



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

**GEOPHYSICAL INVESTIGATIONS FOR GROUNDWATER
IN THE SEMI ARID REGIONS OF MATEBELELAND**

NDLOVU SHAKESPEARE

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

May - 2006

ABSTRACT

The land resettlement in Zimbabwe resulted in the increased use of groundwater for small-scale irrigation purposes. This has resulted in increased groundwater exploration activities in the former commercial farms. Unscientific methods are being used in the majority of cases with catastrophic and huge sums of money lost in a number of proposed projects. As part of a program to utilize integrated proven scientific methods for groundwater resource investigation in the semi-arid granites region of Matabeleland south in Zimbabwe, Electromagnetic methods and Geoelectrical methods were used at Bungalow ranch. These methods were used to site boreholes to be used to supply water for irrigating a twelve hectare paprika field. In this investigation a survey method, which includes the combined use of the EM and VES methods, was developed and refined to accurately locate prospective borehole sites. Fractured zones and variations of bedrock surface were traced by profiling technique using FDEM methods, while depth variations measurements were done at selected sites chosen using the FDEM data. The VES technique was then used. The data results from the FDEM were processed using the surfer software whilst for the VES results a computer curve matching software was used. The results from the combined methods proved more than adequate for providing information that can be used to site boreholes.