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Eskom Majuba Power Station – Ash Disposal Facility Exemption Extension: Soils specialist opinion

1. Background

The current ash disposal facility (ADF) at Majuba Power Station, Mpumalanga, will need to be expanded at some future stage. As part of this process, a soil study was carried out in 2014 by ARC-Soil, Climate and Water (Paterson, Mushia & Mkula, 2014).

This study firstly assessed the broad feasibility of several areas around the power station and then carried out a detailed field investigation of an area to the south of the existing ADF. This is shown by the red outlined area in the map below, which comprised a total area of 804 ha.

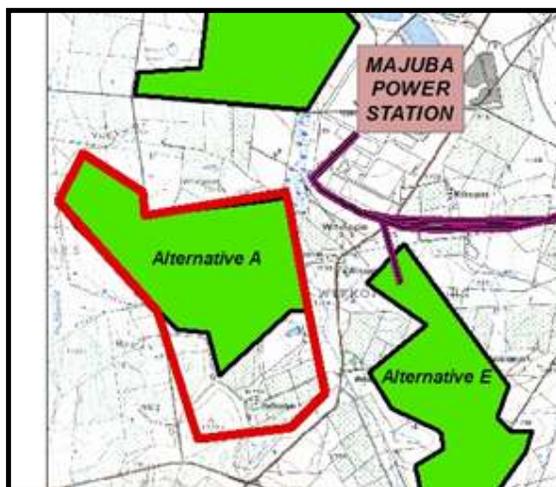


Figure 1 Area of detailed soil survey

In that exercise, the soils were systematically surveyed on a 150 x 150 m grid, and similar soils were grouped into mapping units. The agricultural potential and other properties of each unit could then be assessed.

2. Extension

ARC-SCW was contacted by Eskom, through Gemini Consulting, about a proposed exemption extension at the ADF, whereby an area would be used for ash disposal without a liner. The request was made to assess the soils occurring in this area and to provide a specialist opinion on their suitability or otherwise.

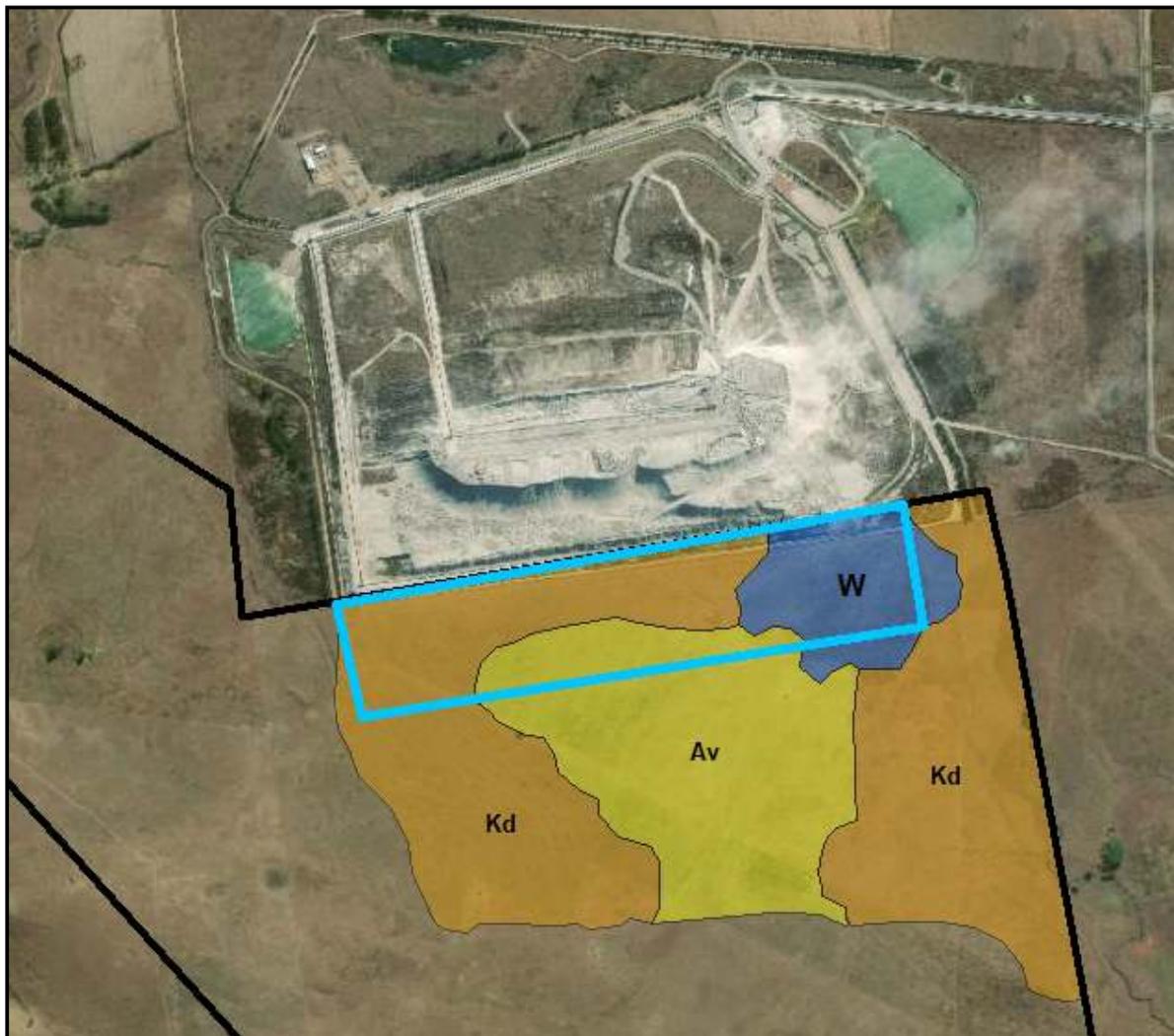


Figure 2 ADF Exemption Extension

In Figure 2, the block for which the exemption extension is applied is shown in light blue. Within this block, three mapping units occur, namely: **Kd**, **Av** and **W**. **Kd** represents dominantly soils of the Kroonstad form, **Av** represents soils dominantly of the Avalon form (Soil Classification Working Group, 1991), while **W** represents wet areas.

As defined in the soil legend of the previous detail survey, the **Kd** and **Av** map units have certain similarities, namely a grey-brown to brown, structureless, loam to sandy loam

topsoil (0-250 mm) overlying a grey-brown (**Kd**) or yellow-brown (**Av**), structureless, sandy loam to sandy clay loam subsoil (250-900 mm), overlying grey, sandy clay to clay subsoil, either with iron & manganese oxide mottling (**Av**) or streaked mottled gleyed material (**Kd**), usually from 900 mm deeper.

Both of these map units can be cultivated, but the **Av** unit is seen as having a somewhat higher potential. This is due to the loss of iron (yellow colouring) in the subsoil and consequent bleaching that has taken place to produce the grey colours in the **Kd** unit, with a subsequent lower natural fertility.

The problem is the **W** unit, shown in blue in Figure 2, which occurs in the east of the extension block. Here, the **W** stands for wetland, and the soils were not investigated in detail due to the low-lying nature of the area, with prevailing wet conditions. A warning was included in the original report (Paterson, Mushia & Mkula, 2014) that such areas be protected, due to possible contamination of watercourses, either directly, by subsurface leaching, or by downstream effects. It is thus difficult to recommend that any disposal of ash, or any other disturbance for that matter, be permitted in this area.

The prevailing 1:50 000 scale topo-cadastral map shows the symbol for marshes/wetlands in this area, and the difference is clearly visible on Google Earth.

3. Recommendations

- a) That a wetland survey (soils & vegetation) be carried out for that portion of the extension site in order to accurately determine both the extent and type of wetland conditions (permanent, seasonal or temporary).
- b) That the services of a geohydrologist or similar specialist be obtained to give more advice on possible subsurface water movement caused by leaching and/or seepage, both from the existing ADF as well as from any possible extension.

Yours sincerely,



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References:

Paterson, D.G., Mushia, N.M. & Mkula, S.D., 2014. Soil Survey for Proposed Ash Disposal Facility, Majuba Power Station, Mpumalanga Province. Report No. GW/A/2014/12, ARC-Soil, Climate and Water, Pretoria.

Soil Classification Working Group, 1991. Soil classification. A taxonomic system for South Africa. Institute for Soil, Climate & Water, Pretoria.