

# Using geophysics to locate *unmarked graves*

David Hunter

▼ *Undertaking a ground-penetrating radar survey of a park in Windsor (Melbourne, Victoria).*



Image courtesy Armin Schmidt

▼ *Monument section at Creswick Cemetery.*



Image courtesy David Hunter

Geophysics was originally developed as a means of locating buried minerals, but recent advancements have made these techniques applicable to archaeology and to the locating of graves.

The issue of unmarked graves can cause serious problems for cemeteries. Accidentally excavating an unmarked grave when digging a new grave causes emotional distress, delays for new interments and financial setbacks.

There are numerous geophysical methods which can be applied to finding unmarked graves; the decision to use a particular method in preference to another is dependant on the local soil, local bedrock and a number of other considerations.

The most commonly used survey technique for finding unmarked graves is Ground-penetrating Radar (GPR). GPR involves mounting a radio antenna onto a pram-like cart, and then simply pushing the cart along the ground in the area of interest. Radiowaves are transmitted downward from the antenna at regular intervals along the ground surface and are reflected back to the antenna whenever the signal comes into contact with any object of different electrical conductivity (such as any natural soil layering beneath the ground). The systems used are sensitive enough to detect the variation in soil moisture in graves (caused by the soil being above ground during the funeral service), making them detectable.

Geophysics is the ideal solution to finding unmarked graves, but due to the costs involved is often beyond the budget of most cemeteries. Currently, the Victorian Department of Health funds geophysical surveys under their 'Cemetery

Maintenance Grant' scheme.

In May, Hunter Geophysics undertook a survey of Creswick Cemetery using Ground-penetrating Radar, magnetometry, and a few other experimental techniques.



Image courtesy David Hunter

▲ *The area at Creswick Cemetery in which several hundred Chinese were buried in the 1860s.*

Many Chinese and some European people were buried in Compartment six at the Creswick Cemetery from 1858, with the last burial being in 1923, when 'Bobby' – the last Chinese person in Creswick – passed away. The size of the area is unknown due to the lack of maintenance in that area over many years. A geophysical survey will help the Cemetery determine the size of this area and will enable the Trust to make use of valuable empty space for future lawn graves.

For physical characteristics of the skeletal material (such as height) to be determined, the burial depth needs to be less than fifty centimetres below the ground surface.

Metallic objects in graves can be detected at greater depths, but their specific identification (e.g. jewellery or coffin nails) is not possible. Metallic or ceramic cremation urns can also be detected.

Archaeological work is being undertaken, particularly in north Western Australia's mining region, to avoid the accidental exhumation of indigenous graves ahead of infrastructure and property development. This is certainly another avenue where geophysics can significantly reduce costs and help ensure that Aboriginal graves are not disturbed in accordance with cultural and legal requirements.

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