

CENTRAL ARTERY/TUNNEL PROJECT ('THE BIG DIG'), BOSTON, USA

OVERVIEW

LOCATION: BOSTON, USA
SCOPE: INTRA-URBAN
TRANSPORT MODE: ROAD
PRINCIPAL CONSTRUCTION:
TUNNEL/BRIDGE
NEW LINK: YES

PRINCIPAL OBJECTIVES

CONGESTION RELIEF
STRATEGIC TRANSPORT LINK
ACCIDENT REDUCTION

PRINCIPAL STAKEHOLDERS

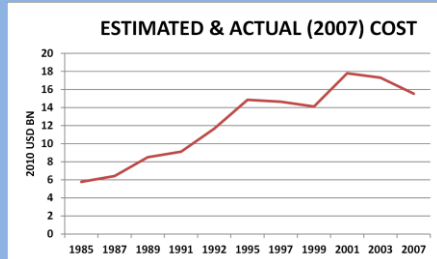
CLIENT: MHD/MTA
PROJECT MANAGER:
BECHTEL/PARSONS BRINCKERHOFF JV
CONTRACTORS:
MODERN CONTINENTAL & OTHERS
FUNDER: FEDERAL/STATE GOVERNMENTS

PLANNING AND IMPLEMENTATION

APPROX. PLANNING START DATE: 1982
CONSTRUCTION START DATE: 05/1991
OPERATION START DATE: 12/2007
MONTHS IN PLANNING: 108
MONTHS IN CONSTRUCTION: 199
PROJECT COMPLETED: 36 MONTHS
BEHIND SCHEDULE

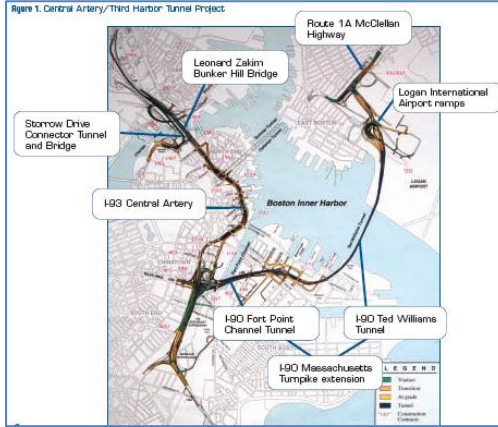
COSTS (IN 2010 USD)

PREDICTED COST: 6.08BN
ACTUAL COST: 15.53BN
PROJECT COMPLETED:
155% OVER BUDGET
FUNDING: 100% PUBLIC



INFRASTRUCTURE QUANTITIES:

LENGTH OF CORRIDOR: 12.9KM
TOTAL INFRASTRUCTURE: 258KM
TUNNELS: THREE
BRIDGES: TWO
COST PER KM (2010 USD): 1.20BN
(TOTAL LENGTH); 2.2BN (CORRIDOR)



INTRODUCTION

Boston's Central Artery/Tunnel Project ('The Big Dig') combines the undergrounding of the Interstate 93 elevated highway, a third tunnel under Boston Harbor to Logan Airport, and two bridges across the Charles River.

It also includes pedestrian facilities, most notably the 27-acre (11 hectare) Rose Kennedy Greenway. However, a rail connection between two major terminals was dropped from the initial plans. The project opened in stages and was fully open by December 2007.

BACKGROUND

The objectives of the project were to relieve highway traffic congestion, to reduce bottlenecks by providing additional crossings over the River and Harbor, and to reduce the accident rate. Congestion had been a problem for many years and accident rates were four times the national average, but community opposition had prevented the building of more highways in the city centre.

The idea of burying the Central Artery (Interstate 93) underground dates from a 1971 meeting between the mayor's transport advisor, Fred Salvucci, and a highway contractor. Meanwhile, the business community was pushing for another harbor crossing to improve access to the airport. Salvucci was to become a key figure in the project's evolution: as the Governor's transport secretary in the 1980s he was involved in bringing the two projects together, providing a sufficiently broad base of support to proceed.

Official planning began in 1982, and environmental impact studies in 1983, with the Environmental Impact Statement/Report published in 1986. US Congress passed a public works bill securing funding for the project in 1987 and, although the bill was then vetoed by the US President, Congress eventually overrode the President's veto.

Controversy began in 1988, when Salvucci's choice of the 'Scheme Z' crossing of Charles River met with widespread criticism and opposition. A new 'amputated' version of Scheme Z was presented in 1990 and quickly incorporated into the Final Supplemental Environmental Impact Statement. A package of mitigation measures was announced and the main opposition group conceded.

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TIMELINE

CONCEPTION: 1971: SALVUCCI MEETS HIGHWAY CONTRACTOR, DISCUSS BURYING ROAD

INCEPTION: 1982: OFFICIAL START OF PROJECT

INCEPTION: 1983: ENVIRONMENTAL IMPACT STUDIES BEGIN

INCEPTION: 1986: BECHTEL/PARSONS BRINCKERHOFF JV APPOINTED

INCEPTION: 1987: US CONGRESS PASSES FUNDING BILL

DELAY: 1987: US PRESIDENT VETOES BILL

INCEPTION: 1987: CONGRESS OVERTURNS PRESIDENT'S VETO, PROJECT PROCEEDS

INCEPTION: 1988: SALVUCCI CHOOSES SCHEME Z ROUTE ACROSS CHARLES RIVER

CONTROVERSY: 1989: OPPOSITION TO SCHEME Z

INCEPTION: 1990: 'AMPUTATED' SCHEME Z INCORPORATED INTO FINAL EIS, MITIGATION MEASURES ANNOUNCED

DELAY: 1991: NEW STATE GOVERNMENT SETS UP BRIDGE DESIGN REVIEW COMMITTEE TO FIND ALTERNATIVE TO SCHEME Z

CONSTRUCTION: 1991 (MAY): FORMAL APPROVAL, CONTRACTS ADVERTISED

INCEPTION: 1992: SCHEME Z REPLACED BY SCHEME 8.1.D. NEW EIS NEEDED

INCEPTION: 1994: STATE HIGHWAYS DEPARTMENT APPROVES ROUTE ACROSS RIVER

DELIVERY: 1995: TED WILLIAMS TUNNEL OPEN

CONSTRUCTION: 1999: PROJECT 50% COMPLETE

DELIVERY: 1999: LEVERETT CIRCLE BRIDGE OPEN

DELIVERY: 2003: I-93 NORTH OPEN

CONSTRUCTION: 2001: PROJECT 70% COMPLETE

CONSTRUCTION: 2005: ELEVATED HIGHWAY DISMANTLED

DELIVERY: 2005: I-93 SOUTH OPEN

CONTROVERSY: 2006: CEILING COLLAPSE CAUSES FATAL ACCIDENT IN TUNNEL

DELIVERY: 2007: SURFACE ROADS COMPLETE

DELIVERY: 2007 (DEC): CENTRAL ARTERY AND TUNNEL OPEN. END OF PARTNERSHIP BETWEEN B/PBJV AND MTA

DELIVERY: 2008 (OCT): ROSE KENNEDY GREENWAY OPENS

CONTROVERSY: 2008: B/PB SETTLE CLAIMS AGAINST THEM

However, following a change in the state leadership in 1991, the Bridge Design Review Committee (representing 42 community, environmental and other stakeholders) was set up to find an alternative to Scheme Z. Construction had already begun on other elements of the project. Various options were proposed, and the state highways department finally approved one in 1994.

CHARACTERISTICS

In 1985 the cost was estimated at USD 2.8bn (1982 prices) (USD 6.08bn at 2010 prices). The final cost was USD 14.8bn in 2007 (USD 15.53bn at 2010 prices), an increase of 155%, making the Big Dig the most expensive highway project in the USA. However, *The Boston Globe* argues that the true final cost including interest will be in the region of USD 22bn. Delays, increased scope and mitigation measures were amongst the reasons given for cost increases.

The client organisation was the Massachusetts Highway Department (MHD) (later Massachusetts Turnpike Authority (MTA)). Bechtel/Parsons Brinckerhoff Joint Venture were appointed as project managers in 1986. MHD/MTA selected and awarded contracts, but B/PB was responsible for monitoring compliance. In 1999, MTA combined some of its team with B/PB's in an 'integrated project organization' intended to make management more efficient.

The project was the first in the USA to use slurry wall construction to build a tunnel, allowing construction without disrupting traffic. However, allegations of corruption and poor workmanship continued throughout the project, with some suppliers prosecuted for providing substandard materials or fraud. After opening, leaking tunnels continued to cause concern and the collapse of a ceiling in 2006 caused the death of a car passenger.

TIMELINE ISSUES

The first official project schedule, produced in 1989, anticipated completion of the project by 1998. Poor design and workmanship were amongst the many factors leading to a delay of nine years.

FUNDING

The federal government provided part funding, but this was capped at USD 8.5bn (48% of the final cost). State sources, including transportation infrastructure funds and the MTA's own resources, provided the remainder. In 2008, with the costs of servicing the project debt rising, MTA increased toll fees on parts of the Big Dig and other sections of the network. In 2009, it faced an unsuccessful lawsuit brought by a group of disgruntled motorists.