

Alaskan Way Bored Tunnel vs. Boston's Big Dig More differences than similarities

Comment [A1]: Should probably say "SR99" instead of Alaskan Way so people don't think the tunnel is on the waterfront.

Boston's Big Dig Central Artery/Tunnel

Substantially larger and more complex including:

- 1) Very disruptive cut-and-cover tunnel through the central city under the existing elevated roadway and 2 subway lines
 - 2) a signature cable-stayed bridge over the Charles River, cut-and-cover through South Boston
 - 3) 2 sets of immersed tubes under the harbor to the airport and the complex interchange with very poor geotechnical conditions
- Project was disruptive and required extensive traffic management and mitigation
 - The initial project cost estimate, did not include added scope, mitigation and environmental requirements, inflation and appropriate allowance for risk and escalation
 - The Central Artery/Tunnel did not have a strong agency management or consistent leadership throughout the course of the project
 - As a result, the project was delivered grossly over budget and years behind schedule

Comment [A2]: We will have cut/cover sections on the ends which will be disruptive. Maybe we should add the relative lengths of cut/cover between the 2 programs? We have new issues on the South End transition we should discuss....

Comment [A3]: I don't think any initial project estimates really include added scope, so this may not be a fair comparison.

Deleted: number

Comment [A4]: I think this is the same as inflation and is therefore redundant

	Bored Tunnel & South End Project	Big Dig Projects
Total Project Length	2.8 miles	8 miles
Number of tunnels*	1	3
Length of tunnels*	2 miles	5 miles
Total lane miles	12.8 miles	> 160 miles

Comment [A5]: Does this include the removal of the viaduct and subsequent Alaskan Way street restoration?

*Boston Big Dig tunnels included cut-and-cover, immersed tubes, jacked tunnel and other special tunneling methods

The SR99 Deep-Bore Tunnel

- Only the tunnel portals will be cut/cover. The majority of the tunnel will be bored up to 200 feet underground minimizing traffic disruption and impacts to the Waterfront and downtown.
- WSDOT uses the CEVP® process on all state projects over \$100M to ensure costs are complete, reasonable, defensible and appropriately represent risk and uncertainties.
- WSDOT is a strong owner in policy, management and technical capability and Governor Gregoire is project authority.

Deleted: Alaskan Way

Deleted: Project

Deleted: run

Deleted: 80-

- WSDOT will maintain this strength over the life of the project, assisted by eminent private-sector engineers and contractors.
 - accountable to the public, Governor and Legislature

Lessons Learned for Successful Tunnel Delivery

- Maintain a strong owner role and draw upon technical advice from industry experts.
- Maintain a **financial** management program to accurately predict potential cost exposure of all program work elements, **are appropriate and used properly**.
- Maintain an effective risk management program to ensure all risks are **identified and** managed to an acceptable level.
- Institute cost containment practices with rigorous controls to limit changes in scope.

Deleted: program

Comment [A6]: Dangling clause, not sure what this is supposed to say?

Examples of Successful Tunnel Excavation in Urban Areas

1. 4th Elbe River, Hamburg: Successfully excavated 1.6 miles at 46.6-ft-diameter.
2. Lefortovo Tunnel, Moscow: Rebuilt Elbe TBM successfully excavated 2 bores each 1.4 miles long at 46.6-ft-diameter. Same machine refurbished for another 2 tunnels in Moscow.



Comment [A7]: Should define "successful", does this mean on time and on budget?



3. Madrid M30 EPB: Successfully excavated 2 bores each 1.3 miles long at 50-ft-diameter by 2 closed-face TBMs built by different manufacturers. M30 diameter was about 10 ft larger than previous TBMs (~50% greater face area).
4. Shanghai Yangtze River Mixshield: Successfully excavated 2 bores each 4.6 miles long at 50.6-ft-diameter.

This TBM is the current record holder for diameter. Tunnel completed about a year ahead of original schedule.

Elbe Tunnel Slurry Machine