

## 8. SUMMARY AND CONCLUSIONS

The gravity survey indicated a clear regional pattern of gravity highs and lows. Geological field evidence indicated that gravity highs are always associated with outcropping dolomite or dolomite under a thin cover.

Drilling results have shown that most of the narrower and shallower gravity lows are usually related to leached zones, whilst the major gravity anomalies, at least in the test area are often caused by leached zones which have been filled with alluvial gravel.

The aim of the survey, to establish the presence of leached zones and palaeosinkholes in which gravel deposits may be present, was successfully reached. Although time-consuming and therefore expensive it is the only method which has thus far been proved to be of use in the search for these subsurface structures.

Because of the dimensions of the structures involved, the 50 m spacing of stations was sufficiently close. A closer grid would not have provided sufficient additional information to justify the expense. A larger station spacing might have missed several structures.

The success of the gravity survey can mainly be attributed to the significant density contrast between the dolomite and chert on the one hand and the material in the leached zones (wad and residual chert) and superficial deposits on the other.

The position of the Grasfontein dyke was accurately located by means of the magnetic survey. No other magnetic bodies were detected.

From the unsuccessful search for kimberlitic minerals in the gravels, which are otherwise so rich in diamonds, and from the abundance of Waterberg quartzite pebbles which were partially transported to the Lichtenburg area by the ice flows of the Dwyka glaciation, it is felt that the diamonds went through a polycyclic sedimentological history. The palaeorivers of which the gravel runs at Bakerville are remnants

must have been eroding the Dwyka tillite which was locally rich in diamonds. The kimberlitic minerals, not being as stable as diamonds, were eventually broken down by mechanical and chemical weathering in glacial and fluvial environments, and environments that existed before the Dwyka glaciation. Few garnets and ilmenites were saved from this destruction and these were deposited in small quantities in some of the major potholes.

From glacial directions and the location of the source area of the gravels it was concluded that the pre-Karoo kimberlite intrusions that were responsible for the diamonds in Bakerville are situated a considerable distance in north-easterly direction from the Lichtenburg-Ventersdorp area.

It might thus be desirable to sample some of the outliers of Dwyka tillite between Swartruggens and Lichtenburg to establish the possible diamond content in order to verify this proposed hypothesis.

Finally, a more accurate correlation of the gravels from different localities appears to be important. This might be done by a magnetic susceptibility survey. This method proved to be successful in Canada to distinguish between different surface tills (Gravenor and Stupavsky, 1974).