

# Project

## I-90/I-93 Interchange, I-93 Northbound (C09A4), Boston, Massachusetts, USA

This demanding highway tunnel project took place just south of downtown Boston, adjacent to South station with its major railtrack structures, the I-90 and I-93 Interstate highways and the tidal Fort Point Channel. Part of the larger Boston Central Artery/Tunnel Project, it comprised the construction of three highway tunnels at only a slight depth beneath very active rail tracks and under the worst possible ground conditions.

The joint venture SIWP developed an alternative design, which allowed earlier access for at-grade and viaduct construction, thereby substantially shortening the critical path to surface and viaduct work completion. The joint venture and the client shared the ensuing savings of more than \$ 3.3 million. The alternative method was awarded the AASHTO Certificate for the most cost-effective Value Engineering Cost Proposal in 1999.

**Location**

Boston, Massachusetts, USA

**Client**

The Commonwealth of Massachusetts, Massachusetts Highway Department

**Contractor**

Joint venture SIWP: Slattery-Skanska, BAM International, J.F. White Contracting, Perini

**Contract period**

January 1997 – September 2003

**Contract sum**

\$ 475 million

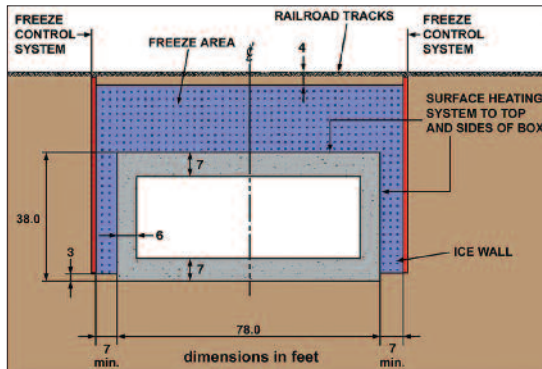
*‘Widely recognised as the most demanding component of the Boston’s Central Artery/ Tunnel project.’*

### Scope of work

The major work of the project consisted of extending the I-90 highway eastward in tunnels under the I-93 and railroad tracks, constructing the I-93 Northbound viaduct to the tunnel portal at South Station and building the connecting tunnel and viaduct ramps. All in all, the project included three jacked tunnels, seven cast-in-place tunnels and boat sections, nine precast segmental viaducts and five approach structures.

Prior to the construction of the tunnel work, significant land reclamation and soil stabilisation were required, which were achieved by means of grouting and freezing and earth support systems.

Tunnel section, showing the extent of the frozen ground



Segment installation above the railway tracks



The 18-metre high vertical, frozen face



### Ground freezing

The soil improvement alternative for this project hinged on ground freezing as introduced by BAM International. This avoided concerns expected with the localised grouting in the original contract design.

During the jacking a large number of unexpected obstructions were discovered in the ground and had to be removed. Apart from the road headers that cut the frozen soil and timber piles, jackhammers had to be used to remove a large quantity of masonry, concrete and abandoned granite structures.



Jack box for I-90 under railway tracks

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