



# NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

## FACULTY OF APPLIED SCIENCES

**NUST LIBRARY**

**SPECIAL COLLECTION  
LIBRARY USE ONLY**

**Using the VLF electromagnetic method as an alternative to electrical resistivity for lateral profiling in groundwater surveys for borehole siting**



\* 9 2 0 0 4 0 0 7 9 1 7 \*

NUST Library

**NOBERT MAREVANHEMA  
(N003 2384X)**

LIBRARY NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY PO BOX 346 BULAWAYO ZIMBABWE		
DATE	ACCESSION	CLASS No.
15/05/07	1805	SC TD404 MAR

**A thesis submitted in partial fulfilment of the requirements of a Master of Science degree in Geophysics in the Department of Applied Physics.**

**JULY 2005**

## **Abstract**

Surface geophysical methods are used in groundwater investigations to locate and map subsurface aquifers, using surface measurements of physical properties of the ground. For borehole siting it is essential to first locate potential sites before drilling. Electrical resistivity and conductivity are the physical properties widely used for groundwater surveying. In this study the very low frequency (VLF) electromagnetic method was used in conjunction with the electrical resistivity method to investigate the lateral variations in the ground resistivity. The investigations were intended to find out if the VLF method could replace the Schlumberger electrical resistivity method for locating potential sites for vertical electric sounding. The results showed that the two methods located the same sites along the marked profile lines, with the VLF method cheaper and easier to handle. The vertical electric sounding (VES) results were used for ground modelling using the method of curve matching. The obtained models were then used to estimate the thicknesses and the resistivity of the layered Earth at the potential sites.