

Doha Metro Gold Line Underground Tunnels

Doha, Qatar

Project

Doha Metro Gold Line Underground Tunnels & Cross Passages. Provision of engineering and design consultancy services in association with the respective construction documentation (shop drawings)

Project Budget

Total Cost: approx. € 0.5 B.

Project Schedule

Design - Construction: 2014 - 2018

Project Description

Total Gold Line length approx. 23km with full stretch of underground bored tunnel (TBM) in urban environment

Total length: approx. 23km tunnelling

Cross section: 36.6 m²

Effective cross section: 19.4m²

24 Pedestrian Cross Passages (NATM) in urban environment

Total length: approx. 200m

Cross section: 12.5m² - 18m²

Effective cross section: ~6.0m²

Excavation Method

- TBM tunnels: Mechanical excavation with EPB – TBM (6nos Earth Pressure Balance - Tunnel Boring Machine)
- Cross passages: Conventional tunnelling method (NATM)

Final Lining

- Concrete C50/60 for segments (33cm thickness)
- Concrete C40/50 for cross passages

Geology

- Weathered limestone, limestone, shale, chalky limestone and interlayers of siltstone
- Karst and sink holes/cavities
- 2 aquifers (unconfined & confined), high water aggressiveness
- Overburden: 15m - 30m

Our Services

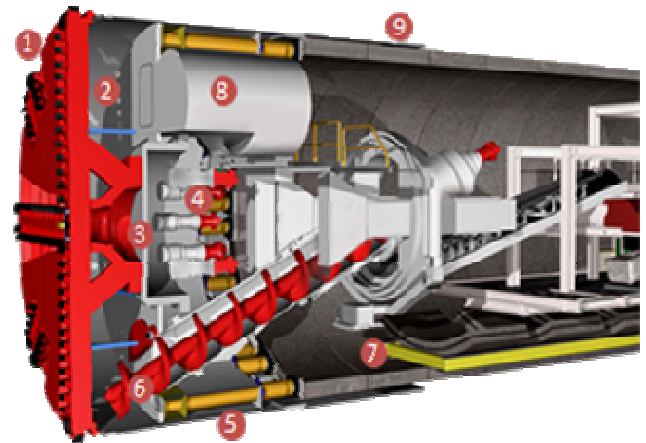
- Design check
- EPB – TBM / Cross passages follow up – Back Analyses
- Elaboration of shop drawings (construction documentation)
- Interstation files
- On site engineering design team
- On site consultancy services

Construction Details

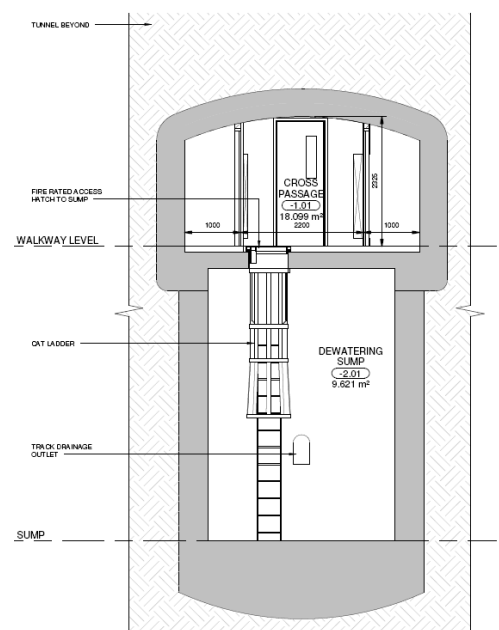
- Special grouting techniques for water isolation
- Concrete mix for 120 years durability
- Double waterproofing gasket with hydrophilic seal

Client

ALYSJ JV
(AKTOR - L&T - YAPI MERKEZI – STFA – AL JABER JOINT VENTURE)



Earth Pressure Balance - Tunnel Boring Machine (EPB - TBM)



Cross passage excavation geometry at pumping shaft

Metro Stations

Doha Metro Gold Line Underground Stations

Doha, Qatar

Project

Doha Metro Gold Line Stations. Provision of engineering and design consultancy services in association with the respective construction documentation / detailed design reinforcement drawings (shop drawings) for 10 UG Stations of the Doha Gold Line Underground Metro project

Project Budget

Total cost: approx. € 1.5 B.

Project Schedule

Design: 2015 – 2017

Construction: 2013 – 2018

Project Description

10 UG Stations (including ventilation shafts):

- 9 UG stations each with: Length: ~177m / Width: ~27m / Depth: ~25m to ~45m / 4 final levels: Foundation level / Platform level / Concourse level / Roof level
- 1 UG station with: Length: ~355m / Width: ~48m / Depth: ~45m

6 final levels: Foundation level / Platform level / Transfer level / Intermediate level / Concourse level / Roof level

Construction Method

Excavation & reinstatement (Cut & Cover)

Final Lining

Reinforced concrete C40/50

Geology

Weathered limestone, limestone, shale, chalky limestone and interlayers of siltstone,

2 aquifers (unconfined & confined) - high water aggressiveness

Our Services

- Excavation and Lateral Support final detailed designs
- Structural designs, detailed design reinforcement drawings
- Shop drawings

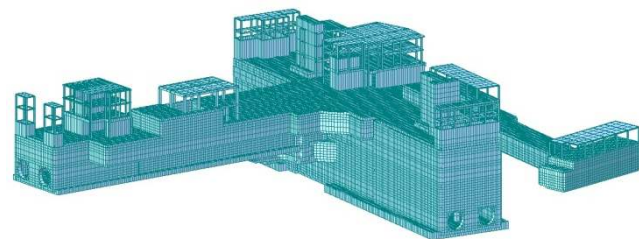
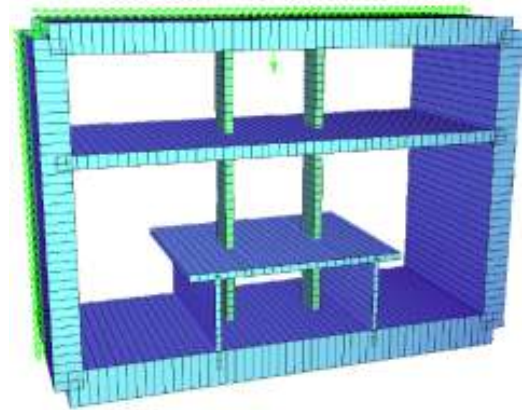
Construction Details

- Durability requirements for 120 years
- Special dewatering systems
- Appropriate traffic deviations

Client

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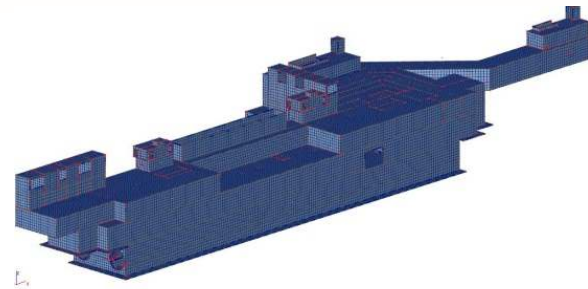
Typical Station Structural Analysis Models

Doha Metro Gold Line – Design Only Stations

Doha, Qatar

Project

Doha Metro Gold Line Design Only Stations and Subways. Provision of engineering and design consultancy services for Design only stations & subways. Final Alignment, Architectural, Geotechnical & Structural Designs. Design guideline reinforcement drawings and BIM/Revit design and production of 3D reinforcement guideline drawings



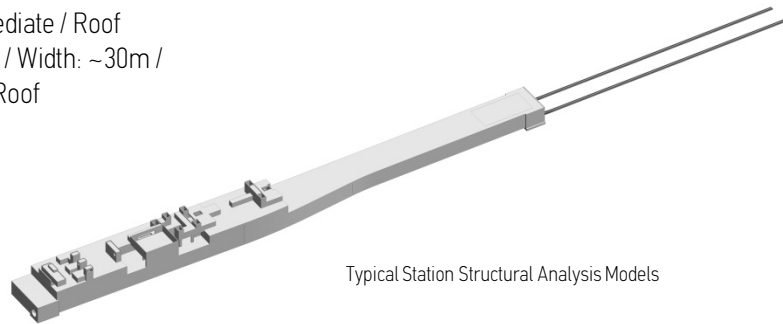
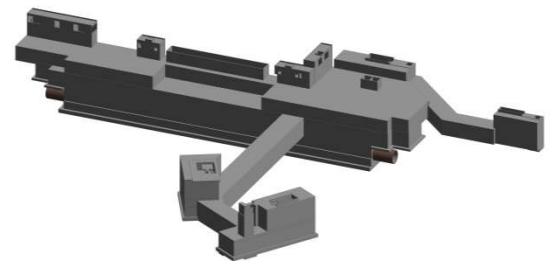
Project Schedule

Design: 2016 – 2017

Project Description

3UG Stations (Abu Sidra Stabling Yard & Reversing Facility, Zoo and Al Manaseer Stations) & 6 Subways:

- 3UG stations with:
 (Zoo) Length: ~177m / Width: ~30m / Depth: ~27m / 5 final levels: Base / Platform / Concourse / Intermediate / Roof
 (Al Manaseer) Length: ~210m / Width: ~27m / Depth: ~22m / 5 final levels: Base / Platform / Concourse / Intermediate / Roof
 (Stabling Yard & Reversing Facility) Length: ~403m / Width: ~30m / Depth: ~16m / 3 final levels: Base / Intermediate / Roof
- 6 Subways with max dimensions:
 Length: ~210m / Width: ~15m / Depth: ~18m



Typical Station Structural Analysis Models

Construction Method

Excavation & reinstatement (Cut & Cover)

Final Lining

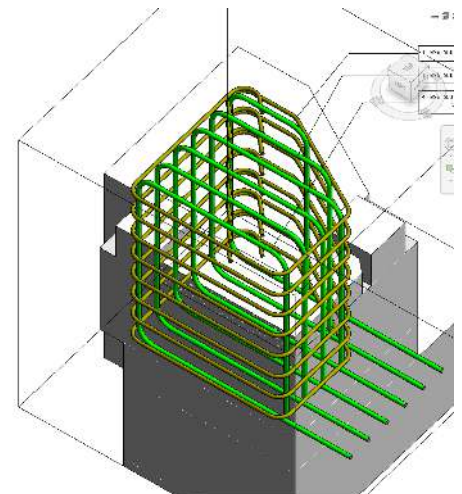
Reinforced concrete C40/50

Geology

Weathered limestone, limestone, shale, chalky limestone and interlayers of siltstone.
 2 aquifers (unconfined & confined) - high water aggressiveness

Our Services

- Final Alignment Design
- Architectural Design
- Detailed Excavation and Lateral Support Design
- Detailed Structural Design
- Guideline Reinforcement Drawings
- BIM/Revit design and production of 3D reinforcement guideline drawings

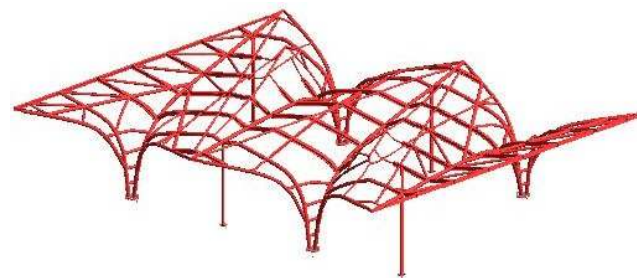


Construction Details

- Durability requirements for 120 years
- Special dewatering systems
- Appropriate traffic deviations

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Reinforcement BIM/Revit Design