

Selection and Establishment of Suitable Plant Species on Phytocaps

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Abstract: Landfill operators are required by law to prevent the entry of water into landfills with the view to minimising methane emission and leachate generation. This is currently achieved via placement of compacted clay over the buried waste. Recent studies in the US demonstrate that the compacted clay caps leak due to cracking. These studies also suggest that *Alternative Covers* could be equally or more effective in minimising percolation.

Amongst all available alternative covers, *Phytocapping* is considered to be the most effective cover. In this technique, deep rooted vegetation is established on a layer of uncompacted soil placed over the buried waste. The soil used in phytocapping should act as good plant growth medium as well as storing water during rainfall events.

The overall performance of a phytocap, therefore, depends upon the plant species chosen for the purpose, and the nature and depth of the soil placed over the waste. Plants contribute to site water balance in two ways. First, their canopy intercepts part of the rainfall (*Canopy Interception* leading to direct evaporation). Second, plants transpire thus removing part of the water stored in the soil (*Biopumping*). The growth performance, canopy interception and biopumping capacity of plants depend upon the type of species used, climatic conditions, agronomic techniques used and the nature of the waste buried underneath.

A number of field trials have been established in different agroclimatic zones of Australia, viz Townsville, Rockhampton, Noosa, Brisbane, Lismore, Melbourne, Adelaide and Perth, with the view to identifying suitable plant species for phytocapping and to optimising the establishment techniques. The processes used in identifying suitable plant species, the techniques adopted in their establishment and the performance of certain species on sites that have been tested for up to 5 years, will be discussed in this paper, along with the lessons learnt through the processes on what could go wrong and how to avoid these pitfalls during phytocapping trials.