

777 Peridot Street  
Jukskei Park  
2158

Tel: +27 81 319 1225

09 March 2023

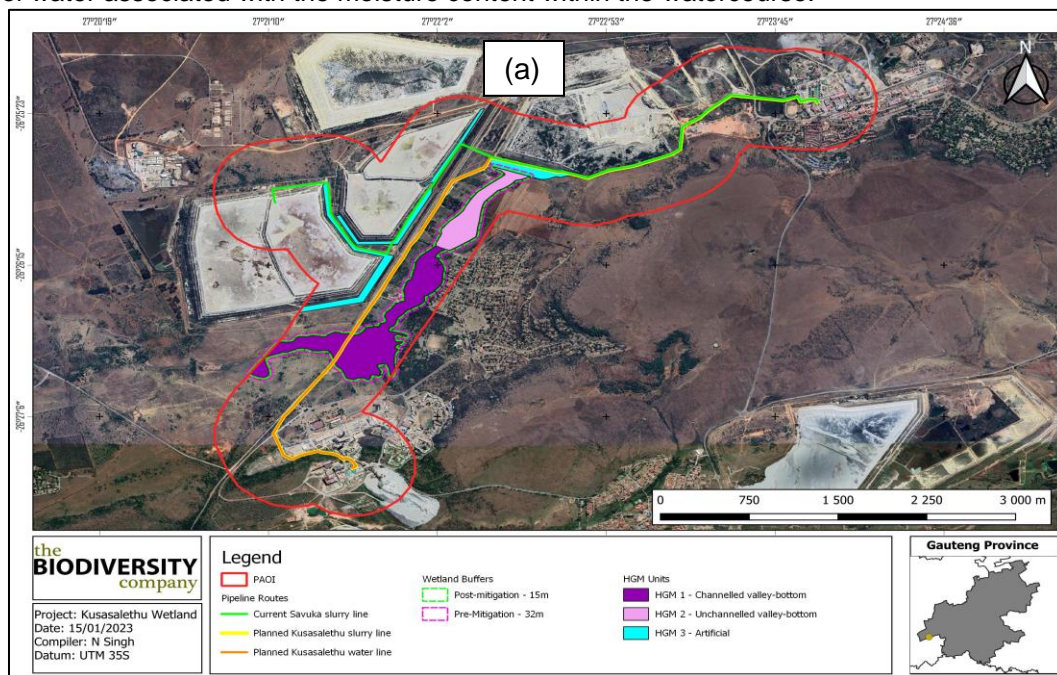
To whom it may concern

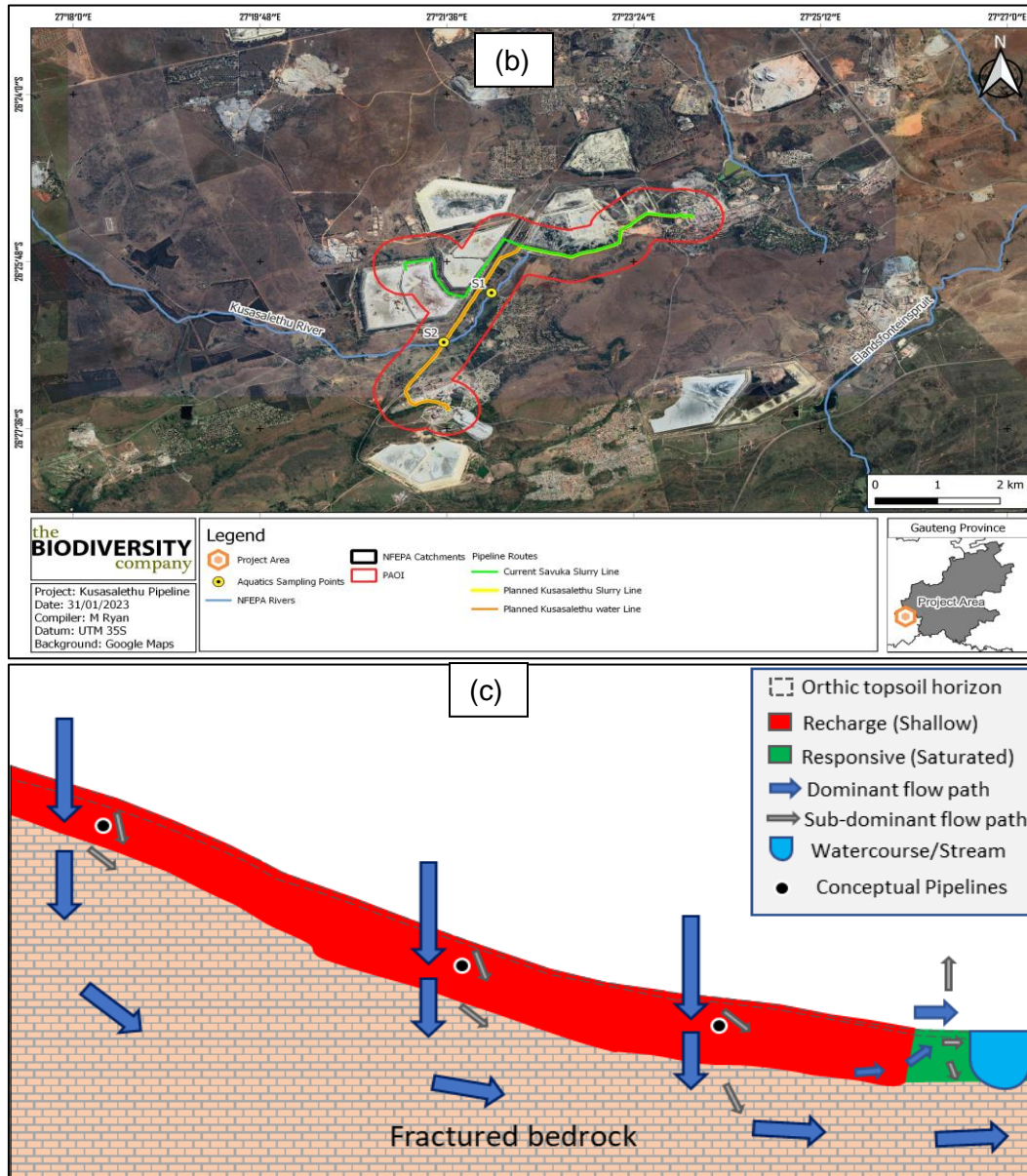
**SUBJECT: HYDROPEDOLOGY STATEMENT FOR THE PROPOSED HARMONY'S KUSASALETHU MINE BACKFILL AND RETURN WATER TRANSFER PIPELINE PROJECT.**

Dear Sir / Madam,

The Biodiversity Company has been commissioned to provide a hydropedology statement in support of the Water Use License (WUL) process for the proposed 200 mm backfill pipeline expansion for the Kusasaletu Mine's backfill pumped from the SGP to Kusasaletu Plant via two (2) backfill pipelines (1 x duty and 1 x standby) on an intermitted basis, a single (1) return water line and associated infrastructure upgrades for the Harmony's Kusasaletu Mine project located 90km west of Johannesburg, near the Gauteng-North West provincial border in the West Rand Region. The upgrade refers to an increase in backfill capacity of the plant to accommodate a future  $\pm 1\ 100$  tons daily volume of backfill and estimated daily volume of 186 000 litres of water flows. This statement pertains to the relevance of hydropedology, 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 (Figure 1 a) associated with the project area as well as the Kusasaletu River and other Rivers (Figure 1 b) 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 shallow recharge hydrogeological soils groups (i.e., Glenrosa and Mispah soil forms) see **Error! Reference source not found.** c). It is worth considering the source of water associated with the moisture content within the watercourse.





**Figure 1 a) The identified wetlands; b) River systems within the catchment hydrogeological water regime basin; and c) Conceptual hydrogeological flows after the pipeline construction.**

Wetlands were identified in the Kusasaletu River water regime system. The reach of the Kusasaletu River adjacent to the proposed infrastructure backfill and water pipelines derive the majority of its water flows from the catchment north-west and south-west, which is characterised with shallow recharge soil hydrogeological 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 pipelines will have a limited impact on the recharge soils in proximity to the site's catchment as dominant vertical and sub-dominant lateral flows towards the water table recharge stores (shallow and deep recharge) will be minimally impeded see **Error! Reference source not found.** c). Limited impacts can also be expected where the upgrades of the pipelines and pump stations foundation intercept the hillslopes with lateral flows as they 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, lateral flows in the shallow recharge soils 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) mostly associated with wetlands 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, Kusasalethu River and other associated rivers in the water regime catchment, it is clear that the potential worst-case scenario loss of moisture to the wetland is approximately < 2% 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's Kusasalethu Mine Backfill and Water Pipelines Project will not result in a significant loss of total streamflow and groundwater recharge water regime stores. It is therefore recommended that the proposed activities proceed as have been planned and no further hydropedology assessments are necessary.

Regards,



Andrew Husted  
Freshwater Ecologist  
SACNASP (*Pr. Sci Nat* 400213/11)



Dr Matthew Mamera  
Soil Hydropedologist  
SACNASP (*Pr. Sci Nat* 116356)

