

ATTENUATION OF GPR SIGNALS IN HIGHLY MAGNETIC SOILS AT THE NATIONAL MEMORIAL CEMETERY OF THE PACIFIC, HONOLULU, HI

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Attenuation of ground penetrating radar (GPR) signals is usually attributed to some combination of salt, water, or clays in the subsurface. The potential for magnetic properties of the soils being a significant contributor to the attenuation is usually ignored, and rightly so for many locations. Several published geophysical surveys performed at the National Memorial Cemetery of the Pacific, also known as the Punchbowl, demonstrated very poor results and were used as an argument against geophysics as a tool for forensic surveys. The Punchbowl is a volcanic cinder cone located in Honolulu, HI that was converted to an armed forces cemetery. An attempt to explain this documented poor performance is presented here where a series of fortuitous events allowed for a unique data collection. The lead author happened to be in Honolulu during a layover between fieldwork with his GPR equipment at the same time that a number of disinterments were occurring. While the graves were open, magnetic susceptibility profiles were measured in six graves and soil samples were collected at up to five depths. GPR profiles were collected along a number of profiles that crossed the open graves as well as common midpoint (CMP) surveys in the center of the profiles with 250, 500, and 1000 MHz antennas. Laboratory measurements of the complex permittivity, permeability and conductivity of the soils were performed to allow the calculation of the GPR velocity and attenuation. The results of these lab and field measurements will be presented in an attempt to quantify GPR performance at this highly magnetic site.