

Hampton Roads Bridge Tunnel (HRBT) Expansion Project Virginia Department of Transportation (VDOT)

Location: Hampton and Norfolk, Virginia

Date: 2019 - Present

Structure: Twin large-bore TBM tunnels; Tri-Cell and Bi-Cell Large Diameter Shafts

Length: Approximately 8,000 ft (2.4 km)

Cross-Section: 41.5ft (12.7m) – TBM Internal Diameter

Geology: Quaternary alluvial coarse-grained fine-grained, and highly plastic/organic fine-grained deposits; Poorly graded and well graded sand fills

Cost: US \$3.8 billion

Client: Mott MacDonald

Owner: Virginia Department of Transportation (VDOT)

MM is the designer for the underground works part of the Hampton Roads Connector Partners Joint Venture. The IDV services include a full structural verification of the segmental tunnel lining design for the large diameter dual-bore TBM tunnels, which pass through soft to very-soft alluvial deposits including some thick organic layers. The verification cover both temporary and permanent load cases. In addition to the lining verification, GZ is performing various structural calculations pertaining to the large diameter Bi-cell and Tri-Cell tunnel launch and reception shafts located on the north and south islands, respectively.

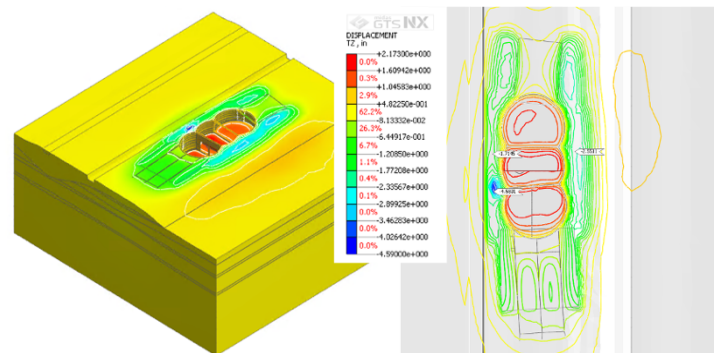


Figure 1. Predicted ground surface settlements from South Island Tunnel Approach Structure as estimated from a 3D FE model.

Independent Design Verification Services for Bored Tunnel and Tunnel Approach Structures:

The Hampton Roads Bridge-Tunnel (HRBT) Expansion Project is intended to provide congestion relief for the Hampton Roads area in Virginia by increasing the capacity of the existing Chesapeake Bay crossing. The current I-64 Hampton Roads Bridge-Tunnel (HRBT) is a 3.5-mile facility with two 2-lane 7,500 feet long immersed tube tunnels connecting artificial islands, which are connected to the shore by bridge. Traffic through the facility exceeds 100,000 vehicles per day during peak summer traffic. The HRBT project will widen the four-lane segments of the I-64 corridor in the cities of Hampton and Norfolk. Twin two-lane 41.5ft (12.7m) diameter bored-tunnels will be built west of the existing eastbound tunnel. The current eastbound and westbound tunnels are expected to accommodate all westbound traffic upon completion of the project.

The HRBT project is the largest construction project in Virginia's history with a total project budget of \$3.8 billion. Construction is intended to begin in 2020 with a foreseen construction end date in late 2025.

Gall Zeidler Consultants (GZ) is providing independent design verification (IDV) services for the tunnel and tunnel approach structures for Mott MacDonald (MM).



Figure 2. Existing Hampton Roads Bridge-Tunnel with Island Approach Structures and Tunnel alignment indicated by Highlighted Path.