Description of Work
The KCRC East Rail Extension Contract LDB201 included the design and construction of two 7.6m internal diameter bored tunnels 3.7km in length. The separation between the tunnels is 13.5m between the centrelines and the safety and emergency evacuation requirements for the operation of the tunnels meant that cross passages connecting the two tunnels were required at approximately 240m intervals. The alignment of the tunnels required that the invert level for cross passages would be between 16m and 37m below ground level. The preliminary appraisal of the geology indicated that 9 of the 12 cross passages would require mined excavation in water bearing soils formed from weathered volcanic tuff of variable quality. The particular environmental restrictions for the project prohibited surface excavation for a number of locations this forcing the contractor to adopt hand-mined solutions.

GCG (Asia) were commissioned by the contractor (Dragages (HK) Joint Venture) to carry out a comprehensive review of all available geotechnical information relating to project in order that detailed geological and geotechnical models be established for each of the mined cross passage sites. This information was then used to assess the options available for the safe and economic excavation of each the cross passages. This exercise involved the identification and development of alternative methods of ground treatment together with an associated risk assessment. The product of these studies included technical recommendations for each of the cross passage excavations.

The results of this study led to the use of ground freezing to facilitate excavation at three of the cross passages. This was the first use of ground freezing in weathered rock in Hong Kong. All cross passages excavations were completed in safe and timely manner.

Client: Dragages (HK) Joint Venture
Dates: 2003-2004
Estimated Project Cost: HK$ 2.7 billion

Detailed Interpretation of Geology at Cross Passage

Geological Section for Cross Passage 12A

Hand mined excavation of frozen decomposed Volcanic Tuff