MANAGING SEPTIC TANKS IN NEW ZEALAND
ENVIRONMENT BAY OF PLENTY'S SEPTIC TANK MAINTENANCE PROGRAMME

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Abstract

This paper reports on the environmental benefits of Environment Bay of Plenty's (the Regional Council) septic tank maintenance programme. The principal driver for the programme was extensive system failure and water pollution, well demonstrated to have been primarily due to a lack of maintenance of septic tanks and disposal fields and site constraints.

The septic tank maintenance programme builds on a 1992 Environment Bay of Plenty investigation into septic tanks systems. The earlier investigation identified 14 communities around the Bay of Plenty region as environmental "hotspots" because of the impact that septic tank systems were having on estuarine and lake edge water quality.

Under its Operative On-Site Effluent Treatment Regional Plan (effective as at 1 December 1996), Environment Bay of Plenty initiated a septic tank maintenance inspection programme for the 14 communities.

This paper describes the strategic framework of Environment Bay of Plenty's septic tank maintenance programme; shows where certification and operator training fits into the regulatory framework; outlines the results of the septic tank maintenance programme; limitations and lessons learnt; and future direction for the programme in the Bay of Plenty Region.

Keywords

inspection, maintenance, regulation, septic tank systems, strategic, training

1 Introduction

In New Zealand approximately 15% of the population are not served by a reticulated wastewater treatment system (Ministry of Health, 2001), and rely instead on septic tanks, composting toilets or other systems to treat their sewage. Septic tanks are most common type of on-site wastewater system used. Environment Bay of Plenty (EBOP) acknowledges that for the most part septic tank systems work quite satisfactorily, provided that they are properly maintained and areas where systems are located do not become so densely populated that the capacity of the soil is overloaded. However, the region has experienced a high increase in population.

Maintenance of a septic tank system is essential to ensure the integrity of the system for its long-term use, by minimising the opportunities for failure and consequential adverse environmental effects. However, most residents in the Bay of Plenty (BOP) region do not maintain their septic tanks to keep them in good working order, mainly through ignorance of the need to do so.

Therefore, as part of a strategic approach to the management of adverse environmental effects due to on-site effluent treatment systems (septic tank systems) EBOP has implemented a maintenance programme to monitor the performance of the systems and their impact on the wider environment.

1.1 Background

EBOP carried out investigations into septic tanks systems in 1992 (EBOP, 1992). These investigations showed that some systems were contaminating fresh and coastal waters with excessively high levels of pathogens and nutrients, particularly those systems in close proximity to coastal, estuarine and lake margins. The prime causes of this pollution were identified as being due to either to a lack of maintenance of septic tanks and soakage fields or to inadequately designed systems.

In its Operative On-Site Effluent Treatment Regional Plan (plan)(effective as at 1 December 1996), EBOP identified 14 communities around the BOP that were considered environmental "hotspots" because of the impact septic tank systems were having on water quality. These are primarily communities located in close proximity to the margins of lakes, estuaries and shorelines of the region. The 14 communities are: Woodlands, Hinehopu, Gisborne Point, Mourea, Hamurana, Okawa Bay, Lake Tarawera, Lake Okareka, Maketu, Little Waihi, Omokoroa, Tanners Point, Athenree and Waihi Beach.

These communities were addressed in the plan with a Rule that all existing on-site effluent treatment systems in the 14 communities were required to obtain a resource consent unless:

- *EITHER* each system is subject to a septic tank survey and regular maintenance programme whereby the owner of the system provides EBOP at intervals not greater than three (3) years with a certificate issued by a certifier approved by EBOP certifying the system is not likely to be the subject of gross overload within the following three (3) years.
- *OR* each system is subject to a septic tank survey and regular maintenance programme administered by the district council for the area.

As defined in the plan, a septic tank survey is "where all properties containing septic tanks are visited, the tank contents are pumped out, the structural integrity of the tank is assessed and an assessment is made of the drainfield/soakhole. The amount and type of sludge in the tank may also be used as a guide to whether the drainfield or soakhole is operating."

Before implementation of the septic tank maintenance programme the Opotiki, Rotorua and Western Bay of Plenty District Councils, whose districts contain one or more of the communities identified as environmental "hotspots", were approached by EBOP to ascertain which alternative they intended to take. Only Western Bay of Plenty District Council (WBOPDC) is known to have investigated this further. However, no further action was taken by WBOPDC and the entire septic tank maintenance programme is administered by EBOP.

1.2 Other New Zealand experiences

The "warrant of fitness" concept that EBOP has adopted for septic tank systems in the BOP region is not an isolated case. There are a number of other local authorities around in New Zealand that are currently carrying out property inspections in specific localities to establish septic tank system performance. These include New Plymouth District Council, South Taranaki District Council and Waitakere City Council.

EBOP's programme differs from these territorial local authorities in that it has been developed using the provisions of the Resource Management Act 1991 through rules rather than using a bylaw under the Local Government Act 2002. Regional councils currently do not have specific regulatory powers to make bylaws that relate to on-site effluent treatment systems under the Local Government Act. In addition, instead of relying on one contractor to carry out the inspections, a number of people associated with the on-site wastewater industry have been trained by EBOP to carry out the inspections. All costs associated with the inspection and any septic tank maintenance activity including the pumping, removal and disposal of waste and any repair work are at the property owner's expense.

2 Certification Training Programme

The maintenance certification a training programme was established by EBOP in 1998. At the time the AS/NZ Standard 1547:2000 was being developed, and it was considered important that this training be consistent with the likely standard, which allows the option of "maintenance certification" of individual on-site effluent treatment systems under its monitoring provisions.

Applications from people interested in becoming certified by EBOP were accepted on the basis of past experience with septic tank installation and maintenance. EBOP has run six training workshops since the end of 1998 for 39 people from inside and outside the region. The intention of the courses has been to build on the wastewater industry skills of those attending to familiarise them with a detailed inspection and survey form. In the half-day training workshop participants were taken through an inspection exercise and administrative aspects that relate to a certificate of compliance being issued. This link back to the "real world" emphasises the importance of quality training since without it EBOP would not be in a position to gain accurate and consistent data in order to realistically assess the extent of the problem and take appropriate action.

3 The Certification Programme

The workshop and inspection process has been is supported by a "Septic Tank Certification Manual" which provides a "how to" for certified septic tank inspectors on carrying out and reporting on site inspections. A take-home exercise is also provided to course participants who return it to demonstrate their understanding of the processes. On receipt of the completed take home exercises, EBOP issues an ID card and provided the necessary forms. Septic tank certifiers are also advised that being certified inspectors does not prevent them from undertaking repairs to sewerage systems – provided they had have the requisite qualifications to do so.

The responsibility of the certifier ends when they tell the property owner of the results of the inspection, and sends the completed inspection form to EBOP. EBOP then completes the process by issuing certificates of compliance for systems that have passed the inspection, or following up property owners of failed systems. Where EBOP has not received a written record for a property, abatement notices have been served to the respective property owners.

Where systems have failed the inspection, the property owner is advised by the certifier to contact EBOP as to what upgrade work is required to achieve compliance. However, the certifier has no responsibility to ensure that the upgrade occurs. EBOP is responsible for ensuring the property owner undertakes any remedial work required to achieve compliance. The cost of any remedial work is borne by the property owner.

Where a system needs to be upgraded, EBOP's policy has been twofold. Where reticulation is planned by a district council for implementation within five to six years (from 1998), only the totally unsatisfactory systems have been required to upgrade. For the remaining areas that, for the present time, are to continue as unsewered communities, the system upgrades have been required to conform to the standards set out in the Operative Plan by December 2004, unless a gross problem had been identified. However if a property located in any of the 14 communities identified in the plan is put up for sale and the system has failed the property owner is required to bring the system up to the required standard set out in the plan.

3.1 Database management

Once inspection forms are received by EBOP they are entered into a computerised database. Data relevant to its district is regularly forwarded to each District Council. Some District Councils have incorporated this information in Land Information Memoranda (LIM) reports. In addition this information will form part of a strategic approach to wastewater in terms of prioritising areas for service development as well as land use planning purposes and for State of the Environment Reporting.

Because a certificate of compliance can be easily obtained from the database, EBOP staff regularly receive phone calls from real estate agents, lawyers and potential purchasers requesting a certificate of compliance. A certificate of compliance is often a condition of sale for properties. Thus property sales often become the driver for upgrades.

3.2 Audits for quality assurance

All inspection form data supplied by the certified septic tank inspectors are checked by EBOP as part of the standard data entry and database management.

For quality assurance purposes a nominal percentage of the systems that have been certified are audited. Random on-site audits of all certified septic tank inspectors and inspection forms have been carried out to ensure that both data and procedures are kept legible, consistent and of good quality. Where an audit has revealed the unsatisfactory recording of inspection form data EBOP have given appropriate assistance to help certified septic tank inspectors achieve and maintain the inspection and reporting standard required. While EBOP can ultimately de-certify an inspector, to date this has only occurred twice.

3.3 Continuing education

The success of the inspection and certification programme has depended on a close and positive working relationship between certified septic tank inspectors, EBOP and the District Councils. A programme of ongoing technical support, information exchange and liaison has been developed to facilitate this.

EBOP has made a commitment to ensuring that those who have completed the training programme are provided with backup support. Certifiers are required to attend refresher training courses at least every 3 years, where they also share their experiences.

An ongoing public awareness programme has also been implemented to ensure that property owners and occupiers are aware of their responsibilities. Educational opportunities for interested members of the community have been through public information releases (e.g. newspapers and letterbox drops), EBOP's website and community forums.

4 Results of the Septic Tank Maintenance Programme

The scoring system assigns demerit points based on physical and environmental criteria set by EBOP. To have "failed", a system has to score five or more demerit points. Systems which scored 20 or more demerit points were generally in need of an urgent upgrade. There were also situations where systems scored less than 20 demerit points but were in need of urgent upgrade, for example where the septic tank was connected to a nearby drain. The number of systems inspected in each of the 14 communities and the corresponding pass and failure rates as at May 2003 is shown in Table 1.

Table 1: Analysis of Septic Tank Inspection Programme Results

Town	Passed [1]	Failed	Failed on Tank Size	Demerit Point Range				Number Inspected
				5-9	10-14	15-19	>20	
Athenree[2]	26%	74%	77%	93%	6%	0%	1%	208
Waihi Beach[2]	24%	76%	75%	93%	6%	1%	1%	680
Tanners Point	45%	55%	68%	94%	6%	0%	0%	86
Omokoroa	50%	50%	43%	86%	10%	3%	1%	710
Maketu	53%	50%	49%	84%	12%	3%	1%	318
Little Waihi	28%	72%	42%	65%	26%	6%	3%	43
Woodlands	50%	50%	54%	94%	5%	0%	1%	286
Hamurana	42%	58%	62%	92%	5%	2%	2%	108
Hinehopu	12%	88%	30%	62%	24%	5%	8%	42
Gisborne Point	33%	67%	52%	85%	13%	1%	0%	112
Okareka	28%	72%	65%	80%	17%	2%	1%	232
Tarawera	43%	57%	56%	78%	18%	3%	1%	297
Mourea/Okawa Bay	36%	66%	42%	80%	13%	4%	0%	110
Overall exc. Waihi & Athenree	44% 1037	56% 1307	51% 670	84% 1097	12% 161	23% 31	12% 16	 2344

Notes:
[1] Presented as a percentage of the number of systems in the community
[2] Athenree and Waihi Beach never completed 1st inspection round due to reticulation installation.

The scoring system, on which the inspection programme is based, gives significant weight to the following aspects of the system:

- Unsatisfactory septic tank size — 5 demerit points
- Condition of septic tank (comprising 5 demerit points for each of: inadequate access to desludge the tank, no base in the tank, faulty inlet, faulty outlet) — 20 demerit points
- Stormwater entering the tank — 5 demerit points
- Land application area unlocatable — 5 demerit points
- Unsatisfactory condition of land application area — 5 demerit points
- Inadequate clearance to groundwater — 5 demerit points
- Physical barriers such as retaining walls within 5 metres of land application area — 5 demerit points

Other aspects that may contribute to an overall failure but will not be the cause of a failure by themselves, such as cracked lids, are allocated less than 5 demerit points.

Of the 3232 tanks inspected so far, 64% failed the inspection. Corrective action to rectify failures has reduced this failure rate to 56%, so far, for the communities still on on-site

systems. A significant percentage of systems failed because the tank size was found to be smaller than the 2,700 L capacity required under NZS 4610:1982, which was adopted as the minimum tank size in the plan. Recorded tank sizes ranged from 140 L to 12,800 L.

In most circumstances, where the system "failed" does not imply that the system is performing badly (is causing or is likely to cause public health and or environmental impacts), nor that the system need be totally replaced. A system may fail because of tank size as set down by the criteria, and provided it is relative to a given household size, the system can deliver appropriate pre-treatment provided it is retrofitted with an effluent outlet filter. To accommodate this EBOP initiated a plan change to recognise this (No.1 to the Plan), which was publicly notified in December 2000 and became Operative in December 2002. The amendment also allows septic tanks with an effluent filter installed down to a minimum 2000 L to be operated as a permitted activity if the septic tank system was installed prior to the plan becoming operative in 1 December 1996. This method was considered fair as it recognises the problem is the control of solid particles that carry over into the land application area. This plan change also allows for the cleaning and inspection frequency to be extended from three years to six years for any systems with an effluent outlet solids filter fitted. As the cost of fitting a filter is similar to having the tank cleaned and inspected, this gives a viable way of allowing those holiday and/or low occupancy homes a more realistic period between cleaning.

Land application areas were assessed relative to pre December 1996 requirements, which was the NZS 4610: 1982 (since 1 December 1996, the standard used has been TP58, second edition, 1994). Therefore, a pass does not necessarily imply adequate treatment of effluent in the ground. The data collected show over 43% of land application areas involved soak holes and over 48% involve disposal trench systems (6% were unable to be located).

4.1 Programme review

The effectiveness of the inspection and certification programme has been regularly reviewed and adaptations have been made to maintain and improve its ability to meet its goals of environmental protection.

The second round of maintenance inspections began in December 2001 with letters going to property owners advising them of the date for their next inspection. The communities of Waihi Beach and Athenree have not been included in the next round of inspections because they are in the process of being connected to a reticulated system. Hamurana is also now excluded from the inspections primarily due to the removal of many dwellings from the foreshore strip of land, subsequent to reports by EBOP (McIntosh, 2001) and NIWA (commissioned by the Rotorua District Council). However, failures identified at Hamurana in the first round of inspections are required to be remedied.

EBOP has currently deferred the second round of inspections for Omokoroa and Mourea/Okawa Bay in response to significant progress towards sewerage. This deferment is subject to review dependent on continued progress.

A review by Ian Gunn (Gunn, 2001) was undertaken in late 2001 to assist in identifying appropriate solutions for some of the communities. One of the recommendations noted in the report was that consideration be given to including the community of Te Puna (Tauranga Harbour) in the maintenance programme. EBOP carried out further monitoring of the receiving environment at Te Puna. This monitoring identified an increasing level of septic tank contamination at Te Puna (Gibbons-Davies, 2002) and raised the urgency to bring Te Puna onto the maintenance programme. The addition of Te Puna to the maintenance programme as a formal requirement can only be achieved through a review process for the

Plan. However, following community meetings with Te Puna Residents on the high level of faecal contamination of drains going into the harbour, in December 2002 Te Puna residents agreed to voluntarily have their septic tank systems cleaned and inspected.

Gunn's report suggested that consideration be again given to District Councils introducing district wide maintenance certification programmes under District Council management on a user pays basis in which regular inspections would be undertaken and a certificate of system performance issued. EBOP invited District Council Councillors and staff to a workshop on this concept. To date EBOP has not been able to progress this further.

5 Lessons Learnt

The septic tank maintenance programme has resulted in a much needed raising of public awareness of the importance of maintaining on-site effluent treatment systems over the whole region. It brought existing systems into line with environmental criteria set down by EBOP and increased and guaranteed business for the septic tank certifiers. However, there have been aspects that in hindsight, could have been more effectively achieved.

5.1 Communicating the purpose of the maintenance programme

The initial implementation of the maintenance programme met with a lot of opposition, including from communities concerned about the effects of septic tanks on the local environment. This was partially due to poor understanding of the link between effects being detected on water margins and the purpose of the maintenance programme. A clear message of what it would and wouldn't achieve was needed.

The maintenance programme would force maintenance of septic tanks, which in some cases was long overdue. Equally, it would require maintenance of some septic tanks more frequently than would otherwise be necessary for some low occupancy properties, a limitation of writing rules. A maintenance programme would describe the state of various systems, including identifying problems with individual systems or communities.

But a maintenance programme by itself doesn't guarantee to fix the problems with septic tanks in a community. In some areas septic tank systems may not be a sustainable option and a maintenance programme will only highlight or confirm what the problem is. In other cases it can identify what change is necessary to make a community sustainable on septic tanks and in some cases the maintenance programme itself may be all that is necessary to make the community sustainable on septic tanks.

5.2 Remedial work

Another reason for early opposition to the maintenance programme was that EBOP had not clearly thought out how it would deal with failed systems. The policy of prioritising upgrades was developed as the programme was implemented, instead of at the beginning of the process. For credibility of the programme a strategy of how failures, big and small, will be handled is needed before the start of the programme. Explaining the strategy we had in place for existing communities on the maintenance programme was a key factor in getting Te Puna residents to voluntarily go on the maintenance programme late last year.

5.3 Advising property owners of results

EBOP staff also found it important to advise property owners by letter that their system had failed soon after the inspection, as most did not appear to read the inspection form. Property owners had been surprised to discover that their system had failed when trying to sell their property or when they received a letter from EBOP reminding them to have upgrade work completed by a set date.

5.4 Staggering of implementation dates

There is a need for the development of an implementation strategy that clearly demonstrates the resources and time line necessary to carry out the work. For example, the first round of letters could have been staggered to allow for any initial problems such as incorrect addresses to be rectified. This also enables non-cooperative owners to be more easily followed up as they do not all come into non-compliance at the same time.

6 Conclusions

Centralised management of on-site effluent treatment systems be it from District or Regional councils is the way of the future. Sustainable management servicing programmes such as the septic tank maintenance programme are essential for safeguarding public health and the environment. Indeed the Standard AS/NZS 1547:2000 provides a prescription for this to happen. The success in delivering sustainable servicing solution depends on the human factor: how well those that are involved in and responsible for implementation of a maintenance programme undertake their responsibilities. EBOP found that upskilling key target audiences was a cost-effective tool. People have been given the skills, motivation and information to do the right thing, which in turn has been supported by EBOP staff helping to ensure that they are doing it. Building relationships through good training and education will ensure better environmental outcomes.

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