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MRT Line 1

Underground Infrastructure

The 51km-long Klang Valley Mass Rapid Transit SBK Line, better known as MRT Line 1 connects Sg. Buloh and Kajang city across 31 stations. While most of the alignment was elevated, a 9.5km-long tunnel connects seven of the underground stations right in the heart of Malaysia's commercial centre and capital, Kuala Lumpur.

G&P Professionals Sdn. Bhd. was appointed by Mott-Macdonald Malaysia as the Detailed Design Consultant for major temporary works and geotechnical supports in the year 2010. The package includes three underground stations, Tun Razak Exchange (TRX), Cochrane and Maluri stations in addition to tunnel ancillary structures such as Maluri Portal, escape shafts, crossover structures and tunnel boring machine launching shafts.

The depth of the TRX Station was the deepest with maximum excavation depth of 45m below ground level where it also serves as an underground interchange station for the future MRT Line 2. Cochrane Station, with a maximum excavation depth of 32m below ground also serves as launching shaft for the TBM from both ends of the station while Maluri Station includes an underground train crossover as operational requirement.

Generally geological formation is Kuala Lumpur Limestone which well known for its highly erratic karstic features. Due to the inherent karstic features of limestone bedrock, the depth of the limestone bedrock is highly irregular. The overburden soils above Kuala Lumpur Limestone are mainly silty sand. The thickness of overburden soils varies significantly due to the irregular topography of the limestone bedrock.

A cost-effective secant pile wall supported with ground anchors or strutting was adopted as the temporary earth retaining system. A circular shaft was designed

specifically to cater for the requirements of a support free system for the launching of tunnel boring machine. To cope with the high groundwater table, grouting in rock was carried out to prevent water ingress as well as to prevent excessive ground settlement and occurrences of sinkholes due to groundwater drawdown. Vertical rock excavation adjacent to the retaining wall which involved rock slope strengthening works, surface protection, controlled blasting and vibration control was successfully designed and implemented.

Minimising traffic disruption, a temporary traffic decking on top of underground station was designed to maintain traffic flow during throughout the station excavation works.



TRX Station with 45m excavation



17m diameter Launching shaft



Traffic decking at Maluri Station