

25 May 2023

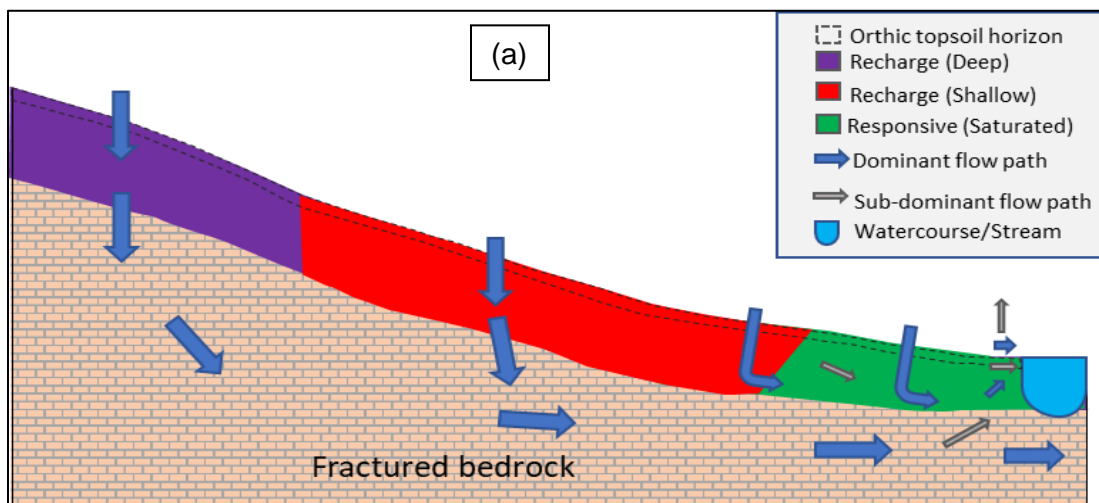
To whom it may concern

SUBJECT: HYDROPEDOLOGY STATEMENT FOR THE PROPOSED HARMONY MISPAH 1 TSF RECLAMATION AND PIPELINES PROJECT.

Dear Sir / Madam,

The Biodiversity Company has been commissioned to provide a hydrogeology statement in support of the Water Use License (WUL) process for the proposed new 600 mm slurry pipeline, 100 mm potable waterline, 150 mm sewage line and 500 mm low pressure process water pipelines and associated infrastructure upgrades for the Harmony Mispah 1 TSF Reclamation project within the Dr Kenneth Kaunda District Municipality (DM) in the North-West Province. The upgrade refers to an increase in capacity of the plant to accommodate a future effluent, water, and slurry flows. This statement pertains to the relevance of hydrogeology, and any associated risks towards the adjacent watercourses.

Several model exercises were undertaken to determine the catchment extent of the sub-basin for the wetlands associated with the project area as well as the Vaal River in proximity to the project boundary. These models indicate minimal to no impacts are expected. The site is in a land type commonly associated with deep recharge soils (i.e., Hutton, Ermelo, Nkonkoni and Vaalbos soil forms) and shallow recharge hydrogeological soil groups (i.e., Mispah) see Figure 1. The relevant land type also suggests high concentrations of shallow recharge soils (i.e., Glenrosa soil forms) and plinthic catena (i.e., Soft plinthic horizons) around the project area and the catchment. Some of the lower slope terrains are characterised with interflow A/B soils (i.e., Lamotte soil form). It is worth considering the source of water associated with the moisture content within the watercourse.



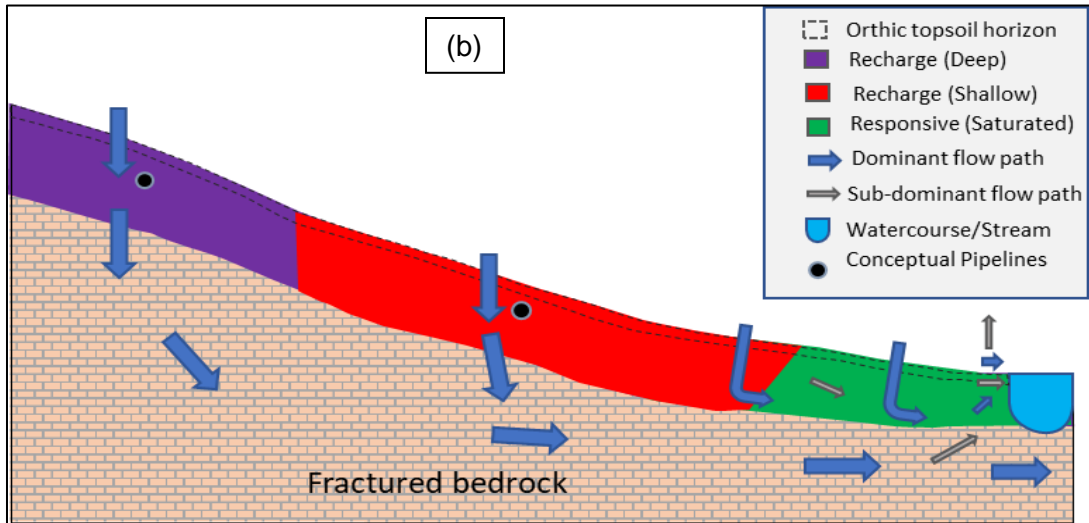


Figure 1 showing a) Hillslopes response before the proposed pipelines and; b) Hillslopes response after the construction of the proposed pipelines and associated infrastructure

Wetlands were identified for the Vaal River water regime system. The reach of the Vaal River adjacent to the proposed infrastructure upgrades, pipeline and pump stations derives the majority of its water flows from the catchment north-east, which is characterised with recharge soils and on the east direction, dominated with interflow A/B soil hydro-pedological groups towards the project area. This indicates that surface and also subsurface recharge flows are predominantly responsible for the level of moisture in the watercourses. Construction of the new facilities will have a limited impact on the recharge soils in proximity to the site's catchment as vertical flows towards the water table recharge stores (deep and shallow recharge) will be minimally impeded see Figure 1 b). Limited impacts can also be expected where the upgrades of pipelines and pump stations foundation intercept hillslopes with interflow soils as the lateral flows will respond to vertical flow paths still recharging the catchment water stores sufficiently. It is however worth-noting that, even though the impact is minimal, the predominate interflow A/B hydro-pedological soil group associated with the project area should also be properly managed. This can minimise surface return flows or drainage problems which commonly promote loss of water as surface run-off or evaporation demands increasing the total catchment deductible water losses. The areas with responsive saturated soils (i.e., Katspruit soil forms) in the project area should be preserved and not used for any developmental activities as such soils acts a water receptor responsible for groundwater stores and recharges

When comparing the size of the project area with that of the combined sub-basins responsible for providing moisture content to the wetland systems and Vaal River, it is clear that the potential worst-case scenario loss of moisture to the wetland is approximately < 3% of the total water regime on a catchment scale. Therefore, when considering a percentage loss of total streamflow and groundwater recharges, negligible losses are expected, predominantly due to the fact that the bulk of the river's moisture and waterflows already originates well upstream of the project area and around the catchment.

Therefore, it is the specialist's opinion that the proposed Harmony Mispah 1 TSF Reclamation and Pipelines Project will not result in a significant loss of total streamflow and groundwater recharge. It is therefore recommended that the proposed activities proceed as have been planned, and no further detailed hydro-pedology assessments are required.

Regards,

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