

## Subsurface drainage in South-West Victoria

W.K. Gardner and J.A. Gardner

RMB 7399  
Horsham 3401

It is estimated (2) that approximately 430,000 ha of south-west Victoria are significantly affected by soil waterlogging and subsurface drainage has been shown to overcome this problem (3). Drainage is now being implemented commercially and this paper describes recent developments .

### Drainage Methods

The basic drainage component is flexible corrugated plastic pipe with perforations to allow water to enter. This material is manufactured in both Victoria and Queensland. is available in 65, 80 and 100mm diameters and is supplied in 200, 100 and 100 m lengths respectively. The drainage pipe is usually installed with a covering of permeable fill ( most commonly gravel or scoria ) which meets the appropriate specifications ( maximum and minimum dimensions 50 and 5 mm respectively, sufficiently durable, non-toxic, non-soluble ) ( 1 ). In sands, a filter sock over the pipe may be used to exclude fine soil particles.

Two distinct types of drainage system are common in South-west Victoria to suit permeable and non permeable soils. In a permeable soil, control of excess water can be achieved by a grid of drains, the spacing of which is determined by the soil's ability to transmit water and by the drainage design criteria used. Various combinations of drain depth and spacing are possible, but usually depths of 1-1.2m are used with a design drainage rate of 7mm /day /ha. Permeable fill is usually used at a rate of 0.03m<sup>3</sup>/m of pipe. Permeable soil types are common in the Dundas Tablelands region and in areas of friable soil south of the Prince's highway.

Impermeable soil types are more common, and operations to improve the soil's ability to transmit water must be undertaken. This is usually achieved using mole drains ( channels formed in the clay subsoil connected to the surface by fissures and cracks ) or by ripping. Water flowing along these channels is collected at appropriate intervals into pipe drains via a band of permeable fill above the pipe ( 3 ). Typically 0.05m<sup>3</sup>/m of permeable fill and a drainage design coefficient of 17mm /day/ha are used.

Pipes are laid either by using trenching machinery or directly behind a tyne (trenchless method) with permeable fill being added as the pipe is put in place. The permeable fill is usually delivered through a hopper on the pipe layer from gravel carts fitted with side delivery conveyor belts. Laser control systems are used to ensure accurate grades.

The cost of subsurface drainage varies from \$750 to \$1,200 /ha depending on slope, soil permeability, cost of permeable fill and ease of water disposal. The lifetime of the systems is at least 50 years, and a range of new or improved enterprises is possible once waterlogging is controlled.

### Conclusion

Some 40,000m of drainage pipe is currently installed annually in South-west Victoria and a rapid increase is likely as the profitability of wool production increases.

### References

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