

## **Bechtel/Parsons Brinckerhoff Responds to "Big Dig" Tunnel Leak Allegations**

The Big Dig is safe and sound.

Recent news stories have vastly exaggerated the impact and significance of I-93 tunnel leaks in the Central Artery/Tunnel Project. A number of public figures have subsequently rushed to judgment. As a result, unjustified fears have been raised about the safety of the tunnels and the potential cost of repairs. In fact:

- All the experts agree: The Big Dig is structurally safe and sound.
- The tunnels already meet industry norms for water intrusion, even before they are finished.
- The program to seal leaks will be completed within months, not years, generally at the contractors' expense and without jeopardizing the project's schedule or budget.

It should come as no revelation that water is entering the tunnels: they are still under construction and partially open to the weather. For instance, water flows into the tunnels down traffic ramps that are still uncovered. Some roof sections have yet to be installed. There are open holes where beams that used to support the old elevated artery once stood. Manholes and utility conduits are not yet sealed. Covering or sealing such pathways is a scheduled part of finishing the project.

In the meantime, water entering the tunnel is readily managed by permanently installed drains and pumps. The volume is decreasing as work progresses.

All tunnels built below the water table will have some seeps and leaks. That's true of subways and highway tunnels in Boston, New York, London, and elsewhere. We have reduced these leaks by waterproofing portions of the tunnel floors, walls, roofs, and joints. As the project team gained experience with local conditions and material performance, waterproofing designs were upgraded over time--but never found defective, as falsely reported.

No waterproofing system is perfect. Chasing water that inevitably seeps through walls and joints is a normal part of construction. The spots where water enters are systematically located and sealed by the contractors responsible for each of the various sections of the tunnels or utilities. The work will generally be done at their expense to meet work specifications.

This task is well under way and will take months to complete, not years. Any residual seepage will be handled by a normal maintenance program as with all tunnels.

According to the Federal Highway Administration, typical tunnel designs assume a continuing trickle equal to about one ordinary garden hose for each linear mile of tunnel. The Big Dig's tunnels already meet this norm for fully finished tunnels. When complete, we expect the Big Dig tunnels to perform better than industry norms.

These anticipated leaks are not unusual in tunnel construction and have nothing in common with the major leak that closed two lanes to traffic on September 15, 2004. That was a localized incident caused by improper construction of a single wall bay. Bechtel/Parsons Brinckerhoff subsequently missed two opportunities to ensure that the contractor correct the defect and avoid the wall breach. We seriously regret not doing enough to prevent this incident. The cost of any repairs will be assumed by the responsible parties, including Bechtel/Parsons Brinckerhoff, not by the project or the public.

While it seriously delayed rush hour traffic, the September leak did not threaten the integrity of the tunnel. Initial repairs were quickly completed and project engineers, including independent experts hired by Bechtel/Parsons Brinckerhoff and the state, have conferred on a permanent solution.

Fortunately, this type of issue is rare. The wall bay in question is one of about 5,000 tunnel wall bays in the Big Dig. The breach, while disruptive and unacceptable, involved a few square feet out of 3.2 million square feet of tunnel walls.

To eliminate the possibility that similar issues might arise elsewhere, project teams are conducting extensive physical inspections and a thorough review of records. This process is expected to take a matter of weeks to complete. Construction issues have been identified at a number of additional wall bays, but all are less serious than the defect that led to the September breach. Any repairs to these wall bays will be performed at no cost to the public or to the project.

Nothing about any of these leaks represents a threat to the integrity of the Big Dig tunnels. Two independent experts hired by the Commonwealth have stated that the tunnels are safe and structurally sound. We strongly share this assessment.

The people of Massachusetts can drive the Big Dig tunnels with assurance. The Central Artery/Tunnel Project represents an extraordinary engineering and construction achievement, and an outstanding contribution to Boston's civic infrastructure.

## Facts and Allegations

In the interests of correcting the many false or misleading allegations in media reports and public statements, Bechtel/Parsons Brinckerhoff (B/PB) offers the following facts:

**Allegation:** It is unacceptable that the completed tunnels continue to leak.

**Fact:** Although the state has opened several tunnels to traffic, construction is not yet finished.

- The project is not scheduled for substantial completion until September 2005.
- Drivers can use I-90 and northbound I-93 tunnels safely in the meantime.
- Until construction is finished, the tunnels remain partially open to the weather and may take in water through:
  - uncovered ramps
  - unfinished roofs
  - openings around beams that held up the old artery
  - unsealed utility conduits
- A program to locate and seal wall and roof leaks is making good progress and should be substantially complete by the summer of 2005, along with the rest of the project.
- This waterproofing program will be accomplished largely at the contractors' expense and does not jeopardize the project's budget.
- All tunnels below the water table have some residual seepage that must be handled through normal maintenance programs. The Big Dig tunnels will have such a program in place.

**Allegation:** Water entering the tunnels makes them unsafe or structurally unsound.

**Fact:** Experts agree the tunnels are both safe and sound.

- The inflow is readily managed by permanent pumps and drains that catch and divert the water safely.
- Today the water flow has been reduced to the equivalent of six garden hoses -- already meeting industry norms for water flow in tunnels, as published by the Federal Highway Administration.

- Water inflows during construction were expected and will diminish once tunnels are complete and they are fully closed to the weather.
- Project officials, an independent expert hired by the state, and our engineers confirm the tunnels are safe and sound.

**Allegation:** Fixing the tunnel leaks will take up to a decade.

**Fact:** Proper repairs will take months, not years, to complete.

- Much of the water inflow will end when construction is complete and tunnel openings are sealed.
- The grouting program to seal water leaks is also part of the construction schedule and should be substantially complete, along with the rest of the project, by the summer of 2005. It has already achieved a substantial reduction in leaks. Two tunnel sections are already watertight.
- The I-93 wall breach was quickly repaired; project engineers and an independent expert hired by the state are conferring on a permanent solution that can be implemented within weeks. Inspecting and making any necessary repairs to the few additional suspect panels should take a few months at most.
- The opened tunnels are perfectly safe to use even while these repairs progress.

**Allegation:** The September 2004 wall breach was indicative of tunnel leak problems.

**Fact:** The problems appear to be very limited in number and do not affect public safety or tunnel integrity.

- The September breach was a localized incident entirely unrelated to the normal leaks and seeps experienced by all tunnels below the water table.
- The September incident in no way compromised the structural integrity of the tunnels, as confirmed by the state's independent expert.
- It was caused by poor construction on one wall bay out of many thousands throughout the tunnels.
- The breach measured only a few square feet out of 3.2 million square feet of wall space.
- The project is conducting extensive physical inspections and a thorough review of records to identify any similar problems. We have identified several more wall bays that may have construction defects, but all are all less serious than the one that failed in September 2004.

**Allegation:** B/PB failed to correct a wall construction defect, leading to the breach.

**Fact:** True. B/PB has acknowledged sharing responsibility for the September 2004 breach and will pay its fair share of the repairs to the wall, along with the wall contractor.

- Our field engineer noted the construction defect in 1999 but apparently approved it and did not follow up with recommendations for corrective action.
- The contractor that built this section of wall identified a leak there in late 2001 and informed B/PB and state engineers. Days later, our resident engineer called on the contractor to undertake nondestructive testing to assure that the wall panel met contract specifications, and to submit a procedure for repair.
- Over the following year, project officials engaged with the contractor, seeking remedial work on slurry wall locations identified in walk-down inspections.
- On February 28, 2003, the contractor advised by letter that required remedial work on all slurry walls had been completed. But the contractor did not take proper steps to fix the so-called inclusion that weakened the wall bay where the September breach occurred.

- Although responsibility lies with the contractor to ensure proper performance of the wall, we seriously regret that we did not do more to prevent the September incident. We should have caught the problem with the construction of this panel during the initial inspection. Later we should have been more vigilant in making the contractor carry out necessary tests and repairs properly.
- The cost of any repairs associated with this wall defect will be assumed by the responsible parties, not by the project or the public. Again, we acknowledge our responsibilities and will be among the parties that share the cost.

**Allegation:** B/PB allowed poor waterproofing to go uncorrected.

**Fact:** B/PB took the lead in addressing waterproofing issues.

- B/PB identified issues with the performance of waterproofing systems. We created a task team with state officials in March 1997 to address those issues aggressively.
- As a result, the project took several actions to correct the problems. Among the most important:
  - The project made contractors strictly meet contract specs and adhere to waterproofing manufacturer written requirements.
  - The project eliminated waterproofing systems that contractors had difficulty implementing properly in the field.
  - This task force led to significant improvement in the installation of waterproofing, reflected in the fact the tunnels today meet industry norms, published by the Federal Highway Administration, even before completion.
- The project will hold contractors accountable for the quality of their work - and for grouting and sealing leaks at their expense.

**Allegation:** B/PB has not acknowledged the extent of the leak problem.

**Fact:** The state has been kept fully apprised of waterproofing issues as they arose.

- From the very beginning, the state chose a state-of-the-art construction method known as "slurry walls" to make it possible to build tunnels within the extremely tight space constraints posed by the existing artery, adjacent buildings, utilities, the subway system, and other obstacles. Concrete walls built this way inevitably leak more than tunnels that are built and sealed in broadly cut trenches.
- State experts joined B/PB engineers on the Waterproofing Task Force that recommended tough measures to ensure high quality waterproofing throughout the project.
- The Waterproofing Task Force report from 1997, which *The Boston Globe* cited in claiming that "The Big Dig's tunnel leak problem is far more costly and extensive than Massachusetts Turnpike officials and private contractors have acknowledged," is not confidential and was made available to the state Inspector General's office a year ago.
- B/PB joined state and federal officials on a task force in 2000 that created a systematic program to identify and seal leaks in tunnel walls and joints.
- As noted, the leak problem is well under control, and does not jeopardize the project's budget.