



## Office of the Inspector General Commonwealth of Massachusetts

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### **A Review of the Central Artery/Tunnel Project's Use of Anchor Bolts on the C05B1 Tunnel Finishes Contract, December 1998**

The \$10.8 billion Central Artery/Tunnel (CA/T) Project involves constructing a new tunnel across Boston Harbor and a new Charles River crossing, and placing the Central Artery underground. The Massachusetts Highway Department (MassHighway) has had the responsibility for overseeing the Project for the Commonwealth. In 1985, MassHighway hired the joint venture of Bechtel Corporation/Parsons Brinckerhoff Quade and Douglas (B/PB) to manage the design, day-to-day operations, and construction of the CA/T Project.

This report focuses on two approved change orders that increased the cost of the \$49.5 million C05B1 – I-90 Tunnel Finishes contract by \$850,000. The cost of this contract grew to \$78.2 million between January 1993 and the completion of the contract in July 1996. The change orders reviewed by this Office relate to work necessitated by ambiguous contract specifications and poor contractor performance. This Office's review disclosed the following:

**Finding One:** Poor design specifications created construction difficulties that cost almost \$800,000 to resolve.

**Finding Two:** The Section Design Consultant prepared poor design specifications for anchor bolt installation.

**Finding Three:** The Section Design Consultant prepared unclear testing procedures.

**Finding Four:** The Project paid the contractor to test improperly installed anchor bolts.

**Finding Five:** The Project issued a change order to compensate the contractor for poor subcontractor performance.

**Finding Six:** The Project did not consult with the tunnel designers before allowing the contractor to drill through steel reinforcement in the tunnel roof.

The Project should have given clear specifications to the contractor and should have better coordinated the roof and ceiling designs. Had the specifications been complete and unambiguous, the construction contract bidders would have included the cost of the work and risk in their bid proposals. By relying on change orders, the Project paid a premium price for the extra work during construction.

This Office makes the following recommendations to assist MassHighway -- through B/PB, where appropriate -- in reducing future contract costs:

1. **Direct B/PB to develop clear and complete specifications for construction contracts.**
2. **Ensure better design coordination between contracts.**
3. **Hold contractors accountable for shoddy work and poor planning.**
4. **Ensure that Section Design Consultants hired by the Project to complete designs review and approve design and specification changes.**
5. **Take cost recovery action when costly errors and omissions are discovered.**
6. **Direct B/PB to ensure that contractors proceed with work only under approved procedures.**

Project management must act now to avoid unnecessary and costly contract increases. Project costs are rising and so is the Commonwealth's share of that cost. Although design is nearly complete, opportunities still exist to ensure that construction contract specifications are clear and readily applicable to a given contract. The Project stands to benefit by applying these lessons to upcoming tunnel finishes contracts, which have a current total value of more than \$200 million.

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