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LOWER PHONGOLO RIVER: SHEMULA COMMUNITY WATER SUPPLY
SCHEME
PALAEOLOGICAL/GEOLOGICAL SURVEY OF THE PROPOSED SITE
FOR
THE PUMP STATION AND PURIFICATION PLANT

By

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**Lower Phongolo River: Shemula Community Water Supply Scheme -
Palaeontological/Geological Survey of the proposed site for
the pump station and purification plant.**

Brief

To undertake a palaeontological survey of the proposed site on the Phongolo River for the Shemula pump station and water-purification plant.

Location

The proposed site for the Shemula pump station and purification plant (Fig. 1) is situated on the north bank of the Phongolo River at latitude 27°02'29"S and longitude 32°15'14.3"E. It is reached by taking a dirt track to the southeast, off the tarred road from Jozini to Makanes bridge, 1,7km beyond the dirt-road turnout to Ndumu. The site is located on the north bank of the Phongolo River, to the north and west of the existing stock-water pump house, and the vegetation covering is dominated by rather thick *Acacia* scrub in which the larger trees are a *Combretum* sp.

Geology

Much of the proposed site is blanketed by bright red silty-sands of Berea type, resulting from decalcification of underlying calcareous deposits; gully exposures suggest these are at least 1m thick. The presence of Middle and Later Stone Age artefacts in slope colluvium of these "red sands" provides a minimum age for the base of this unit. The only exposures of hard rock were encountered along the bank of the Phongolo River itself where thickly vegetated and largely inaccessible cliffs are developed. At the eastern end of this cliff section, however, some 100m west of the existing stock water pump house, an accessible exposure is encountered (Fig. 2) displaying subhorizontally-bedded strata (from the situation elsewhere on the coastal plain there is probably a slight depositional dip of 2-3° to the east, although this is not evident in the limited exposure). At the base of the succession are some 4m of dark olive-green fossiliferous siltstones of the Mziniene Formation with sporadic calcareous nodules of varying sizes; the lower 2m is a scree slope and thus poorly exposed. Petrographically, this unit classifies as a poorly sorted and bioturbated, bioclastic, muddy siltstone. The fine-grained nature of the Mziniene Formation at this locality and its marine fauna, together with *in situ* occurrences of the burrowing bivalves *Modiolus* and *Pleuromya* and the absence of shell beds, suggests deposition under low-energy conditions in a mid- to outer-shelf environment (probably about 80-100m depth).

The upper 1m of the Mziniene Formation at this locality is pale greenish-grey and displays numerous, closely spaced, discontinuous, bedding-parallel parting planes with thin encrustations of white carbonate. Petrographically, it is identical to the sediments in the lower part of the exposure and the physical differences, i.e. the closely spaced parting planes and the carbonate encrustations, are ascribed to a period of erosion, subaerial weathering and leaching, perhaps during the late Cretaceous/early Tertiary, prior to deposition of the overlying carbonates.

The top of the cliff section is capped by some 30cm of hard, mottled, fossiliferous limestone which, using available lithostratigraphical nomenclature, can only be assigned to the Uloa Formation. Petrographically it classifies as a neomorphosed sandy biosparite containing numerous ferruginized larger foraminifera, and deposition was in a nearshore shallow-marine environment. Lithologically this limestone contrasts markedly, both petrographically and palaeo-environmentally, with the underlying sediments of the Mziniene Formation and indicates the presence of a disconformity, i.e. transgressive onlap. Although the presence of such a

discontinuity could not be proven in the limited field exposure available, such a relationship is encountered frequently on the coastal plain and is highly likely. Decalcification of this Tertiary unit is responsible for the Berea-type red sands which blanket the surface.

Palaeontology

(a) The Mzinenne Formation

The Mzinenne Formation at the proposed site has yielded a classic Lower Cretaceous invertebrate fauna, mostly preserved as internal moulds. Ammonites from the section serve to date the deposit to the uppermost Albian (*Stoliczkaia dispar* Zone, *Faraudella gardonica* Subzone), suggesting an age of about 98 million years, and the identified macrofauna includes the following species:

Ammonoidea

Stoliczkaia notha (Seeley)

Paraturrillites escherianus (Pictet & Campiche)

Mortonoceras (Durnovarites) subquadratum (Spath)

Bivalvia

Modiolus sp.

Pleuromya sp.

Gervillia sp.

Pterotrigonia sp.

Panopea sp.

Pholadomya sp.

Unidentified astarids

Gastropoda

Unidentified naticids

Echinoidea

Hemicaster zululandensis Besairie & Lambert

(b) The Uloa Formation

The only macrofossils from the Uloa Formation at the Shemula site were an internal mould of an unidentified heterodont bivalve, and some thick-shelled oyster fragments, perhaps *Crassostrea*. The age of this unit is certainly Tertiary, the presence of ferruginized larger foraminifera, together with an altitude of about 45m for the disconformable base of the Tertiary at this site, favours correlation with the "Flaggy Calcareites" of the Uloa type section and suggests a Neogene (perhaps Pliocene) determination.

Site evaluation

From a geological and palaeontological point of view, the proposed site for the Shemula pump station and purification plant has no economic potential. Ore deposits are absent and it holds no special geological or palaeontological interest; similar fossiliferous strata of the Mzinenne Formation are exposed over wide areas of the Zululand coastal plain, from the Mzinenne River in the south to the Mozambique border in the north. Likewise, the thin layer of the Uloa Formation has no economic potential, and is equally widely distributed. Although the site is worthy of geological and palaeontological documentation, such an evaluation is covered by this report.

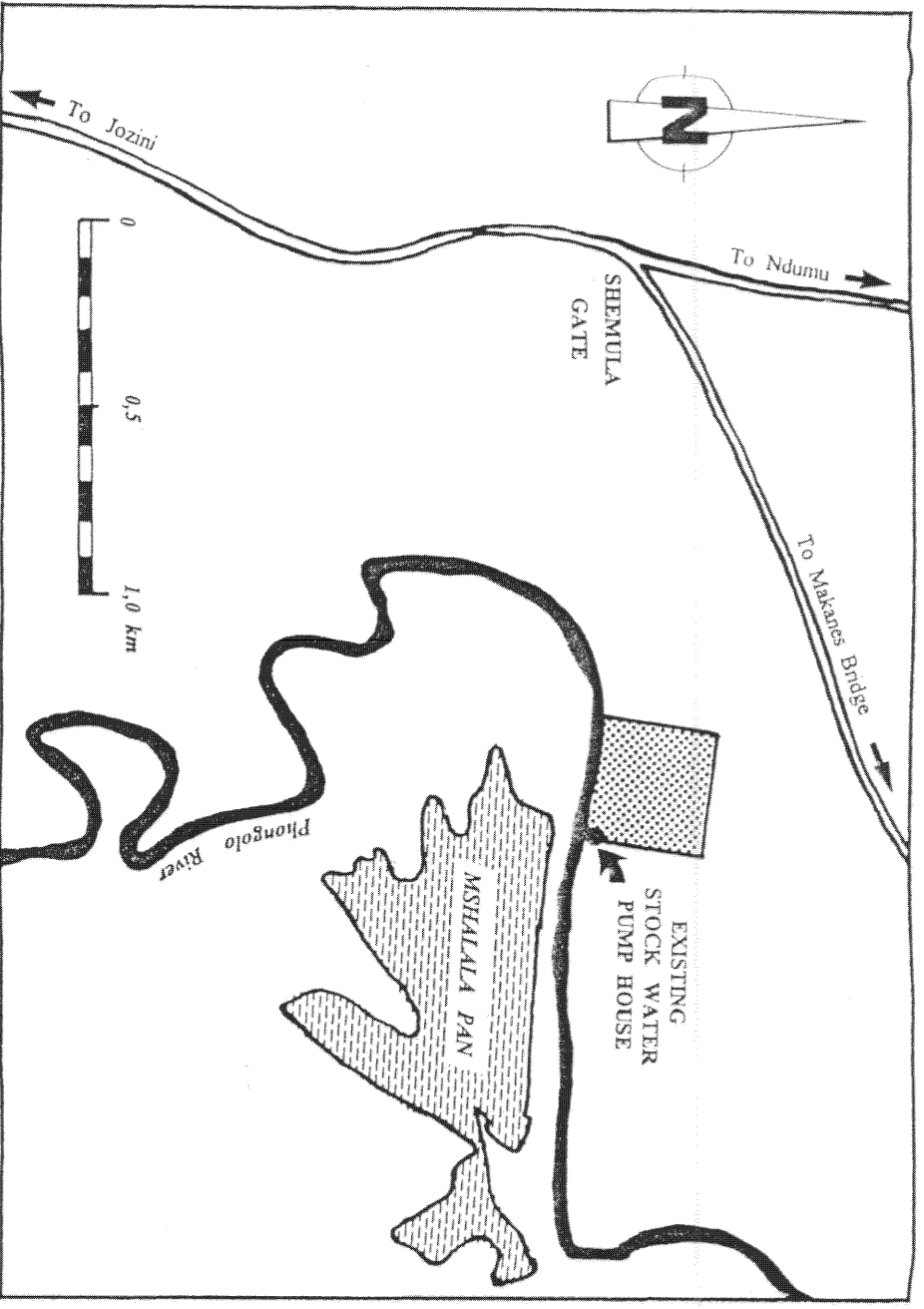
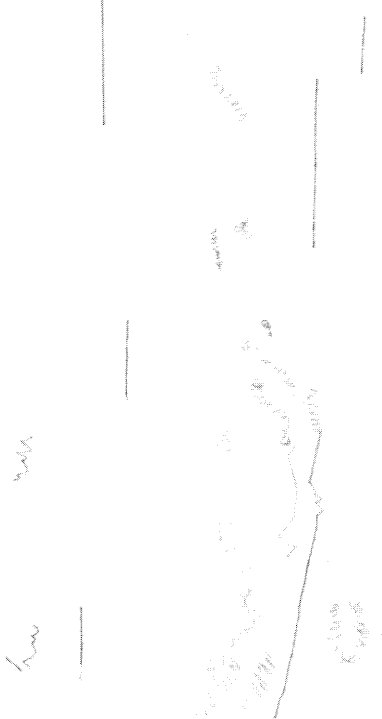


Figure 1



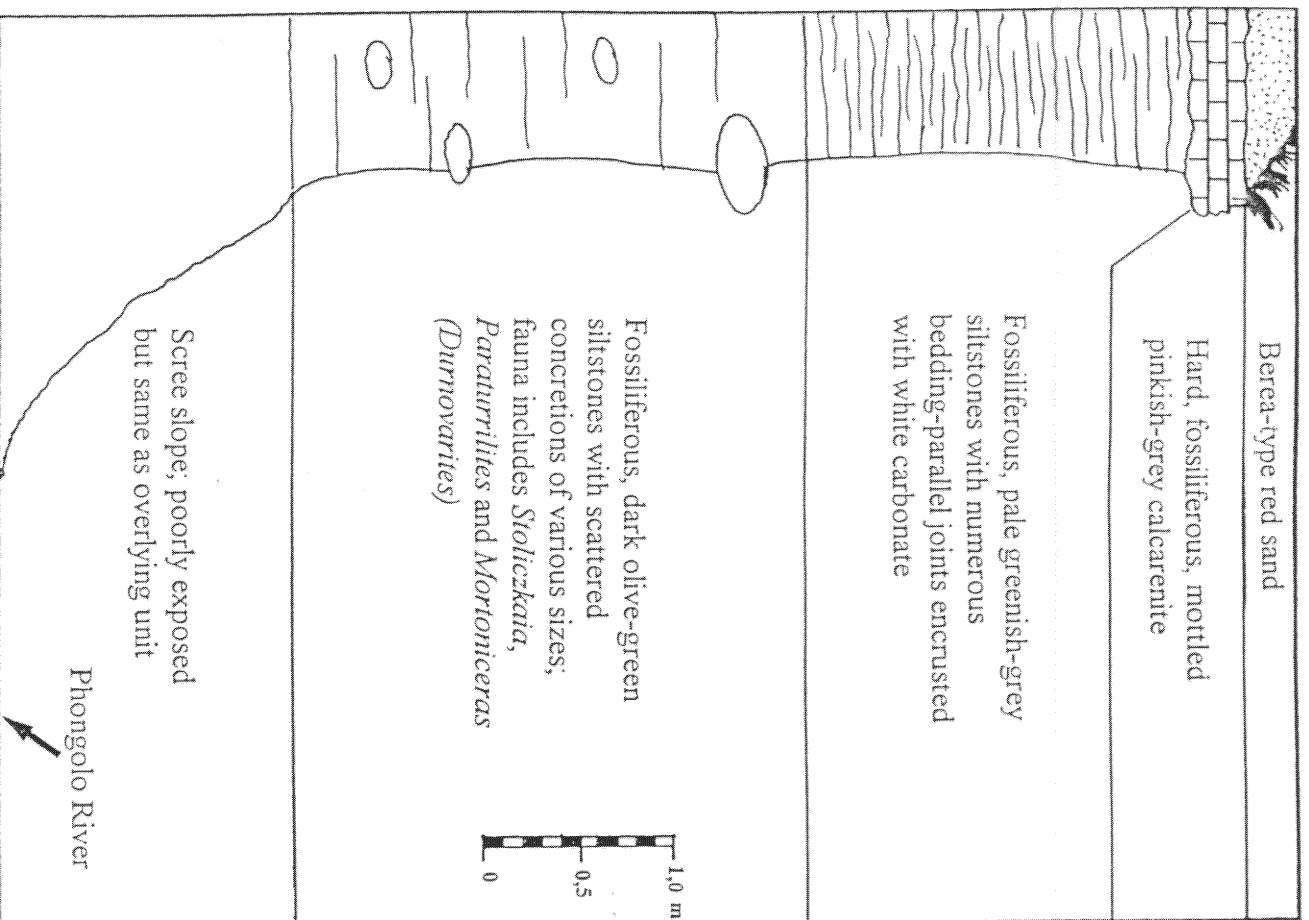


Figure 2