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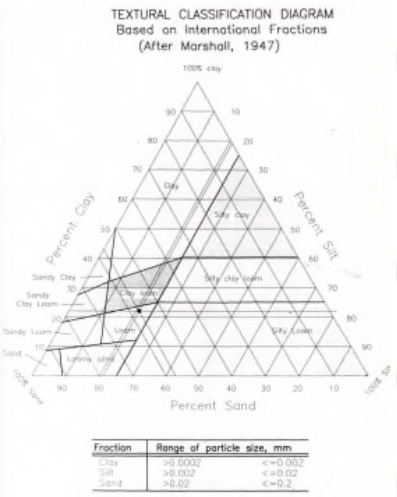
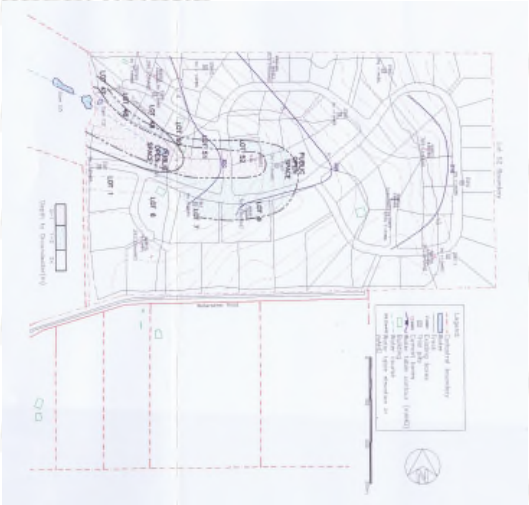
Acceptability of septic tank waste disposal systems for a hills-suburb residential development in Bedfordale, Private Developer.

The potential for residential development employing conventional septic tank effluent systems for a hills-suburb estate was assessed following queries raised by the local City and the Department of Health.

Site investigations were undertaken including trial pits excavated through the lateritic duricrust, to obtain soil samples and to conduct soak-away tests to estimate the soil permeability. In addition, four shallow groundwater monitoring bores were constructed to establish the available freeboard above the water table, and the background groundwater quality.





The Phosphate Retention Index (PRI) was analysed for the soils, and were found to be strongly to very strongly absorbing. The Cation Exchange Capacity (CEC) of the unsaturated soil was determined. Nutrient loading calculations were undertaken based on based on a range of likely generation volumes, and the ability of the soils to absorb, ammonia, nitrates and phosphorous nutrients was estimated under conservative assumptions that only 10% of the soil were available for attenuation. It was estimated that, for a worst case, the soils would be able to attenuate between 3.6 to 46-year of effluent production. However, in practice, considerably more attenuation potential would be available, including within the aquifer saturated zone, to off-set the nutrient loading.

The background groundwater quality was analysed, and compared with surface water quality with surface water dams and streams up and downflow of the dams. Raw water contained low numbers of faecal coliforms consistent with the presence native animals via overland-flow.

The percolation rate through the unsaturated zone was estimated from the soil permeability, together with the time of travel within groundwater to resurge as baseflow to the streams; the minimum time for resurgence was estimated at 1.5 years. The average time for 99.96% elimination of bacteria was that quoted from a literature search to be 23days, with a range of between 10 and 50days. On this basis, bacteria was unlikely to persist in groundwater to affect surface water quality.

The available dilution of groundwater baseflow discharge in surface water flow was estimated to be 1:28 or greater, which implies that there is appreciable dilution available to offset other potential contaminants associated with the effluent.

It was concluded that standard septic tank systems could be safely employed at the site, with an appreciable safety margin.

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