

Riyadh Metro Project Package 1 Riyadh Development Authority (RDA)

Location: Riyadh, Kingdom of Saudi Arabia

Date: 2012 – Present

Structure: Underground Metro Line, tunnels, shafts, and ancillary structures

Length: Line 1 & 2: 63 kilometers; approximately 19 kilometer tunnels

Cross-Section: NATM Running Tunnels - 10.8 meter width, 8.6 meter height; 10m DIA TBM running tunnels

Geology: Limestone with Evaporites (Sulaya, Arab, and Jubaila formations), high permeability, and solution features

Cost: Line 1 & 2: Approximately \$12.0 billion

Client: Civil Works Joint Venture (BACS Consortium: Bechtel, Almagbani, CCC, and Siemens)

Owner: Riyadh Development Authority (RDA)

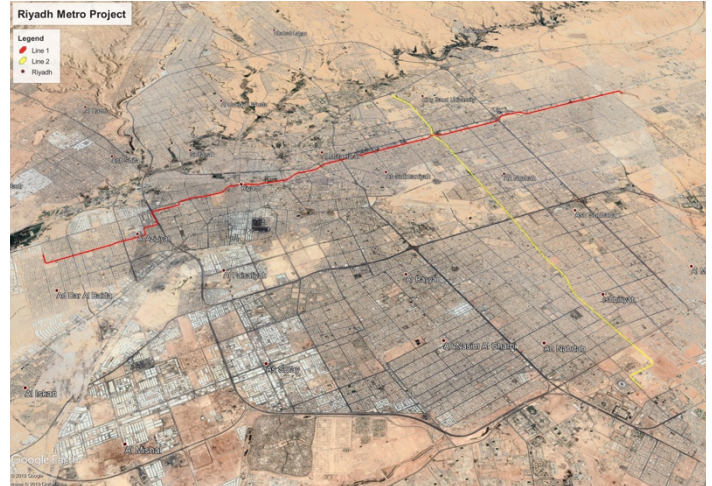


Figure 1. Plan View of Riyadh Metro.

Design Services for Conventional Tunnelling Structures:

The Riyadh Metro Project, implemented by Riyadh Development Authority (RDA), former ADA, consists of elevated rail, rail at grade and underground running tunnels and stations. The project encompasses six lines split into three packages totalling 176 km of rail line and 85 stations.

Gall Zeidler Consultants (GZ) is working for the BACS Consortium on Package 1 which includes 9.9 and 1.25 miles (16 and 2 kilometres) of running tunnels in Line 1 and Line 2 respectively, 13 Emergency Egress Shafts including 2 shafts which serve as both Ventilation and Emergency Egress Shafts, and the relating Adits. GZ is responsible for the material and workmanship specifications, detailed and construction design for temporary and permanent works of all conventionally mined running tunnels, Emergency Egress Shafts and Adits, Ventilation Shafts, TBM tunnel lining and support frames at junctions/openings/portals as well as two TBM Launch Shafts. GZ also provides site support services during construction. The tunnels, adits and shafts are completed.

The geology along Line 1 and line 2 comprises a thick, fractured and disturbed succession of limestone layers of Jurassic limestone and Anhydrite, with two layers of locally highly disturbed Breccia. Along the alignment, deep quaternary deposits (alluvium) are observed above the Jurassic Strata. The water table is close to ground surface.

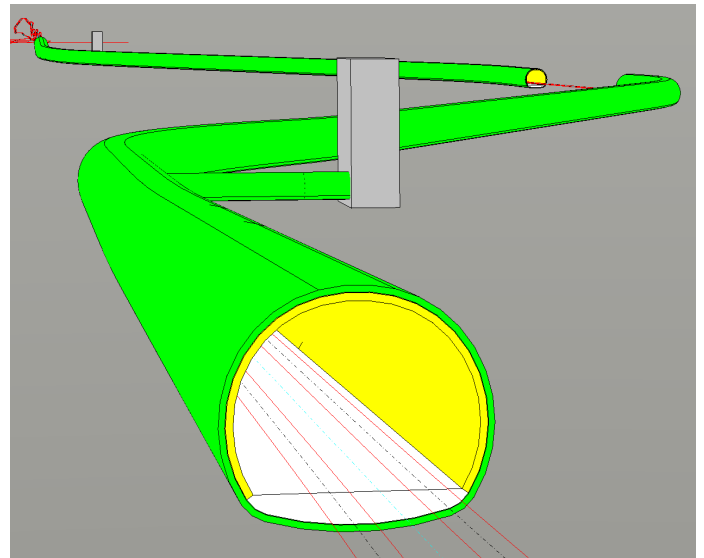


Figure 2. Line 2 – 3D Model of the tunnel.