

## Inspection of Tunnel Boring Machines for Polihali Transfer Tunnel



A team comprising LHDA Phase II Senior Projects Engineer. Mr Neo Thinyane, accompanied by representatives from Metsi a Senqu Khubelu Consultants (MSKC), KKM JV (tunnel contractor), has recently concluded a three-day visit to China to inspect the Tunnel Boring Machines (TBMs) being manufactured for the 38km transfer tunnel from Polihali to Katse, at a CCCC Tianhe plant in Changshu City, Jiangsu Province, from May 8 to 11 2024.

The purpose of the inspection was to ensure that the TBMs meet the necessary specifications for the Polihali transfer tunnel. "We verified the TBMs' design, functionality, and adherence to safety standards," said Neo Thinyane, Phase II Senior Projects Engineer. "This included examining the cutterheads, backup systems, and segment erection mechanisms."

The inspection was led by the TBM designer, Robbins. The team assessed the functionality of the muck removal systems, conveyor belts, power supply, ventilation, water supply, and dewatering systems to ensure that the TBMs are specifically designed to handle the challenging basalt rock formations for the transfer tunnel connecting Polihali and Katse.



Safety features were a primary focus during the acceptance test. "We checked for adequate walkways, head clearance, and body width for workers, gas detection systems for hazardous gases like methane, and the functionality of alert alarms," Thinyane emphasized. Fire detection and suppression systems were also scrutinized, given the critical nature of TBM operations. The TBMs are equipped with refuge bays containing life-support systems, including first-aid kits, oxygen tanks, respirators, air filtration systems, and safe extraction procedures. Additionally, there are backup power and cooling systems to ensure uninterrupted operation in case of power outages. Following the thorough inspection of the TBMs, the team conditionally accepted the TBMs.

The Polihali Transfer Tunnel will transfer water by gravity from the Polihali reservoir to the Katse reservoir. The excavation will utilize both tunnel boring and drill and blast methods from both ends. The Polihali Transfer Tunnel works include the intake works and gate shaft at the Polihali reservoir, outlet works and gate shaft at the existing Katse reservoir with an underwater connection to the lake, and access adits to the waterway and associated construction infrastructure. Notable progress has been made on the intake, outlet works, and access adits. The 5.39-meter diameter TBMs, with 415-meter backup systems, are expected to arrive in Lesotho later this year.

MSKC designed the tunnel and provided the TBM specifications, while Robbins, a U.S. company, designed the machines. Kopano Ke Matla Joint Venture comprising Yellow River Company, Sinohydro Bureau 3 and Unik Civil Engineering is constructing the tunnel.