

Bechtel/Parsons Brinckerhoff:

Roles and Responsibilities on the Central Artery/Tunnel Project

As the management consultant retained by the Massachusetts Highway Department (MHD) in 1985, B/PB, a joint venture of Bechtel Corporation and Parsons Brinckerhoff Quade & Douglas, Inc., has helped manage the Big Dig according to widely accepted industry standards. As specified in 16 separate contracts, B/PB has been responsible for:

- providing preliminary design services;
- managing the performance of the final designers of record;
- managing the construction work of the various contractors;
- reporting on the project's overall cost and schedule, first to MHD, followed in 1997 by the Massachusetts Turnpike Authority, or MTA; and
- providing recommendations to MHD and MTA for decision making and, when asked, acting as their representative.

Throughout the life of the project, the state has determined what gets built, when, and for how much. B/PB has developed alternatives and provided its professional recommendations on the most practical, cost-effective solutions but has not been empowered to choose among them. The quality of B/PB's work has been well-documented in ongoing evaluations and oversight by state and federal authorities, including MTA, MHD, and the Federal Highway Administration (FHWA).

The biggest change in B/PB's role as management consultant occurred in 1998, when MTA combined key B/PB personnel with those of the state in an Integrated Project Organization. MTA's goal was to streamline project management and decision-making and efficiently move the project from the design phase to construction.

Over the life of the project, all contracts for final design were awarded by MHD or MTA. At their direction, B/PB developed preliminary designs for specific sections of the project. Such designs were necessarily conceptual and contained only enough detail to evaluate construction cost estimates, schedule, and general design viability, and to provide the basis for evaluating the responsiveness of proposals from section design consultant candidates.

A selection committee that did not include B/PB ranked candidate design consultants based on submitted qualifications and oral presentations. Once MHD or MTA decided on the top-ranked firm, B/PB prepared an independent cost estimate of the final design work, which in turn was reviewed and approved by the client and the Federal Highway Administration (FHWA). B/PB and the consultant then negotiated the design fee, which went to MHD or MTA for approval.

B/PB reviewed the consultant's final design submittals for conformance to the preliminary design and general projectwide standards (such as permissible inclines or roadway width), and managed interfaces between the final designs. It was normal in this process for the design consultants and B/PB to have differences of professional opinion regarding various technical issues. Resolution of

those differences produced a final design that was been subjected to a healthy process of checks and balances. Based on its limited review of the final design, B/PB recommended and submitted that design to MHD or MTA for approval.

By contract, however, B/PB avoided duplicating the design consultant's work, such as rerunning its calculations. Moreover, B/PB did not approve or stamp the final design. MHD and later MTA retained responsibility for approving design submittals and the design consultants were directly accountable to it for the final designs.

Construction contracts were also awarded by MHD or MTA on a fixed-price basis after competitive bidding. Contractors were contractually responsible for cost, schedule, and work quality. Section design consultants reviewed contractor shop drawings to confirm that they were adhering to the final design intent for permanent project work. B/PB's job has been to discharge the critical roles of construction administration, oversight, and safety—administering construction contracts, estimating their cost, monitoring them for adherence to budget and schedule, inspecting the work for quality, and regularly reporting this information to its client.

Judging by the record, this division of responsibility has worked exceptionally well. Relatively few major contentious issues have surfaced over 12 years of construction and 18 years of design, which is even more remarkable for a project of this enormity and complexity. The quality of B/PB's work has been well-documented in ongoing evaluations and oversight by state and federal agencies, including MTA, MHD, and FHWA.

Over the Big Dig's history, the vast majority of B/PB revenues have been pass-through payments—reimbursements for labor and direct expenses or for payments to other subcontractors. B/PB's earnings are derived from its management fee. This is a standard method of compensation for management-consultant or program-management services and the fees fall well within industry standards. Through March 2005, after nearly 20 years on the project, B/PB has earned \$126 million in fees, less than 9 tenths of 1 percent of total CA/T project expenses.