

1983/59. Magnetic investigation at The Squares Marsh as an aid to siting a groundwater bore.

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Abstract

Results of two total magnetic field traverses at The Squares Marsh indicate that dolerite is unlikely to be intersected at the proposed groundwater bore site.

INTRODUCTION

An exploratory groundwater bore is planned for the northern end of The Squares Marsh [EP079087] near Bothwell. The proposed bore site is situated on Quaternary sandy deposits and the groundwater targets are the sediments below and just above the boundary between the Upper and Lower Permian Super-Group rocks. A nearby (within 100 m) stratigraphic hole nine metres deep intersected unit 'P_j' (freshwater predominantly feldspathic sandstone) at a depth of four metres.

It is desirable that Jurassic dolerite, which crops out within a few hundred metres to the north, east, and west of the proposed bore site, is not intersected when the hole is drilled. A magnetometer survey was carried out to determine whether dolerite underlies the Quaternary deposits and, if not, the approximate location of the dolerite boundary. As an interpretative aid, a control traverse was run across a dolerite/(Permian) sediments boundary free of Quaternary deposits and located a few hundred metres north-east of the proposed bore site.

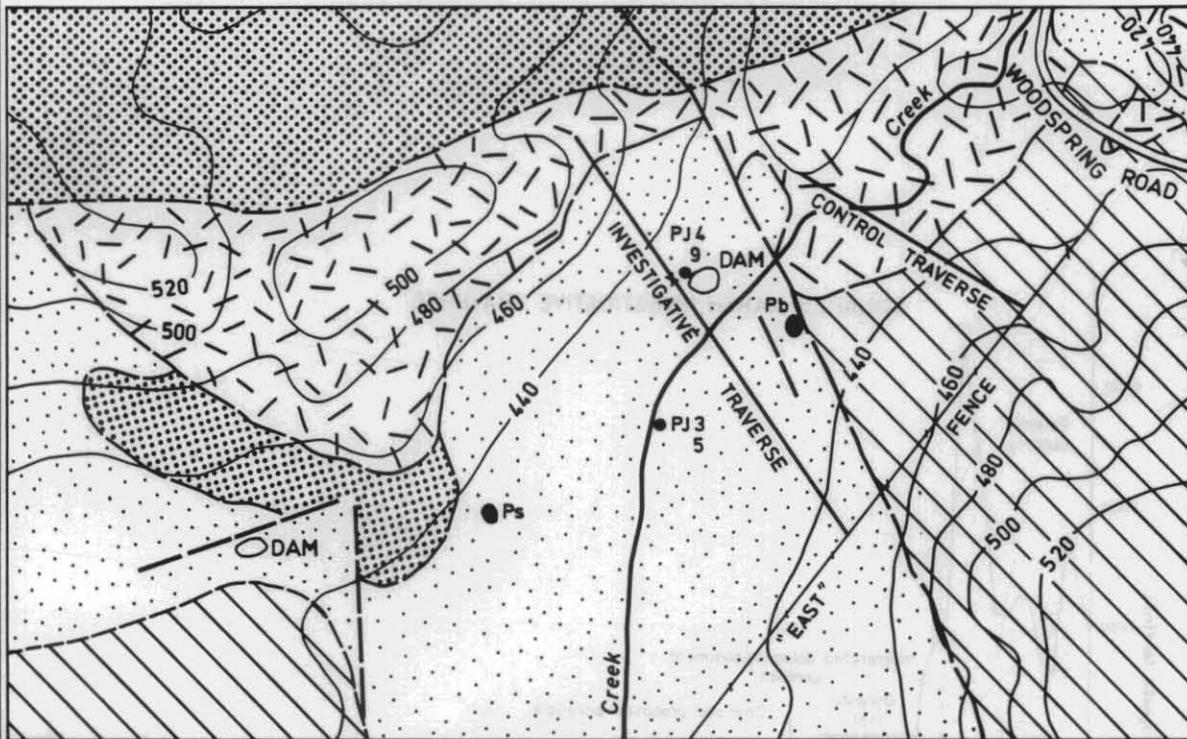
OBSERVATIONS AND RESULTS

Observations of the total magnetic field were made with a McPhar GP-70 proton magnetometer. The investigative traverse (bearing 145°T) commenced ten metres north-west of the 'East Fence' and ended 900 m later on dolerite. The control traverse commenced on dolerite, had bearing 120°T, covered 460 m and terminated over Permian sediments. Base stations were established, one near the centre of each traverse, but the temporal magnetic variations were not sufficiently large to necessitate the application of corrections. Both traverses are shown in profile form in Figure 2.

INTERPRETATION AND CONCLUSIONS

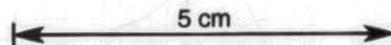
The control traverse shows high amplitude irregular peaks and an overall increase in magnetic field values over the dolerite. The contact with the Permian sediments occurs near where the magnetic profile dips to a minimum at the start of the quiet section over the sediments. Comparison of the profiles of the investigative and control traverses shows that the profiles are essentially similar, and we may conclude from the results of the control traverse that the dolerite/sediment contact beneath the Quaternary of the investigative traverse occurs at the profile dip as indicated in Figure 2. It is expected that dolerite does not underlie the Quaternary deposits at the proposed bore site and further, if the bore is drilled, that dolerite would not be intersected in the first hundred metres and probably not for several hundred metres.

GEOLOGY OF
**NORTHERN SQUARES MARSH AREA
 AND LOCATION OF MAGNETIC TRAVERSES**



- Quaternary deposits*
- Triassic quartzose sandstone*
- Ps *Permian marine siltstone and mudstone*
- Pb *Permian sandy granule conglomerate*
- Pj *Permian freshwater feldspathic sandstone*
- Jurassic dolerite*
- x *Proposed borehole*
- — *Fault position approximate*
- Pj4
9 *Borehole with subsurface depth in metres to geological units indicated. Total depth given by lower figures*

Figure 1.



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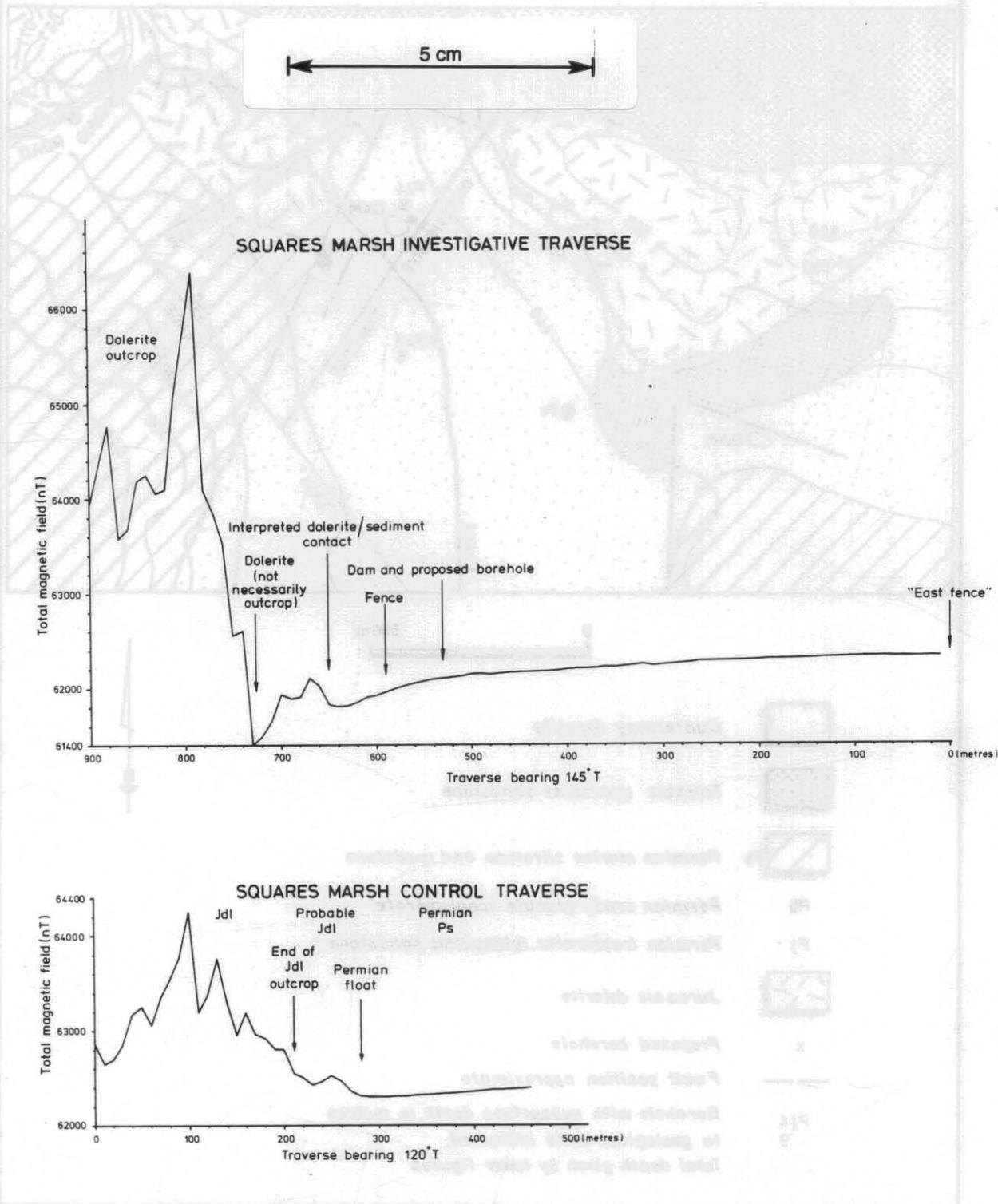


Figure 2. Magnetic profiles, The Squares Marsh