

## I N D E X

1. Report on subject-matter.
2. Cadastral map 1:250,000, covering the region concerned, with iso-hyethals to indicate the aerial distribution of the observation bore-holes, rainfall stations and river gauging stations.
3. Geological map.
4. Average yield of the productive boreholes as per farms. Below-surface water level Contours.
5. Comparison graphs of riverflows and rainfall totals in the ground water levels.
6. Comparison graphs of rainfall fluctuations with ground water levels.
7. Hydrograph of the Marico River at the Eerstespoort Dam (Stn. 99)

PROPOSED EERSTEPOORT DAM SITE ON THE  
MARICO RIVER AND AREA OF PROPOSED  
WATER SUPPLY. - STOCKGRAZING.

---

Geological conditions at the proposed Eerste-  
poort dam site and area for the water supply are as  
follows:-

The Marico River flows northwards from Zeerust  
to Derdepoort. The valley of the river cuts through the  
geological formation nearly <sup>at right angles</sup> vertically.

Geologically a part of this area belongs to  
the Transvaal system, ~~and~~ changing to Ventersdorp System  
near to Derdepoort, but the majority of the proposed water  
supply area belongs to the Igneous Complex of the Bushveld.

- a). Transvaal system represented in this area com-  
prises block of fairly soft shale of Pretoria series in  
which quartzite, andesite and dolomite occur. As a whole  
the system is characterized by the strong development of  
the zone of <sup>banded</sup> ironstone at the top of the dolomite.  
Beds of <sup>banded</sup> ~~charts~~ <sup>cherts</sup> are seen alternating repeatedly  
with thin bands of dolomite.
- b). The Ventersdorp System is represented in this  
area by various kinds of lava.
- c). The greater portion of the waterbearing formation  
belongs <sup>to</sup> the Igneous Complex of the Bushveld and <sup>is</sup> represented  
by red granite.

The rocks underlying the superficial sediments:-  
The upper portion of the granite is fairly decomposed (in  
various depths up to 150), therefore the rainwater can

infiltrate / ...

infiltrate deeply into the granite. Rock outcrops on the northern part of the area are practically absent except for several inselbergs surrounded by debris and gravel collars. The slopes of the inselbergs are fairly steep.

The superficial deposits are black or chocolate coloured turf soil, but towards the South at foot-hill region redish laterite soils occur. Large deposits of alluvium occur in the lower reaches of the Crocodile River.

The superficial deposits interrupted occasionally by surface limestone, which sediment has probably been derived from the dolomite of Witfontein Rand to the South.

The altitude ranges from 3000 to 3500 feet. Over the greater portion of this area there is a very gentle and hardly perceptible fall in elevation towards the West.

The major portion of the area falls within the drainage basin of the Marico and the rest belongs to the Crocodile River. Part of the watershed is reasonably well defined (South-East towards the Witfontein Rand Ranges) but elsewhere it is very indefinite.

The Marico is the largest river in this area, the upper waters of which are supplied from perennial springs in the Dolomite area of the high veld, has here cut out for itself a deep channel in a general north and south direction, irrespective of the nature of the formations encountered in its course. The gap through the Dwarsberg is known as Eerstespoort, that through the Black Reef escarpment being known as Tweedespoort, while the poort where the river cuts through the felsite range close to the Bechuanaland border is called Derdepoort. From this poort the river flows in a slightly more easterly direction through the flat bushveld, occupied by the Older Granite until it finally joins the Crocodile River.

Usually the Marico carries a perennial flow of water throughout its course, but during very dry seasons,

as that this year, it may show very little if any, surface flow below Eersteport, the bed of the river consisting mostly of deep sand.

The area has a fairly arid subtropical climate with very hot summers but fairly moderated winter. Very often frost occurs and the temperature sometimes drops below freezing point.

The average annual rainfall is 20 inches or 500 mm. From Eastwards West the rainfall gradually change and it is slightly higher in the mountainous area. This area is over grown by shrub and only near to rivers has it been cleared for the cultivation <sup>of</sup> crops (mealies, peanuts, lucerne and seldom tobacco) because there the river water can be used for seasonal irrigation.

On the area in question the percentage of product and inproductive boreholes are as follows:- from 720 boreholes 285 are productive (40%) and 435 are unproductive (60%). The average yield of the productive boreholes is + 680 g.p.h.

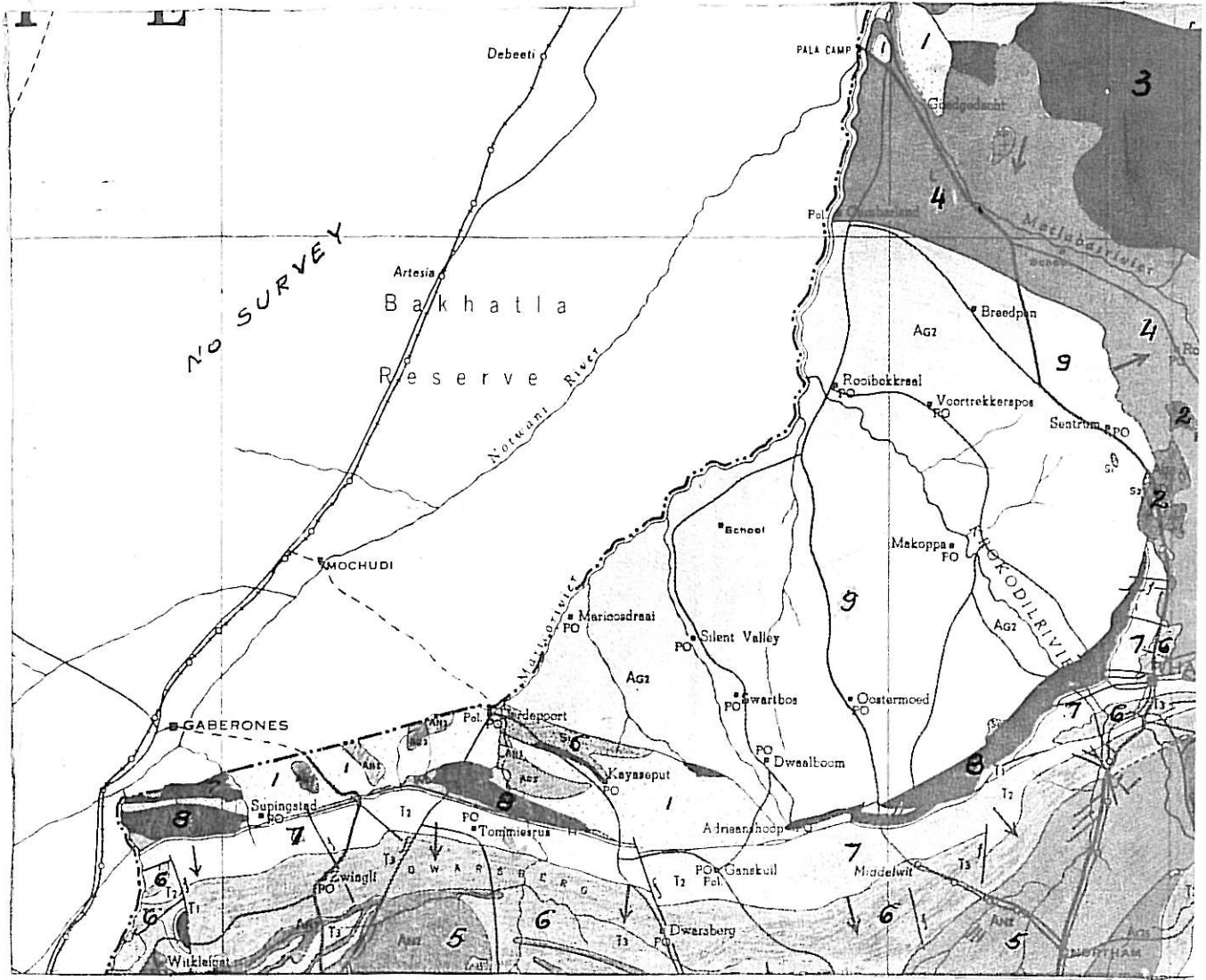
From ~~As~~ the attached map it is evident that the colour in yield areas are highly irregular, there is no continuity in the transition from lower to higher yield areas. Most probably these fluctuations are being caused by a series of dykes (diabase). Unfortunately at present we have no details on geological <sup>7</sup> ~~lead~~ therefore it is difficult to trace the course of the presumed compartments.

During my last field trip along Marico Valley from Derdepoort towards North Transvaal observed at several points indication of dyke formation (diabase).

Our division has installed 6 recorders to determine ~~of~~ water level fluctuation. The investigation began February 1961 and the recorders are still operating. (See the attached graphs.)

K. D. ...  
hydrological  
20 - 5.1965

# GEOLOGICAL MAP.



- 1 Superficial deposit, Sandstone, Limestone, Marl, Sand. (Tertiary to recent)
- 2 Granite (Bushveld igneous complex)
- 3 Sandstone, Conglomerate (Waterberg system)
- 4 Shale, Quartzite, Conglomerate, Subordinate limestone.
- 5 Gabbro, Norite (Bushveld igneous complex)
- 6 Shale, Quartzite (Pretoria series)
- 7 Dolomite, Ironstone, Chert, Shale, Quartzite, Conglomerate.
- 8 Andesitic Lava (Dominion Reef system)
- 9 Old Granite.