



**THE COMMONWEALTH OF MASSACHUSETTS
OFFICE OF THE INSPECTOR GENERAL**

**A Review of the Central Artery/Tunnel Project's
Materials Testing Laboratory Function**

**Robert A. Cerasoli
Inspector General
December 1997**



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December 1997

His Excellency the Governor

The Honorable President of the Senate

The Honorable Speaker of the House of Representatives

The Honorable Chairman of the Senate Ways and Means Committee

The Honorable Chairman of the House Ways and Means Committee

The Honorable Chairman of the House Post Audit and Oversight Committee

The Directors of the Legislative Post Audit Committees

The Secretary of Administration and Finance

Members of the General Court

Omnibus ad quos praesentes literae pervenerint, salutem.

I am today releasing a report concerning the Central Artery/Tunnel (CA/T) Project's Materials Testing Laboratory (laboratory). The Massachusetts Highway Department (MassHighway) in 1991 authorized its management consultant, Bechtel/Parsons Brinckerhoff (B/PB), to establish and maintain a laboratory function. This Office estimates that the laboratory has cost the Project more than \$26 million to date and will probably cost the Project nearly \$53 million by the year 2004. As public officials negotiate the transfer of CA/T Project management responsibilities to the Massachusetts Turnpike Authority, I urge a closer look at B/PB's role, including but in no way limited to provision of costly services such as those discussed in this report.

The Commonwealth faces great challenges as it approaches the peak of CA/T Project construction and the potential for delays and cost overruns increases. Project management is aware of this potential and is committed to controlling Project costs. By using existing MassHighway laboratory facilities and staff and contracting out for certain laboratory testing, the Project may be able to reduce costs. The Project will also benefit by reducing its near total reliance on B/PB to provide the laboratory testing function and will help to ensure that CA/T Project testing expertise remains in the Commonwealth after the Project ends.

CA/T Project managers have been fully apprised of my concerns and accorded ample opportunity to review and comment on the report. The Project's formal written response is included at the end of the report.

Sincerely,

Robert A. Cerasoli
Inspector General

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Executive Summary

The \$11.4 billion Central Artery/Tunnel (CA/T) Project involves constructing a new tunnel across Boston Harbor, placing the Central Artery underground, and constructing a new Charles River crossing. 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/Parsons Brinckerhoff Quade and Douglas (B/PB) to manage the design and construction of the CA/T Project.

This report focuses on the CA/T Project's materials testing laboratory and the potential for future cost savings. The laboratory helps B/PB to ensure that construction materials such as concrete and reinforcing steel meet CA/T Project specifications. The laboratory opened in 1991 and taxpayers have already paid more than \$26 million for B/PB to design, construct, operate, and maintain the facility. This Office estimates that the laboratory will cost an additional \$26 million between now and the scheduled completion of the Project in 2004. This Office's review disclosed the following:

Finding One: Project management did not adequately assess the options before spending millions of dollars to establish and maintain a materials testing laboratory.

Finding Two: MassHighway violated state law by allowing B/PB to give more than \$621,000 worth of no-bid Harding Building renovation work to Bechtel Construction Company.

Finding Three: MassHighway violated state law by not obtaining Division of Capital Planning and Operations (DCPO) certification to renovate the Harding and D Street buildings.

Project missteps should not and could not be cured through a violation of state bidding law. MassHighway violated state law and is also responsible for any extra costs borne by the taxpayers as a result of avoiding the competitive bid process. Furthermore, by failing to comply with the public bidding law, MassHighway deprived the public of the benefits of open competition and market forces that may have driven costs down. This Office urges Project management to comply with all applicable state laws and regulations. In addition, this Office concludes that at least \$5 million has been spent unnecessarily for design and renovation work, relocation expenses and fees paid to B/PB as a consequence of poor planning.

This Office concludes that it is in the Commonwealth's best interests for Project management to include the CA/T Project laboratory operations in cost containment initiatives at this point in the Project. Cost savings may result from transferring certain CA/T laboratory functions to MassHighway's already existing statewide materials testing laboratory, using outside laboratory services, or some combination of the two.

Once the Project is completed, maintaining the new facility will require materials testing as well. B/PB will no longer be supplying these services after 2004. In order to reduce reliance on B/PB now and develop expertise for use after Project completion, public employees should now begin to assume the laboratory functions. Over time, this expertise will benefit all highway projects across the state as well as the CA/T Project.

Introduction

The \$11.4 billion¹ Central Artery/Tunnel (CA/T) Project involves constructing a new tunnel across Boston Harbor, placing the Central Artery underground, and constructing a new Charles River crossing. The Federal Highway Administration (FHWA) has funded approximately 86 percent of the Project cost but pending federal legislation will likely decrease this percentage dramatically. The CA/T Project is scheduled for completion in 2004. Currently, the Project has completed approximately 30 percent of construction and 93 percent of design work.

Since the early 1980's the Massachusetts Highway Department (MassHighway) has had the responsibility for planning and overseeing design and construction of the Project for the Commonwealth. Chapter 3 of the Acts of 1997 (Chapter 3) established a plan for operating and financing a network of roadways, including the Central Artery and the Ted Williams Tunnel, called the Metropolitan Highway System (MHS). The law empowered the Massachusetts Turnpike Authority (Turnpike Authority) to "own, construct, maintain, repair, reconstruct, improve, rehabilitate, finance, refinance, use, police, administer, control and operate" the MHS.

In 1985, MassHighway hired the joint venture of Bechtel/Parsons Brinckerhoff (B/PB) to manage the design, construction, and day-to-day operations of the

¹ A July 1997 report released by the U.S. General Accounting Office estimates the current Project cost to be \$11.6 billion. A Massachusetts Turnpike Authority preliminary official statement for the Metropolitan Highway System bond issue states the cost as \$11.44 billion (\$4.6 billion expended as of June 30, 1997; \$6.84 billion projected through June 30, 2005).

CA/T Project. B/PB prepares preliminary design documents, manages final design contracts, provides administrative and technical support to the Project, and manages construction. Included in B/PB's responsibilities is the task of maintaining materials testing capacity during construction. In 1991, MassHighway instructed B/PB to establish a CA/T Project laboratory to ensure that construction materials such as concrete met Project specifications. This Office has reviewed the Project's formation and maintenance of this laboratory.

In conducting this review, this Office focused on the costs of establishing and maintaining the laboratory as well as certain assumptions that Project management made about the laboratory function. This Office's review objectives included assessing whether MassHighway should consider the laboratory for cost cutting initiatives and if MassHighway should reduce its reliance on B/PB for laboratory services. During this review, staff from this Office examined hundreds of Project documents and interviewed Project staff.

Background

MassHighway construction contracts require that all construction materials meet contract specifications. According to Project staff, MassHighway considers laboratory services vital to the Project's quality control and oversight on construction contracts. Work program seven, the contract between MassHighway and B/PB for the period January 1991 through May 1992, stated:

The CONSULTANT [B/PB] shall furnish testing services to the Resident Engineer forces. CONSULTANT shall maintain a certified testing laboratory and provide personnel for the testing of soil, asphalt, metals and welding, and concrete for construction control. All testing equipment shall be furnished by the CONSULTANT.

Project staff stated that talks about creating a CAT laboratory began in the late 1980s. In late 1990 B/PB submitted a plan to MassHighway to install the laboratory at the MassHighway-owned former Harding Building in South Boston. In February 1991, MassHighway approved B/PB's plan. The laboratory occupied the Harding Building from mid-1991 through mid-1995. In mid-1995, before the scheduled demolition of the Harding Building, the Project moved the laboratory to MassHighway's former District Eight depot on D Street in South Boston. MassHighway's statewide materials testing laboratory is also located at the D Street site.

The Project laboratory tests construction materials to determine whether the materials meet contract specifications. B/PB also operates a laboratory-affiliated training program that certifies B/PB field engineers to perform some materials testing at construction sites. B/PB designed, equipped, constructed, and has operated the laboratory under its management consulting contracts

with MassHighway since the laboratory's opening in 1991. As of September 1997, the Project had spent approximately \$26 million for the set-up and operation of the Project laboratory function. [See Table One on the following page.] The laboratory currently employs approximately 33 B/PB staff.

Table One
Estimated Capital and Operating Costs²

COST ITEM	HARDING BLDG 1991- 1995	D STREET 1995 – 1997	TOTAL 1991- 1997	<i>ESTIMATED COSTS 1998- 2004</i>
Design	\$ 86,000	\$ 169,100	\$ 255,100	N/A
Renovation	\$ 621,837	\$ 882,000	\$ 1,503,837	N/A
Equipment/Set-up	\$ 2,625,437	\$ 421,070	\$ 3,046,507	\$ 812,000
Relocation	N/A	\$ 540,000	\$ 540,000	N/A
Salary Cost ³	\$ 4,274,000	\$ 3,787,000	\$ 8,061,000	\$ 10,857,000
Indirect Costs ⁴	\$ 4,616,000	\$ 4,166,000	\$ 8,782,000	\$ 12,051,000
MassHighway ⁵	N/A	\$ 1,635,000	\$ 1,635,000	N/A
Other Costs ⁶	\$ 184,941	\$ 620,900	\$ 805,841	\$ 665,000
B/PB Profit ⁷	\$ 889,000	\$ 795,000	\$ 1,684,000	\$ 2,291,000
TOTAL	\$ 3,297,215	\$13,016,070	\$ 26,313,285	\$26,676,000

TOTAL ESTIMATED COSTS 1991- 2004 = **\$52,989,285**

The costs listed above include actual costs and estimates by the Office of the Inspector General based on Project documents. (N/A = not applicable.)

² These estimates do not include all costs. For example, the estimate does not include all costs incurred by MassHighway for contract administration, oversight, and for establishing and operating satellite laboratory offices in East Boston, South Boston and on Spectacle Island.

³ This Office calculated salary costs by estimating the total number of staff per year based on Project documents and multiplying this number by the U.S. Department of Labor's (USDOL) Compensation Survey pay scales for the Boston Area for engineers and laboratory technicians. This Office used different pay levels for the different staff positions. This Office used 1994 and 1996 compensation survey information and adjusted these numbers up or down for other years based on a three-percent inflation factor. In a 1997 report concerning laboratory costs, B/PB used lower salary estimates than the USDOL. Since this Office did not obtain the report from the Project until November 1997, this Office had insufficient time to evaluate and verify the B/PB estimates.

⁴ This Office estimated indirect cost by multiplying the total estimated direct salary cost by the indirect cost rate for Bechtel Corporation. The work programs between B/PB and MassHighway during the period 1991 and 1997 used 108 and 110 percent as the rate. For the period 1998 to 2004 this Office estimated a rate of 111 percent. This Office applied each rate to the applicable work program year.

⁵ CA/T Project funds paid for the renovation of the D Street site and the relocation of MassHighway's statewide materials testing laboratory from Wellesley to D Street in exchange for B/PB's use of MassHighway's D Street site for the CA/T Project's laboratory.

⁶ "Other costs" refers to miscellaneous design, construction, maintenance, and subcontractor costs identified in Project documents such as a new air conditioner for the D Street building, utility and maintenance charges, the installation of a new telephone system, and laboratory sub-consultants.

⁷ This Office estimated B/PB's profit by adding the estimated direct salary cost and estimated indirect costs paid to B/PB by MassHighway for this work and multiplying the total by the average net fee percentage (10 percent) from the work programs between 1991 and 1997.

Findings

Finding One: Project management did not adequately assess the options before spending millions of dollars to establish and maintain a materials testing laboratory.

According to this Office's estimate, MassHighway has spent almost \$26 million, to date, to create and maintain an in-house Project laboratory. [See Table One.] Project documents provide no evidence that during the laboratory services planning phase in late 1990 through early 1991 B/PB considered an alternative to a B/PB-run laboratory or whether a private laboratory or MassHighway's existing laboratory could more cost-effectively provide this work under a separate contract.⁸ Documents provided to this Office during the review showed that B/PB's only analyses dealt with the cost differences between renovating an existing space or constructing or renting a new space.

This Office questions MassHighway's decision to give B/PB the job of creating and operating a costly service without first requiring that B/PB explore available alternatives or conducting an independent assessment. MassHighway should have required B/PB to provide a more detailed analysis of options, including the respective costs and benefits, before authorizing the creation of an in-house laboratory. B/PB completed a cost/benefit analysis in 1997 for the laboratory service. This analysis reportedly showed the B/PB laboratory to be the most cost-effective option.

⁸ According to Project staff, high-level Project managers probably deliberated about whether MassHighway's statewide laboratory could be used for the CA/T Project. However, the Project provided no minutes, summaries, memoranda or other records of these deliberations.

B/PB failed to provide MassHighway with adequate cost information.

B/PB did not produce a complete cost/benefit analysis in 1991, nor did B/PB address the life cycle costs⁹ for a laboratory. Project documents contained no cost estimates for the operation, maintenance, and administration of the laboratory from its inception through the end of the CA/T Project, scheduled at that time for the year 2000. Simple arithmetic, however, leads to a final cost estimate of almost \$53 million between 1991 and the scheduled completion date of the Project in 2004.

Table Two: Estimated Final Costs¹⁰

1991 – 1997 Actual and Estimated Capital and Operating Costs (See Table One)	\$26,313,285
1998 – 2004 Estimated Operating Costs (See Table One)	\$26,676,000 ¹¹
Total Estimated Final Cost	\$52,989,285

The costs listed above include actual costs and estimates by the Office of the Inspector General based on Project documents.

⁹ Life cycle costs include the total construction, operations, and maintenance costs for the expected useful life of the facility, structure, or component in question.

¹⁰ The estimates contained in this table are derived from Table One. Please see Table One (page 5) and the endnotes for Table One for additional information.

¹¹ This estimate includes salary, indirect costs, and B/PB profit as explained in Table One. Salary information did account for diminishing staff levels as the Project nears completion. This Office estimated the cost for equipment and “other” items based on laboratory expenses for fiscal year 1997.

Furthermore, the cost advice B/PB did provide MassHighway was wrong. This Office's review of the costs associated with the Harding and D Street renovations shows this option to be less cost effective than B/PB believed. For example, in 1991, B/PB estimated that it could construct a new laboratory facility for approximately \$1.1 million or rent space until the year 2000 for about \$700,000 (not including any necessary renovations). B/PB and MassHighway spent, by this Office's estimate, more than \$2.2 million in design, renovation, and relocation costs for the Harding and D Street laboratories – twice B/PB's original \$1.1 million estimated cost for building a new facility. B/PB's 1991 analysis of laboratory space options showed that constructing a facility or renting space would have been significantly less expensive in the long run. By using the Harding Building, B/PB ignored its own analysis of options.

B/PB knew in 1991 that the Harding Building had been scheduled for demolition and according to staff interviewed by this Office, Project management had always regarded the Harding Building as a temporary location. B/PB demolished the Harding Building after relocating the laboratory in 1995. MassHighway should have chosen an option that would not require major additional expenditures, such as relocation to and renovation of the D Street facility, before the end of the Project. Better planning would have identified the least costly option for the long-term.

B/PB failed to consider existing private and public laboratory options.

According to Project staff, B/PB did not consider the option of using MassHighway's statewide materials testing laboratory which is used for all other state highway projects in Massachusetts. Neither Project staff nor

Project documents could explain why Project management did not consider use of the MassHighway laboratory as a viable option. Additionally, Project documents do not indicate that prior to 1996 MassHighway and B/PB considered using private laboratories.

Selecting MassHighway's statewide laboratory for Project work would have eliminated the need for at least one of the two facilities the CA/T Project had designed and renovated for a CA/T laboratory. This would also have eliminated the net fee (profit) paid to B/PB by MassHighway for operating the CA/T Project laboratory. MassHighway's contract with B/PB sets this fee at a percentage of total dollars paid to B/PB for direct salary and indirect expenses. This Office estimated that B/PB earned nearly \$1.7 million in profit for the operation of the CA/T laboratory between 1991 and 1997. MassHighway also paid B/PB for CA/T laboratory design, renovation, and construction costs totaling more than \$2 million. [See Table One.]

An additional cost savings (not calculated in this report) would be the reduction in B/PB staff and overhead supporting the laboratory. For example, this Office did not include in its cost savings estimates the reduction of B/PB staff and resources devoted to functions like processing laboratory staff payroll, reviewing and processing hundreds of purchase orders and other documents, and providing management oversight for the laboratory. Since B/PB stood to benefit financially from building and operating the CA/T Project laboratory, B/PB had no incentive to objectively assess the options in its role as management consultant to MassHighway.

The Project could have contracted with and provided funding to the MassHighway laboratory to meet CA/T Project needs. This Office recognizes that the use of MassHighway's statewide laboratory for CA/T

work would have required a significant expenditure of funds for the renovation, staffing and set-up of the MassHighway facility, but only once.

This investment would have had numerous benefits for the future. One benefit of expanding MassHighway's statewide laboratory would have been the transfer to the state of expertise for later use to operate and maintain the new Metropolitan Highway System and for other projects statewide. Once the CA/T Project was completed, the laboratory could have been reduced in staff and equipment, as necessary.

MassHighway's statewide laboratory has been responsible for providing independent assurance testing for the CA/T Project laboratory. To assist MassHighway's laboratory in providing this service, the Project not only renovated space for the MassHighway laboratory, but also paid for its relocation from Wellesley to Boston, and purchased approximately \$100,000 worth of computer equipment and furniture for the MassHighway laboratory. The Project could have committed resources to one laboratory rather than two.

B/PB staff stated that a major reason for not using private laboratories was that the Project and the FHWA wanted its laboratory to be accredited by the American Association of State Highway Transportation Officials (AASHTO). According to Project staff, only two local private laboratories have some form of AASHTO accreditation.¹² B/PB staff stated that, in their opinion, AASHTO requires accredited laboratories to adhere to higher performance

¹² AASHTO will accredit private laboratories that meet AASHTO standards. There are different levels of AASHTO accreditation and apparently local private laboratories do not have the same level of accreditation that the MassHighway and CA/T laboratories have.

and staffing standards than are normally seen in the industry.¹³ B/PB obtained AASHTO accreditation for the CA/T Project laboratory. MassHighway's statewide laboratory had AASHTO accreditation.

Finding Two: MassHighway violated state law by allowing B/PB to give more than \$621,000 worth of no-bid Harding Building renovation work to Bechtel Construction Company.

In 1988, B/PB had planned to begin major CA/T Project construction in 1991. B/PB knew that the Project would require increased materials testing capability during the construction phase of the CA/T Project. Yet 1991 arrived, major construction was imminent, and MassHighway and B/PB had still not put a plan in motion for additional laboratory services.

In 1991, B/PB recommended to MassHighway that the CA/T Project laboratory be located at the Harding Building, which required renovation. Project documents estimated that the design and renovation work would cost more than \$500,000. Eventually renovation would cost more than \$621,000 and design would cost approximately \$86,000 for a total cost of \$707,000. [See Table One.]

Project documents indicate that B/PB planned to competitively bid the renovation work. Ultimately, however, B/PB did all the design work and gave Bechtel Construction Company (BCC), a subsidiary of Bechtel

¹³ According to recent press reports, the National Council for Laboratory Accreditation is in the process of standardizing laboratory accreditation. As a result, future AASHTO accreditation should be similar to or equal to other accreditation.

Corporation, all renovation work and construction management services. Project staff stated that B/PB gave the work to BCC because: 1) the standard state procurement process would have taken too long (approximately 18 months by the Project's estimate); 2) B/PB had staff who could function as BCC representatives; and 3) B/PB had not yet established a strong construction management function. To the extent that the Project faced time constraints, the constraints resulted from B/PB's lack of adequate planning.

In 1991, MassHighway violated state bid law by allowing B/PB to give the Harding Building renovation work, worth more than \$621,000, to BCC instead of competitively bidding the work as required by M.G.L. c.149, §44A, which states:

Every contract for the construction, reconstruction, installation, demolition, maintenance or repair of any building by a public agency estimated to cost more than twenty-five thousand dollars . . . **shall be awarded to the lowest responsible and eligible bidder on the basis of competitive bids.** . . . [Emphasis added in bold.]

Project records and staff interviews provided no clear evidence that a written contract or agreement existed between MassHighway or B/PB, and BCC, for this renovation work. MassHighway paid B/PB more than \$621,000 for this work as a direct expense. According to Project documents, BCC received from B/PB more than \$258,000 for the services, labor and equipment it provided. B/PB paid the remaining money directly to BCC subcontractors.

Work program seven specifies that B/PB can perform certain construction as follows:

. . . DEPARTMENT may require the CONSULTANT to perform certain types of miscellaneous construction services. Any such participation in Project construction or miscellaneous construction services **shall be on terms and conditions in compliance with all applicable laws.** [Emphasis added in bold type.]

Project documents indicate that B/PB interpreted the language in work program seven to permit B/PB to use BCC for the construction or renovation of a CA/T laboratory facility. MassHighway is responsible for ensuring that “all applicable laws” are properly followed. MassHighway shirked this responsibility when it permitted B/PB to use BCC.

In addition, the Project Management Plan, which is incorporated by reference in B/PB’s contract with MassHighway (work program seven in this case), explicitly obligates B/PB to comply with the law and to oversee and manage all procurement-related activities to ensure “full and open competition . . . consistent with all applicable Federal, State, and local laws. . . .” This lack of planning should not and could not be cured through a violation of state bidding law. MassHighway violated state law and is also responsible for any extra costs borne by the taxpayers as a result of avoiding the competitive bid process.

Finding Three: MassHighway violated state law by not obtaining Division of Capital Planning and Operations (DCPO) certification to renovate the Harding and D Street buildings.

M.G.L. c.29, §7K requires DCPO certification of a design study before a state agency enters into a contract for design or construction services for a state building. The certification ensures that DCPO has reviewed the

project costs and schedule and that the owner agency has appropriately identified its current and long-term needs. The owner agency must also certify that the design under review accurately reflects the needs of the agency. The DCPO certification requirement is a safeguard established as a result of the Ward Commission reforms instituted in the early 1980s in response to rampant corruption in public construction.

The Project failed to conduct the statutorily mandated study for both the Harding and D Street buildings before authorizing B/PB to proceed with design.¹⁴ By not completing these studies, B/PB violated state law and contravened the Project Management Plan, which is incorporated by reference in B/PB's contract with MassHighway. The Plan explicitly obligates B/PB to comply with all applicable federal, state, and local laws.

Harding Building

In response to this Office's concern about the lack of a DCPO-approved study for the Harding Building, Project staff stated in interviews that MassHighway considered the Harding Building laboratory to be a B/PB facility, not a state facility, and that only state facilities require DCPO certification.

Project staff is mistaken. In the case of the CA/T Project, a "B/PB facility" *is* a state facility. According to the contracts between MassHighway and B/PB, B/PB is MassHighway's paid agent. The state owned the Harding

¹⁴ Under Section 16 of Chapter 11 of the Acts of 1997, the CA/T Project is now exempt from this study requirement. This was not the case in 1991.

Building property and paid for all the renovation work. The laboratory equipment is state-owned property. MassHighway asked B/PB, acting as the state's agent, to provide the materials testing service for a state project. State law required MassHighway to obtain this certification.

D Street Building

In mid-1995, the CA/T Project laboratory moved out of the Harding Building and into the newly renovated facilities at D Street. The Project did not complete a design study or seek DCPO certification for the conversion of MassHighway's District Eight Depot at D Street into a materials testing laboratory.¹⁵

MassHighway staff told this Office that the D Street laboratory renovation design did not require DCPO certification because the work was funded by Chapter 33 of the Acts of 1991, which provided that MassHighway should perform the work funded thereunder "notwithstanding any general or special law to the contrary."

This Office disagrees with MassHighway's interpretation of the statute. Buildings funded under Chapter 33 require DCPO-certified design studies

¹⁵ By letter of November 1994 to the Project, this Office informed the Project of the need for a design study for the relocation of staff to D Street. This Office recommended that the Project not proceed with the D Street renovation until it obtained DCPO certification. Soon after this letter, MassHighway awarded a \$500,000 renovation contract for D Street. In contrast to the Harding Building renovation work, B/PB followed state law in the procurement and award of that renovation contract.

because the appropriation for these projects does not “specifically state that no such study or program need or shall be done.” (M.G.L. c.29, §7K)

Moreover, financial records provided by the Massachusetts Comptroller’s Office and payment voucher information provided by the Project show that the Project did not pay for the D Street facility renovation from funds allocated under Chapter 33, but rather with funds allocated under the Acts of 1994.

Conclusions

CA/T Project costs are rising and so is the Commonwealth's share of costs for the Project. The Project, MassHighway, and the Turnpike Authority are looking at ways to finance the Commonwealth's increasing share of Project costs as well as to contain costs. We have repeatedly expressed support for the Project's cost containment efforts but have also expressed concern at the Project's lack of full commitment to or incomplete implementation of some cost containment initiatives. Opportunities still exist for cost reduction and cost containment.

In the case of the CA/T Project laboratory, MassHighway may have been able to cut costs by insisting on a thorough cost-benefit analysis of options for a CA/T laboratory during the planning phase. Furthermore, by failing to comply with the public bidding law, MassHighway deprived the public of the benefits of open competition and market forces that may have driven costs down. In addition, this Office estimates that at least \$5 million¹⁶ has been spent unnecessarily for design and renovation work, relocation expenses and fees paid to B/PB as a consequence of poor planning. The result has been the need to relocate the laboratory facilities from the Harding Building to the D Street location. This money can no longer be saved, but now is the time for MassHighway and the Turnpike Authority to question how and why B/PB is providing certain services.

¹⁶ This figure includes the cost of obtaining, designing and renovating the laboratory space at D Street.

We estimate that the 14-year cost for the CA/T Project laboratory will total nearly \$53 million. There is no reason to believe that MassHighway expected to spend \$53 million when it approved the laboratory in 1991. MassHighway should have required more thorough planning, including an assessment of life cycle costs and all available alternatives. It is not too late to do this analysis for the remaining six-plus years of the Project.

MassHighway and the Turnpike Authority should consider phasing out B/PB's complete control of the CA/T laboratory function and reduce its reliance on B/PB overall. MassHighway's statewide testing laboratory or private laboratories might begin to assume some of the B/PB functions (private laboratories are now used by B/PB on a limited basis). A July 1997 report on cost containment prepared by the McCormack Institute of Public Affairs at the University of Massachusetts at Boston suggested that transferring functions away from B/PB to MassHighway staff could save significant costs. The report stated:

As the Project moves into its final construction stages, it will be important for those responsible for its supervision to explore the possibilities for functions now planned for the management consultant to be absorbed by agencies which will have ultimate responsibility for operating the system, particularly MHD [MassHighway] and the Massachusetts Turnpike Authority.

According to the McCormack Institute report, salary, indirect costs and B/PB fees could be reduced approximately 40 percent by transferring functions to a state agency. Applying the McCormack Institute assumption to this Office's estimated laboratory costs (salary, indirect, fees) for the years 1998 to 2004 indicates that the Project could save

approximately \$11 million by transferring the laboratory function to MassHighway or another state entity. [See Table One.]

This Office has long been concerned about the vulnerabilities of MassHighway's costly 12-year -- \$1.5 billion and growing -- contractual arrangement with B/PB. To date, Project officials have rejected or ignored this Office's recommendations aimed at curing over-reliance on B/PB, opening work up to other firms, and re-asserting agency control over the Project. As Project officials negotiate the transfer of management responsibilities to the Turnpike Authority, we urge a closer look at B/PB's role, including but in no way limited to provision of services such as those discussed in this report.

Appendix A: Project Response to the Draft Report

We appreciate the Project's timely response to the draft of this report. We carefully reviewed the Project's response and as a result clarified our comments and incorporated explanatory notes where applicable.

Note: The original response letter has been scanned and reformatted for electronic publishing. However, the text of the Project's letter has not changed.

Massachusetts Highway Department

Central Artery/Tunnel

December 17, 1997

Office of the Inspector General
One Ashburton Place
John W. McCormack Building, Room 1311
Boston, MA 02128

Attn: Ms. Wendy Haynes
Deputy Inspector General for Contract Audit and Review Division

Dear Ms. Haynes:

This letter responds to your draft report on the Central Artery/Tunnel Project's Materials Testing Laboratory, dated November 19, 1997. Thank you for extending the deadline for preparing this response, given the passage of time since the events in question occurred, the need to identify and examine documents archived in remote locations, and the fact that the decision makers on this issue are no longer with the Project.

The Materials Testing Laboratory has provided a good value to the Project and to the Commonwealth. It is a major factor in maintaining a high level of construction quality in CA/T work thus far, and I am satisfied that the facility constructed was the facility needed to get the job done.

Establishment of the lab proceeded this way: The Project needed a testing lab to support construction. Given the volume and range of activity planned for the lab (including materials and office engineering, lab and field testing, plant inspection, and structural instrumentation), and the need to minimize the potential for claims and disputes, it was determined early on that the lab was best operated in-house and close to construction sites.

The Project had planned to build the lab as part of an early contract, for the South Boston Haul Road. When this contract was delayed, the Project decided to establish the lab as a stand-alone effort in order to meet project-wide testing needs. Since no off-project alternative was available, either through the Department of Public Works (now the Highway Department) or with a private concern, the Project chose to use the Harding Building on B Street in South Boston. Mindful of the need to work quickly without sacrificing cost or the fairness of the procurement, the Project mobilized Bechtel Construction to manage all subcontracting tasks to renovate the Harding Building, pursuant to Work Program Seven, which specified that "the CONSULTANT (B/PB) shall furnish testing services to the Resident Engineer forces. CONSULTANT shall maintain a certified testing laboratory and provide personnel for the testing of soil, asphalt, metals and welding, and concrete for construction control. All testing equipment shall be furnished by the

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CONSULTANT." Nothing in the history of the procurement or of the lab's operation leads me to believe that the Project or Commonwealth were not well served by this process. Let me review your findings one by one.

Finding One suggests that "Project Management did not adequately assess the options before spending millions of dollars to establish and maintain a materials testing laboratory." In fact an elaborate analysis was not necessary because the Massachusetts Department of Public Works laboratory was located in Wellesley, unworkably far away from CA/T job sites, and lacked capacity to support CA/T demands. Further, no local commercial laboratories were then sufficiently equipped or available to handle the number of tests required. Our judgement that local labs could not perform the work cost-effectively was confirmed by a recent evaluation (a summary of which was provided to you) of laboratory options. As for the location of the lab, this issue did receive careful analysis, as reflected in documents provided to you.

Finding Two claims that "MassHighway violated state law by allowing B/PB to give more than \$621,000 worth of no-bid Harding Building renovation work to Bechtel Construction Company." In terms of state law, it was the Project's belief at the time that the facility was a B/PB operation and as such not subject to the Chapter 149 provisions you cited. This process, pursuant to Work Program Seven (which was procured under applicable state regulations), allowed the Project to proceed quickly under the circumstances, given the need for early construction contracts to have adequate lab facilities available, and in fact Bechtel Construction did obtain competitive quotes from subcontractors for most of the cost of renovating the Harding Building.

When the Harding Building renovations were performed, the B/PB Work Program Seven scope of services included the responsibility for providing all testing services, as well as a testing lab and all testing equipment. Since all of these components were contained in B/PB's scope, the Project's view was that it was wholly consistent for B/PB to perform the work required to fulfill these specifications. There is little doubt that if B/PB had chosen to locate the contractually-required laboratory in a private building the construction work would have been performed in a similar manner and its costs passed on to the Project. At the time this was an appropriate approach.

Finding Three alleges that "MassHighway violated state law by not obtaining Division of Capital Planning and Operations (DCPO) certification to renovate the Harding and D Street buildings." As discussed above, when the lab was being set up, the Harding Building renovation was a function of the B/PB Work Program's scope. Therefore the issue of DCPO certification did not apply, and as you indicate in a footnote, this issue has become moot since the CA/T Project has been exempted from this study requirement by the state legislature.

In any event, the procurement as completed was governed by management practices substantially the same as those that would have applied under DCPO oversight or public bidding of project

management. It is also useful to emphasize that while the in-house lab fills an important requirement as we head into the peak of construction, the function will be the subject of continuing analysis to determine whether an outside lab could become a more cost-effective alternative at some point.

Finally, if you desire, the Project can assist in arranging for you to contact William Twomey, former CA/T Project Director, and Donald Marshall, former B/PB Program Manager, who were the top managers on the CA/T project when the original decisions on the lab were made. If you have further questions on this issue, my point of contact is William Smith, Senior Counsel. His telephone number is 951-6105.

Sincerely,

MASSACHUSETTS HIGHWAY DEPARTMENT

Peter M. Zuk
Project Director

PMZ/tb

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