'REAL WORLD' PROBLEMS – CONFLICTS BETWEEN THE 'SILVER BULLET' AND AS/NZS 1547

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Abstract

In the past, management of on-site household effluent has been conducted according to the guidelines set out in the AS1547:1994 (Standards Australia, 1994), and more recently AS/NZS1547:2000 (Standards Australia & Standards New Zealand). However, in January 1998 the *Environment & Health Protection Guidelines* were produced *for "On-site Sewage Management for Single Households*", colloquially termed "Silver Bullet" (DLG, 1998).

The 1998 publication was designed to aid local government and other management authorities in their application of the Australian Standards for their local environs. However, some major discrepancies are associated with the two documents, one of these being the problem associated with calculation of effluent volumes.

This paper discusses some of the discrepancies found and highlights problems that can occur in the "real world" as a result of conflicting guidelines.

KEYWORDS

AS/NZS1547:2000, calculation, contrast, effluent, Silver Bullet

1 Discrepancies in Wastewater Generation

1.1 Population Equivalents

AS/NZS 1547:2000 (Standards Australia, 1994) does not recommend volumes for small households (e.g. 2-bedrooms) or single/couple households. It also only provides an upper limit for effluent volumes**,** citing the number of bedrooms and the equivalent or corresponding population. *The Environment & Health Protection Guidelines* (DLG, 1998) give effluent volumes calculated on the number of people only and does not account for the number of bedrooms. Maybe the ability of bedrooms to generate effluent should be questioned.

1.2 Effluent Volumes

Effluent volumes cited in AS/NZS 1547:2000 are much lower than those in *The Envir. & Health Protection Guidelines.* If the greywater and blackwater volumes are combined for a 3-bedroom household (1-5 people), AS/NZS 1547:2000 states that effluent will not exceed 900 litres per day. However *The Envir. & Health Protection Guidelines* state that effluent volumes could be up to 300 litres per person per day, but does not provide a recommendation for a population based on the number of people. In addition, the volume stated would be well in excess of that stated in AS/NZS 1547:2000 for a residence with a population exceeding three people.

There are also differences in the ratio of greywater to blackwater for the two documents. *The Envir. & Health Protection Guidelines* give the implication that blackwater contributions are much higher to total effluent volumes than those allowed for in AS/NZS 1547:2000. *The Envir. & Health Protection Guidelines* state that blackwater contributes to about 15-35% of the total effluent volume. In contrast, AS/NZS 1547:2000 states that at least 50% of the total effluent is from blackwater contributions.

1.3 Source of Household Water

An important discrepancy is that AS/NZS 1547:2000 does not distinguish between households with tank water supply or mains water. *The Envir. & Health Protection Guidelines* identify households utilising non-mains water as being allowed to produce half the volumes of effluent as households running on mains water. AS/NZS 1547:2000 guidelines only allow for a single volume of effluent production irrespective of the means by which the water is obtained. The issue is, in practical terms, one of internal household water management i.e.:

WATER IN = WATER OUT

As a consequence of the above discrepancies, councils and water authorities administering the documents are forced to interpret these documents for the calculation of recommended effluent volumes from any given residence. As a result of different interpretations, a number of recommendations have arisen for different Council areas. This has in turn caused problems for those undertaking on-site effluent reports, with widely varying Council requirements.

Further more, it appears as though levels of wastewater produced for an average household are over estimated when compared with actual effluent volumes produced. In a recent statement by the Minister for Agriculture (NSW) taken from the Bureau of Statistics, that yearly average effluent volumes produced for the Crookwell and Gunning Shires are 150,000 and 180,000 litres respectively.

The actual figures reported are much lower than theoretical volumes of effluent even when one used the minimum allowed volumes taken from AS/NZS 1547:2000, which give the yearly effluent production for as average 3-bedroom household of 1-5 people as in excess of 328,000 litres/year.

1.4 Water Balances

The Envir. & Health Protection Guidelines recommend that when calculating the water balance the 50th percentile of rainfall data be used as the basis of the design. This contrasts with the approach taken by AS/NZS 1547:2000 that uses the 70th percentile data range as the base level of expected rainfall. This represents a serious problem for producing on-site effluent disposal recommendations where the area of land required for disposal may be considerably underestimated if the *Envir. & Health Protection Guidelines* are used.

1.5 On-site Storage

In addition to the above discrepancy it is recommended in *the Envir. & Health Protection Guidelines* that in times when rainfall exceeds evaporation that wastewater must be stored. When AS/NZS 1547:2000 is used then storage of wastewater is rarely required.

1.6 Equipment Life Spans

Conflict in the life span of on-site sewage systems can also be found between the two reports. The *Envir. & Health Protection Guidelines* report an expected life of septic tanks at 25 years and AS/NZS 1547:2000 at 15 years.

1.7 Soils

1. 1. Table 6, *Envir. & Health Protection Guidelines* has many errors of calculation and should not be used as a guide of the limitations of different soil characteristics. Many of the soil features can be easily and inexpensively corrected (Cumming, 1999).
2. 2. AS/NZS 1547:2000 relies principally on a single table (Table 4.1.1) to rank soils on a range of soil characteristics (which are incomplete) and directed principally towards only drainage characteristics.

3. 3. Table 4.1A2 lists a series of soil characteristics, which are briefly described, but interpretation and impact requires a well-qualified and experienced soil scientist's input.
4. 4. There is improper use of the Emerson aggregate test (Table 4.1.D7), as the assessment process is not clear (this also occurs in *Envir. & Health Protection Guidelines*)
5. 5. AS/NZS 1547:2000 determines that sodic soils are one of the most important soil features, although sodic soils occur in few occasions, compared to other more important soil parameters.
6. 6. There is no emphasis on the issue of phosphorus sorption, although in all cases (over 500), that the author has investigated in the last seven years, P-sorption was the most critical area of the investigative process (after water volumes)
7. 7. AS/NZS 1547:2000 has scant regard for the very real issues of fertility management. These management issues are critical in the final assessment of an individual site.

2 Conclusion

On-site sewage management systems are widely used throughout Australia. Guidelines such as the *Envir. & Health Protection Guidelines* are of little use when accurate and better developed standards are in place such as AS/NZS 1547:2000. The consequences of the *Envir. & Health Protection Guidelines* in "real life" life have been a degradation of consistency and reliability within the on-site sewage management industry in relation to disposal requirements, expected effluent quality and volume, and the ability to suitably assess land for different sewage systems.

As local Councils develop strategies for domestic sewage management using different guidelines and standards that have conflicting recommendations, professionals working in the industry are left with a confusing number of guidelines with which to work.

Both the *Envir. & Health Protection Guidelines* and AS/NZS 1547:2000 have individually and collectively, serious problems. These are further exaggerated by there being little direction to the determining bodies (usually Councils) in the acceptance of reports from competent persons. The importance of properly certificated soil scientists in this process cannot be understated.

References

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