for Risk Environment and Systems Technology and Analysis* **E01**

An investigation of three low cost options for improving septic tank performance. The study will scientifically evaluate the degree to which wastewater treatment in the septic tank can be improved through the application of three widely available low cost options: indoor water efficiency upgrades; use of non-phosphate detergents and desludging of septic tanks.

On-site treatment system failure and shellfish contamination in Port Stephens – *Port Stephens Council* **E08**

The project aims to provide Council with a cost effective means to test for failing on-site systems, cracked tanks, illegal pipe works and flooded disposal areas and to identify high risk areas and prioritise management actions where failing on-site systems are likely to impact on shellfish production and where failing on-site systems may be impacting on the potable groundwater resources.

Berowra creek sewage management enhancement options project – *The Council of the Shire of Hornsby* **E09**

The project will focus on the development of effective, low cost on-site sewage management system alternatives for installation and operation in environmentally sensitive areas. The project will result in the preparation and distribution of a Guide for the Enhancement of Existing On-site Sewage Management System outlining the advantages and disadvantages of such systems and highlighting successes by including case studies from Berowra Creek.

Improving the performance of on-site sewage management systems within Blue Mountains water supply catchment areas – *Blue Mountains City Council* **E013**

The project aims to improve performance of on-site sewage management systems through: ensuring that on-site systems are appropriately upgraded and/or maintained to a satisfactory level and where possible connected to the sewer; achieving better on-site system performance within Blue Mountains water supply catchment areas and in doing so reduce risk to public health and the environment. Improve Council's existing database and GIS for recording on-site information; and documenting project outcomes and compiling a guideline for appropriate system design and maintenance.

Sewage Management Approvals Information Package – *Wyang Shire Council* **E015**

The project will develop an information package as part of the requirement to obtain council approval to operate a system of sewage management. The package will be used in all future approvals granted to applicants to install sewage management systems and is a critical component of Wyong Shire Council's 1999-2000 Education Policy identified in Councils draft On-site Sewage Management Strategy.

Greater Taree City Council Catchment Water Quality Monitoring Program – *Greater Taree, Great Lakes, Gloucester, Walcha, Hastings* **E023**

The project will establish a water quality monitoring program for catchments within the Greater Taree City Council Area. Monitoring and sampling will be conducted over 12 months. Sampling to date has identified the on-site sewage disposal problems in Crowdy Head and water front dairy farms in the catchment.

Wisconsin Mound, Anna Bay – *Port Stephens Council* **E030**

This project involves the design, construction and monitoring of a Wisconsin Mound system that will function effectively under the conditions of high groundwater on sandy soil. Monitoring of groundwater and surface water over a two year period on a regular and rain event basis should provide details as to the effectiveness of the system and the level of movement of bacteria and nutrients through the sandy soil.

Marsh Road Proposal – *Port Stephens Council* **E031**

This project involves the design, construction and monitoring of a Wisconsin Mound system that will function effectively under the conditions of high groundwater on estuarine silt/clay soil. Monitoring of groundwater and surface water over a two year period on a regular and rain event basis should provide details as to the effectiveness of the system and the level of movement of bacteria and nutrients through the estuarine silt/clay soil.

Wastewater Management development control plan/local Approvals Policy for application by Hunter and Central Coast Council – *Wyang Shire Council* **E016**

The project intends to prepare a Development Control Plan (DCP) and Local Approvals Policy (LAP) for decentralised sewage management reforms to assist with the implementation of the NSW sewage management reforms. The DCP/LAP will be prepared on behalf of the Hunter and Central Coast Regional Septic Tank Action Group (HCCSTAG) for adoption by participating Councils.

A natural passive treatment process using constructed gravel wetlands for the management of wastewater from an existing septic system at the Buttonderry Waste Management Facility amenities block – Wyong Shire Council **E017**

The project aims to provide domestic users with a working example of an effective, low-cost wastewater system using wetland treatment. The system will be freely inspected and data and advice provided.

Instrumentation for a test facility at south Lismore STP to assess reed bed and sand filter performance – Lismore City Council **E024**

The purpose of the project is to establish a test facility for the assessment of the treatment and hydraulic performance of innovative on-site secondary treatment elements such as reed beds and sand mounds. The test facility will be established at South Lismore STP and will incorporate four test units in parallel from various points in the STP treatment train. The four treatment elements to be tested are: reed bed containing Bio-block synthetic media and *phragmites australis*; a reed bed containing 20mm gravel media and *phragmites australis*; a reed bed containing 20mm gravel media and with rain proof cover and *phragmites australis* and a sand mound. The project aims to create a test facility for the long-term evaluation of the hydraulic and pollutant removal performance of a range of on-site system treatment elements. Funding will provide instrumentation to facilitate treatment elements under local conditions and thus make design and management recommendations that will enhance performance in high rainfall coastal areas.

Broad scale land capability study and review of on-site wastewater policy – Wollondilly Shire Council **E05**

This project involves Council engaging an appropriately qualified consultant to undertake a Shire-wide land capability study and review of current practices and Council policies in regards to on-site effluent disposal. It is envisaged that the study will address a shortfall in information regarding the installation and upgrading of on-site sewage management facilities.

Tweed Shire OSM GIS –Tweed Shire Council **E07**

The project will develop a geographical information system (GIS) based analysis system. Additional layers and database will be incorporated into the Council's existing Genasys GIS to allow a desktop sewage pollution risk assessment of the Shire. Featured records will include buffers to water courses, land use and area, potable water supply and shellfish food production catchments. Strategic land use planning will be assisted through the availability of this data management system.

Allworth catchment improvement – Great Lakes Council **E011**

The project will study the environment to assess the impacts on the Kuruah River that adjoins the village. In addition, alternative systems for the retro fit or decentralised sewage systems will be nominated. The project will comprise a desktop study, mapping of surface drainage, investigation and mapping of surface water seepage, definition and mapping of areas at high risk from surface and groundwater pollution, assessment of catchment based cumulative impact of failing on-site systems and assessment of systems available for decentralised sewage management systems.

GIS Aerial and Soils Mapping –Great Lakes Council **E012**

The project will identify on-site sewage management systems using aerial photography. Aerial photos which are in a compatible digital format for Councils mapping system will be purchased. The aerial photography will identify structures associated with on-site systems that have and have not been registered. The photos will position structures on properties relevant to boundaries and environmentally sensitive areas. The information from the aerial photos will be used to verify existing GIS data and identify data gaps.

Coomba Park Catchment Improvement –Great Lakes Council **E032**

The project will study the environment to assess the impacts on the Coomba Park that adjoins the village. In addition, alternative systems for the retro fit or decentralised sewage systems will be nominated. The project will comprise a desktop study, mapping of surface drainage, investigation and mapping of surface water seepage, definition and mapping of areas at high risk from surface and groundwater pollution, assessment of catchment based cumulative impact of failing on-site systems and assessment of systems available for decentralised sewage management systems.

North Shore sewage management action program – Hastings Council **E014**

The project is focused on minimising the risk of bacteriological contamination of the major oyster growing area of Limeburners Creek from adjacent unsewered urban development and from adjacent oyster processing operations. The project will involve investigating and implementing short term actions such as quantifying the contamination risk through ongoing monitoring which includes sterol analysis, monitoring system performance and education of local residents and oyster growers. The project will incorporate the long-term integrated sewage management options for urban unsewered allotments and oyster processing operations and the investigation of alternative drainage options so as to mitigate/improve a major point source discharge into the heart of the oyster growing area.

Video Production - "Looking after your septic system" – Byron Shire Council **E02**

The project will provide an educational Septic Safe resource material for local councils across NSW that will be freely distributed through local libraries and community groups.

Appendix 2 Overview of Research Grant Projects

Assessment of LTAR and DLR at Jemby-Rinjah Lodge, Blackheath – *Blue Mountains*

City Council

R07

The design of land application systems for treating wastewater on-site relies on two very important parameters: Long Term Acceptance Rate (LTAR) of the soil and the Design Loading Rate (DLR) which is a design value incorporating a factor of safety. This project will provide an analysis of the performance of both a greywater and a combined system and study the relationship between the LTAR, the quality of wastewater, the type of systems and the importance of evapotranspiration.

Effects of household chemical use on domestic wastewater quality – *Armidale Dumaresq*

Council

R09

The project aims to determine the changes that occur to the chemistry of septic tank effluent as a result of daily use of appliances and chemicals within the house. 30 residents, selected as representatives of typical households on septic tanks, some with reticulated water and some rainwater, are going to be outfitted so that the effluent quality can be monitored on a half hourly basis for a period of fourteen days.

Performance monitoring of a low cost alternative on-site effluent treatment system to reduce nutrients – *Lake Macquarie City Council*

R013

The project involves the construction of an alternative on-site treatment system. The system consists of a sand filter that incorporates different layers to enhance nutrient removal, particularly ammonium. Innovative features of the system include the use of zeolite as a filter medium, gravity fed dosing siphons and pressurised drip irrigation for effluent disposal.

Hydraulic and treatment performance of reed beds and sand mounds with characterisation of domestic effluent, NSW North Coast – *Lismore City Council and*

Byron Shire Council

R014

The project involves monitoring four secondary treatment elements recently installed (last two years) on dwellings with typical families (2 adults 2 children). This will provide information on hydraulic and pollutant loadings and concentrations in domestic wastewater under a variety of seasonal conditions from dwellings with traditional flush toilets and composting toilets. The secondary treatment element in three of the systems is a reed bed and in the other it is a sand mound.

Evaluating the options: pumpout, common effluent drainage, and centralised treatment for high risk unsewered townships in Hornsby Shire – *The Council of the Shire of*

Hornsby

R015

The project aims to use holistic tools to evaluate environmental and economic appraisals of the competing options for existing communities with limited capacity for on-site infiltration of partially treated wastewater located adjacent to highly sensitive waters. Life-cycle assessment tools will be used to evaluate environmental burdens and least cost planning frameworks for economic analysis. Due to submit final report on 28 February 2001.

Investigation of the effects of seepage, runoff and stormwater inundation from septic systems on the water quality of oyster growing areas – *Port Stephens Council*

R017

A high proportion of oysters is grown adjacent to populated areas with decentralised sewage disposal. As such there is a risk of faecal contamination of growing waters and hence oysters from this source. The risk of contamination is higher during periods of rainfall, since flow of run-off and groundwater into the growing waters is increased. The project will determine how rainfall characteristics affect growing water contamination. For example, investigation of how the effects of small rainfall volumes over longer periods contrast with large single downpours.