

Project identification

Sharq Crossing, Doha, Qatar

Type of project

Validation and technical design of immersed tunnels and cut-and-cover tunnels for the new bridge-tunnel connection across Doha Bay, Qatar



Client

Calatrava Mideast LLC

In co-operation with

HBI Haerter Ltd., Zurich (CH) and Geotechnical Consulting Group (GCG), London (UK)

Project assignment

Validation and technical design of immersed tunnels, cut-and-cover tunnels, roads, bridge foundations and utilities. Disciplines involved: structural, geotechnical and road design; integral safety concept; MEP; tunnel safety; marine works; constructability

Country

Qatar

Location

Doha

Project duration

2013-2014

Project phase

Concept Design Validation phase

Construction cost

Not disclosed

Consultancy fee

Not disclosed

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Project description

Conceived by world renowned Architect and Engineer Santiago Calatrava on behalf of the State of Qatar's Public Works Authority ASGHAL, the unique 21st century bridge-tunnel connection across Doha Bay comprises three bridges, two immersed tunnels with a total length of approx. 6 km and three cut-and-cover tunnels.

Tunnel Engineering Consultants (TEC), together with Santiago Calatrava Engineers and Architects worked on the validation of the original concept design of five tunnels that are part of Qatar's new landmark Sharq Crossing.

This is one of the most iconic and prestigious bridge-tunnel connections TEC has been commissioned to work on to date, and the first ever immersed tunnel project in the Middle East region. Of particular interest is the Marine Interchange as a complex underground interchange, connecting the two immersed tunnels and the West Bay bridge. Also the West Bay bridge will have the world's largest arch span connecting the shore with the Marine Interchange.

Background

The approx. 12 km bridge-tunnel connection Sharq Crossing is a vital part of the Greater Doha Transportation Master Plan. In recent years the city of Doha has seen considerable increase in population, car ownership and new city districts. It is forecast that the area will experience serious traffic problems in the near future.

When the project completes in 2020, Sharq Crossing will link Doha's city centre with the new Hamad International Airport and new city and business districts. It will also help Qatar receive all visitors to the 2022 FIFA World Cup events.

Scope of work

TEC prepared the validated Concept Design of the two immersed tunnels of 3.1 and 2.8 km and the three cut-and-cover tunnels with a length of approx. 950-1250 m connecting the bridges to the main land and the Marine Interchange, connecting the two immersed tunnels and one of the bridges.

The assignment also included the design of bridge foundations, roads, utilities, mechanical, electrical and plumbing (MEP) systems, the integral safety concept including ventilation and construction schedule.

TEC worked together with HBI Haerter Ltd. (Zurich, Switzerland) for safety and tunnel ventilation and Geotechnical Consulting Group (GCG; London, UK) for geotechnical expertise.

The total project includes 5 phases. The recent sub consultancy agreement covered the first project phase: Concept Design Validation. TEC has executed the first phase in 5 months time, which started in September 2013 and was completed by January 2014.