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United States  
General Accounting Office  
Washington, D.C. 20548

Resources, Community, and  
Economic Development Division

B-260786

June 2, 1995

The Honorable Frank R. Wolf  
Chairman  
Subcommittee on Transportation  
Committee on Appropriations  
House of Representatives

Dear Mr. Chairman:

This report responds to your February 17, 1995, request that we review selected aspects of the Central Artery/Tunnel (CA/T) project--a federally aided highway project in Boston, Massachusetts. At over \$1 billion a mile, the CA/T project is one of the largest and most expensive highway construction projects ever undertaken. Your concern stemmed in part from the fact that the cost of this project grew from \$2.6 billion in 1985 to \$7.7 billion in 1992. The CA/T project is about 85 percent federally funded. As agreed with your office, we examined (1) the status of the project, (2) the estimated cost of the project, and (3) the Commonwealth of Massachusetts' plans for financing it.

In summary, we found that the cost of the CA/T project will exceed the \$8 billion forecast in the current Massachusetts Department of Highways' (MHD) draft estimate.<sup>1</sup> In part, the cost will grow because the estimate excludes over \$1 billion in project elements that were considered part of the project in the past. These items include project components for which funding from other agencies is being sought, some environmental agreements, project features being funded with state funds only, and other items. The estimate is also based on aggressive cost containment goals that MHD has adopted for the CA/T project--goals that, while commendable, envision a far better performance than

<sup>1</sup>The \$8 billion estimate represents expenditures already incurred, valued in the year they were incurred, and future expenditures valued in 1994 dollars.

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has been achieved on the project to date. The cost of completing the CA/T project will increase if these goals are not achieved.

MHD's December 1994 CA/T Finance Plan projected that federal and other funding sources would be sufficient to complete the project by 2004. However, this plan--based on a 1992 estimate--assumed that Massachusetts would have access to federal funding that is not available under current law and projected future federal funding levels that may not be realized in the current budget environment. Massachusetts faces funding shortfalls in 1996 and 1997 that it is moving to address through additional state funding sources. Federal funding after 1997 is uncertain, given that the Congress has yet to make decisions on the size of the overall federal program and how funds will be apportioned to the states. However, if MHD's assumptions about future federal aid are not realized, the project's needs may exceed available funding.

#### DESCRIPTION AND STATUS OF THE PROJECT

The CA/T project is an Interstate Highway System project that will build or reconstruct 7.5 miles of urban highways in Boston--about half of it underground. The project includes, among other features, (1) extending Interstate 90 east, mostly in tunnels, through South Boston, under the Boston Harbor (through the Third Harbor Tunnel) to East Boston and Logan International Airport; (2) replacing the Central Artery--an elevated portion of Interstate 93 through downtown Boston--with an underground roadway; and (3) replacing the I-93 bridge over the Charles River (see enclosure I).

The project is managed by the Massachusetts Department of Highways. Day-to-day design and construction activities are managed by a joint venture of Bechtel/Parsons Brinckerhoff, under contract with MHD. The Federal Highway Administration (FHWA) approves and oversees the expenditure of federal funds. Construction began in 1991, and as of May 1995, the Third Harbor Tunnel was substantially complete, Central Artery construction had just begun, and a

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revised Charles River crossing was being designed. The project is scheduled to be completed in phases by 2004.

As of September 30, 1994, \$3.95 billion in federal and state funds had been obligated for the CA/T project, including \$3.04 billion in federal Interstate Construction funds, \$354.8 million in other federal-aid highway funds, and \$557.4 million in state funds (see enclosure II).

The estimated cost of building the CA/T project has grown from \$2.6 billion in 1985 to \$7.7 billion in 1992. MHD attributes this cost growth to features that were added to the original project, scope changes in existing project features, and inflation. (MHD's analysis is shown in greater detail in enclosure III.)

#### COST ESTIMATE FOR THE PROJECT

As of May 1995, MHD was updating its 1992 estimate. A draft estimate we examined showed the CA/T project's costs at \$8 billion. However, this estimate excluded over \$1 billion in items that were considered part of the project in the past. These items included project components for which funding from other agencies is being sought, some environmental agreements, project features being funded with state funds only, and other items. (A summary of items excluded from the draft estimate is included in enclosure IV.)

The largest item excluded from the estimate was about \$250 million for roadways that connect to the Massachusetts Turnpike and the Sumner and Callahan Tunnels--existing facilities operated by the Massachusetts Turnpike Authority. MHD officials stated that since the authority acquires toll revenues from travelers using these connecting roadways, the authority should assist in paying the CA/T project's construction costs. Also, MHD has excluded the estimated \$177 million cost of designing and constructing a roadway connecting Logan International Airport to Route 1A. MHD believes this portion of the project primarily benefits airport users and is seeking financial assistance from the Massachusetts Port Authority for some or all of its costs. MHD also excluded from its estimate projects that it believes benefit the Massachusetts Bay Transportation Authority, such as a ramp connecting the I-90/I-93 interchange with the South Station Bus Terminal now being constructed with Federal Transit Administration funding. MHD does not currently have agreements with these agencies for them to assume a share

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of the costs excluded from the estimate. MHD officials described negotiations as ongoing.

MHD has adopted aggressive cost containment goals for the CA/T project--goals that envision a far better performance than has been achieved on the project to date. The draft estimate assumes these goals will be achieved. For example:

- As of April 1995, cost growth on completed contracts had averaged about 16 percent.<sup>2</sup> On contracts under way, cost growth has averaged nearly 20 percent. The project's draft estimate budgets contingencies of well under 10 percent.
- During the design of a highway, bridge, or tunnel, preliminary design concepts are refined into the detailed plans and specifications needed to construct the project. The estimated cost of constructing the segment can increase as preliminary concepts give way to a more detailed understanding of the work to be performed, particularly in a complex urban environment. According to FHWA officials, growth in construction cost estimates during the CA/T project's design process has averaged about 18 percent. MHD's draft cost estimate assumes zero cost growth during the design of future construction projects.

MHD officials told us they consider these goals aggressive but achievable. FHWA officials told us that while they are currently reviewing the MHD draft estimate, they are concerned that the assumptions may be optimistic. FHWA officials also said that since the last Interstate Cost Estimates were prepared in 1991, FHWA has had neither a requirement for states to prepare project cost estimates, nor guidelines for how these estimates are to be prepared.

If the excluded items were included in the MHD estimate, the project's costs would be about \$9 billion, rather than \$8 billion. If future inflation were included, project costs would be about \$9.7 billion. If cost growth were to mirror historical patterns rather than the cost containment goals assumed in the draft estimate, costs could be as high as \$10.6 billion. We did not examine the assumptions behind the \$8 billion base estimate, such as the cost of

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<sup>2</sup>That is, the cost of contract modifications has averaged 16 percent of the value of the original contract.

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labor and materials. In addition, our projection of inflation was limited to future construction projects and did not include nonconstruction features, such as the state's management consultant contract with Bechtel/Parsons Brinckerhoff. (The details of our analysis are shown in enclosure V.)

#### Risks Remain That Could Increase the Project's Costs

Most of the construction work remaining on the CA/T project is underground tunneling. FHWA and state officials agree this work is inherently risky, given the uncertainties of underground work in a densely populated urban area. For example, the design of the underground Central Artery is about one-half complete, and construction is just beginning. In addition, final design is just beginning on an immersed tube tunnel that will carry traffic on Interstate 90 under the Fort Point Channel to the Third Harbor Tunnel. Unexpected soil conditions found during the preliminary design process forced MHD to redesign this portion of the project, resulting in cost growth and schedule delays. MHD officials believe that the experience gained in redesigning this segment during the preliminary design phase will minimize any future problems. Their estimate assumes that no growth will occur in the estimated cost of constructing the channel tunnel during the final design phase.

In addition to technical challenges, MHD's plan for a new Charles River crossing faces continued opposition. As a result of public opposition, MHD abandoned the original design in 1992, and FHWA approved a new design in 1994. The new design faces two lawsuits, including one from the City of Cambridge, that allege, among other things, that MHD and FHWA did not comply with the National Environmental Protection Act's provisions for preserving parklands. Until these suits are settled, the risk remains of project schedule delays and increased costs.

#### FINANCING THE CA/T PROJECT

At the request of FHWA, MHD prepared a finance plan in December 1994 detailing how the Commonwealth intended to finance completion of the CA/T project. The plan concluded that funding would be adequate to complete the project by 2004. However, the plan was based on the 1992 cost estimate. Furthermore, the plan (1) assumed that Massachusetts would expend its balance of unobligated federal highway funds before the end of fiscal year 1997

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and (2) assumed that federal aid would continue in the future at existing levels.

In the federal highway program, an "unobligated balance" is the difference between the money a state is apportioned and the money it is allowed to obligate. Subject to certain limitations, these balances can build up over time. Like all other states, Massachusetts receives an annual apportionment of federal-aid highway funds determined by a formula contained in law. The authority to spend formula funds in any given year is constrained by obligation limitations, usually contained in the annual Department of Transportation Appropriation Act. For example, in fiscal year 1995, Massachusetts will receive an apportionment of \$766 million, but it can obligate no more than \$715 million under the fiscal year 1995 Appropriations Act.

MHD's finance plan assumed that to finance the CA/T project between October 1994 and September 1997, Massachusetts would spend the \$707 million unobligated funding balance that had built up over time, in addition to spending its regular annual apportioned funds. However, current law contains no provision that would allow Massachusetts to spend its unobligated balances in this manner.

MHD's finance plan also contained forecasts of expected federal aid after 1997. The current authorization--the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)--expires on September 30, 1997. Funding after that is uncertain, given that the Congress has yet to make decisions on the size of the overall federal program and how funds will be apportioned to the states. However, MHD identified as its "most likely scenario" the continuation of the current formula and funding levels in the next authorization. One of the objectives of the formula in ISTEA is to ensure that states maintain their historical funding share. However, given the current budget climate, it is uncertain whether the Congress will continue this "hold harmless" provision in the next highway authorization measure and whether the program's current level will be retained. MHD's analysis did not consider possible reductions in the federal-aid highway program, such as those contained in the recent House and Senate Budget Committee resolutions.

In its comments on the finance plan, FHWA questioned the state's assumptions about access to unobligated balances and future federal aid. However, FHWA did not request immediate corrective action. Instead, FHWA recommended

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that the state revise its finance plan on an annual basis and that it revisit its assumptions in 1 year's time.

Massachusetts faces funding shortfalls in 1996 and 1997--shortfalls that it is moving to address through additional state funding sources. Massachusetts is committed to financing the CA/T project while maintaining a \$400 million statewide transportation program. However, in fiscal years 1996 and 1997, the needs of the CA/T project will consume nearly all the federal funding that Massachusetts expects to receive, resulting in a projected shortfall of \$393 million. Although the state Senate has not acted, the state House of Representatives has passed a bill that would provide authority to issue additional general obligation bonds to make up the shortfall. This shortfall will be larger if the Congress reduces federal-aid highway spending in 1996 and 1997. (Massachusetts' funding shortfalls and plans are discussed in enclosure VI.)

For the longer term, the funding available to Massachusetts after 1997 may be insufficient to complete the project by 2004. Whether funding is sufficient will depend on the size of the overall federal program, how funds are apportioned to the states, the contribution from the state, and what the final costs of the CA/T project will be. Our analysis shows that under the MHD finance plan's "most likely" scenario--in which current formulas and funding levels are continued in the next authorization--funding would be generally sufficient to cover the remaining project costs, up to an estimate of about \$10.6 billion. However, in the current budget environment, the continuation of existing funding levels and formulas may not be possible. Under other possible scenarios, Massachusetts could face a funding shortfall of as much as \$2.4 billion between 1998 and 2004. (Our analysis is shown in enclosure VII.)

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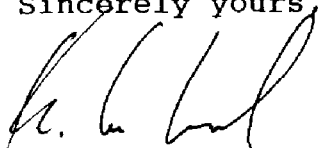
To prepare this report, we reviewed documents and interviewed officials at FHWA's headquarters in Washington, D.C., and at its division office in Boston, Massachusetts; at MHD's CA/T Project Office in Boston; and at the Commonwealth of Massachusetts' Executive Office of Transportation and Construction in Boston. We discussed the information contained in this report with the CA/T Project Manager, MHD, and the Massachusetts Division Administrator, FHWA, who generally agreed with the facts presented. We performed our work from March 1995 through

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May 1995 in accordance with generally accepted government auditing standards.

Unless you advise us otherwise, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will make copies available to interested congressional committees, FHWA, and others upon request. If you have any further questions, please call me at (202) 512-2834.

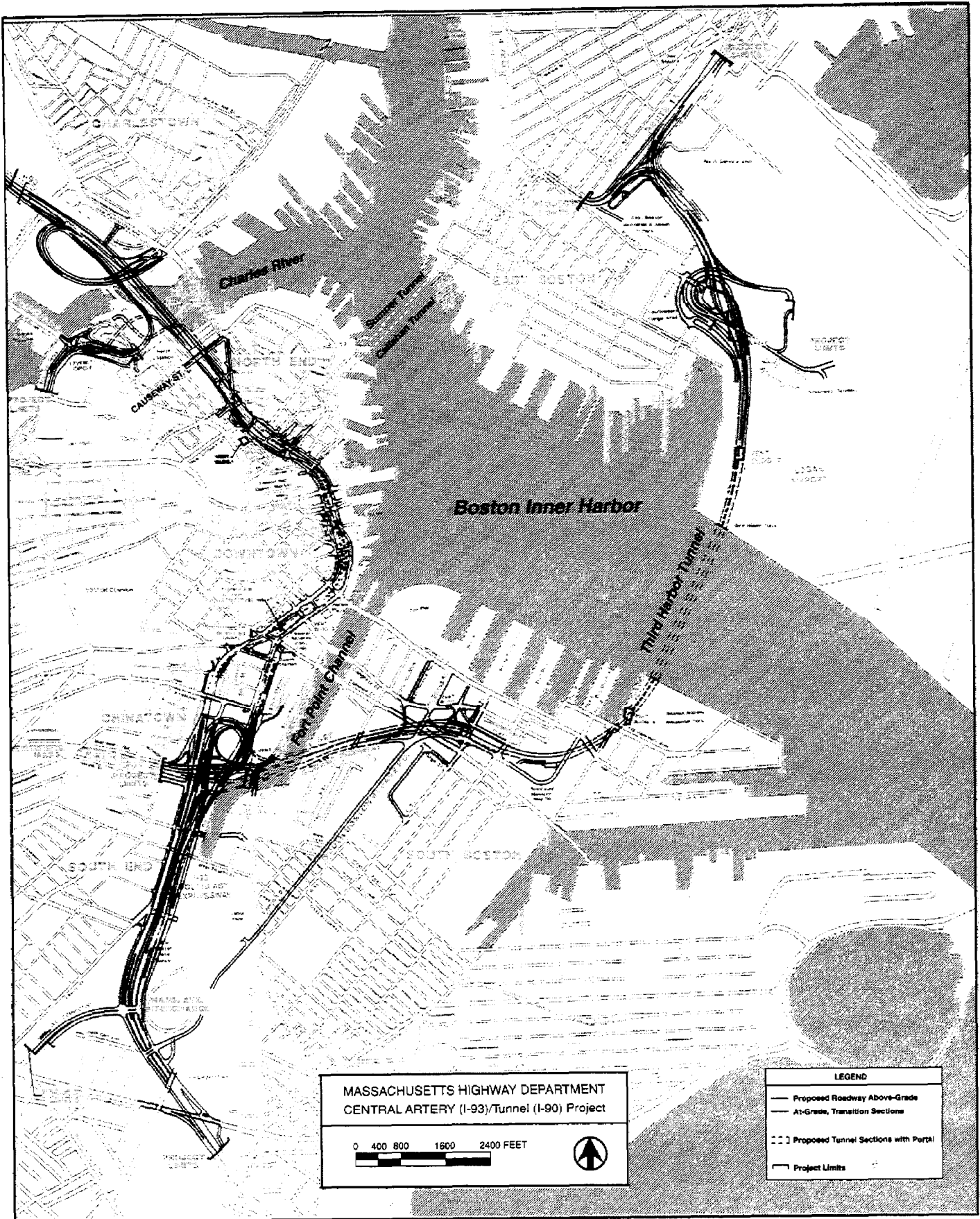
Sincerely yours

A handwritten signature in black ink, appearing to read 'K. M. Mead', written over a horizontal line.

Kenneth M. Mead  
Director, Transportation Issues



CENTRAL ARTERY/TUNNEL PROJECT MAP



MASSACHUSETTS HIGHWAY DEPARTMENT  
 CENTRAL ARTERY (I-93)/TUNNEL (I-90) Project

0 400 800 1600 2400 FEET

LEGEND

- Proposed Roadway Above-Grade
- - - At-Grade, Transition Sections
- · · Proposed Tunnel Sections with Portal
- - - Project Limits

FEDERAL AND STATE FUNDS OBLIGATED FOR  
THE CENTRAL ARTERY/TUNNEL PROJECT AS OF SEPTEMBER 30, 1994

	<u>Federal funds</u>	<u>State funds</u>	<u>Total</u>
Interstate construction (IC) funding	\$3,041,557,152	\$479,668,904	\$3,521,226,056
 <b><u>Non-IC funding</u></b>			
Interstate 4R	\$ 115,776,277	\$ 12,898,296	\$ 128,674,573
National Highway System	98,645,177	25,204,207	123,849,384
Bridge program	85,775,811	21,691,094	107,466,905
Primary/Interstate *	20,584,577	6,914,050	27,498,627
Primary *	16,561,937	6,347,597	22,909,534
Urban **	8,478,525	2,826,175	11,304,700
Highway planning/research	8,975,291	1,835,446	10,810,737
 Subtotal: Non-IC federal funding	 \$ 354,797,595	 \$ 77,716,865	 \$ 432,514,460
 <b><u>Total</u></b>	 <b><u>\$3,396,354,747</u></b>	 <b><u>\$557,385,769</u></b>	 <b><u>\$3,953,740,516</u></b>

\* Now part of the National Highway System Program.

\*\* Now part of the Surface Transportation Program.

Source: Federal Highway Administration.

HISTORY OF CHANGES IN CENTRAL ARTERY/TUNNEL PROJECT COSTS

The following information is summarized from the MHD finance plan and the details of the original estimate are expressed in constant 1982 dollars. The information was not verified by GAO.

Millions of dollars

Original estimate	\$2,564
Features added to the project	\$471
-- I-90 and I-93 HOV lanes	(\$262)
-- South Boston Haul Road	(\$ 53)
-- Material disposal/ hazardous materials	(\$141)
-- Deleted interchange	\$18
-- Other	(\$33)
Scope changes to existing project features	\$2,151
-- New Charles River Crossing	(\$508)
-- Joint Venture Contract	(\$263)
-- Right of way/S. Boston	(\$173)
-- Extend I-93 south	(\$130)
-- Tunnel covers	(\$176)
-- Utilities relocation	(\$ 85)
-- Workmen's compensation	(\$237)
-- Other	(\$579)
Subtotal--project costs in 1982 dollars)	\$5,186
Escalation to 1992 dollars	<u>\$2,554</u>
<b>Total estimated cost: 1992 estimate</b>	<b><u>\$7,740</u></b>

In calculating escalation to 1992 dollars, MHD stated that inflation averaged about 4 percent a year from 1982 to 1992. FHWA's Composite Index for highway construction costs, however, suggests that inflation was lower during this period. For example, FHWA's index shows inflation of less than 1 percent in 1989 and 1990 and deflation during the recession years of 1991 and 1992. MHD and FHWA officials attribute these differences to regional variations. In addition, FHWA officials in Boston believe that the FHWA Composite Index is unreliable.

SUMMARY OF ITEMS EXCLUDED FROM MHD'S DRAFT ESTIMATE

Dollars in millions--1994 dollars

Connections to Turnpike Facilities \$248.9

Construction of roadways connecting to Massachusetts Turnpike facilities and related insurance costs. Excluded estimates represent those roadway portions where the traveler cannot exit before paying a toll.

Logan Airport \$177.0

Roadway improvements connecting Logan Airport to Route 1A.

State-Only Funded Items \$169.5

Project design and construction activities where federal funding has not been sought or where FHWA has declined federal participation.

Environmental Mitigation and Interagency Agreements \$105.7

Including \$30 million Memorandum of Agreement with the City of Cambridge to mitigate project impacts on the community. Also includes community-based training, shoreline restoration, fire department design review and construction support, and other agreements.

Transit Authority/Amtrak \$ 68.6

Includes relocation of Amtrak and Massachusetts Bay Transit Authority tracks at South Station, construction of a ramp from I-90/93 Interchange to South Station Bus Terminal, and other transit-related projects.

Surface Restoration \$ 69.4

Funding for surface restoration not directly related to roadways (e.g., parks) on the Central Artery, Fort Point Channel, and Spectacle Island.

Maintenance and Support Facilities \$ 52.7

Includes maintenance, toll, police, and emergency facilities for which MHD is seeking funding from the ultimate operator of the facility, most likely the Massachusetts Turnpike Authority.

Tunnel Fire Testing \$ 44.6

Testing performed in West Virginia to assist in the design of fire prevention features for the Third Harbor Tunnel and other tunnel projects nationwide.

Scope Deferrals \$ 18.1

High-occupancy-vehicle lane projects on I-93, which may be deferred.

Temporary Facilities \$ 19.1

Includes temporary ramps to I-93, message signs and highway advisory radio for construction phase, and interim operations center.

North-South Rail Link \$ 6.3

Utility relocation and slurry wall construction so as to not preclude a future rail link between Boston's North and South Stations along the Central Artery right of way.

ENCLOSURE IV

ENCLOSURE IV

Other

\$ 29.9

Includes improvements to bridges and surface streets.

**TOTAL**

**\$ 1,009.8**

CA/T PROJECT'S POTENTIAL COSTSTable V.1: CA/T Project's Costs With Inflation and Excluded Project Items

<u>Feature</u>	<u>Cost</u>	<u>Cumulative Cost</u>
MHD estimate		\$8.0 billion
Excluded project items (federal participation)	\$840 million	\$8.8 billion
Excluded project items (state-only funded)	\$169 million	\$9.0 billion
Inflation	\$737 million	\$9.7 billion
<u>Total</u>		<u>\$9.7 billion</u>

MHD's \$8 billion estimate is comprised of assumptions about the cost of labor and materials. We did not examine those assumptions. Our analysis also assumes no further cost growth on ongoing design and construction contracts beyond that which has already been budgeted.

Our inflation estimates are derived from a forecast of future highway construction industry inflation provided to GAO by the WEFA Group, a leading economic forecasting firm based in Pennsylvania. We have applied inflation only to future construction contracts. Nonconstruction features, such as the \$1.3 billion estimated in 1994 dollars for the management contract with Bechtel/Parsons Brinckerhoff, are not included.

Excluded project items are discussed in greater detail in enclosure IV.

State-only portions are aspects of the project where the state has either not sought federal funding or where FHWA has declined to participate.

As discussed in the body of the letter, MHD's draft estimate assumes that the estimated cost of construction will not grow during the final design process. According to FHWA, construction cost estimates have grown an average of 18 percent during the design process. MHD's estimate also assumes that contingencies on awarded contracts will be held

to well under 10 percent. As of April 1995, contingencies on completed contracts had averaged 16 percent, while contingencies on ongoing contracts had averaged 20 percent.

Table V.2 illustrates what the potential impact on project costs would be if historic cost growth patterns continued on the CA/T project.

Table V.2: CA/T Project's Costs Assuming That Historic Patterns Continue

<u>Feature</u>	<u>Cost</u>	<u>Cumulative Cost</u>
Total (from table V.1)		\$ 9.7 billion
Design cost growth		
- At 18%	\$352 million	\$10.1 billion
Construction cost growth		
- At 10%	\$365 million	\$10.2 billion <sup>a</sup>
- At 15%	\$545 million	\$10.4 billion
- At 20%	\$730 million	\$10.6 billion

<sup>a</sup>Excluding construction contingencies already budgeted for in the \$8 billion base estimate.



FUNDING SHORTFALLS: FISCAL YEARS 1996 AND 1997

Massachusetts is committed to financing the CA/T project while maintaining a \$400 million statewide transportation program. The statewide program requires a federal contribution of \$150 million to \$175 million a year. The remainder is financed through a state-only, bond-financed transportation program totaling about \$225 million a year.

Despite the use of substantial state funding, shortfalls in the state's transportation program begin in fiscal year 1996. The shortfalls occur because the CA/T project is entering a period of intensive construction activity. As shown in table VI.1, the federal funding needed for the CA/T project will consume \$666 million of the \$688 million in federal funds that the state expects to receive in fiscal year 1996. In fiscal year 1997, CA/T's needs will outstrip all expected federal funds by about \$90 million.

Table VI.1: Expected Shortfall in State Transportation Program, Fiscal Years 1996 and 1997

Dollars in millions

	<u>FY 96</u>	<u>FY 97</u>	<u>Total</u>
<u>Needed Federal funding</u>			
CA/T project	\$666	\$762	\$1,428
Statewide program	\$150	\$175	\$ 325
<u>Total federal funding needs</u>	<u>\$816</u>	<u>\$937</u>	<u>\$1,753</u>
Federal funding expected	\$688	\$672	\$1,360
<b><u>Shortfall</u></b>	<b><u>\$128</u></b>	<b><u>\$265</u></b>	<b><u>\$ 393</u></b>

Source: Executive Office of Transportation and Construction, Commonwealth of Massachusetts

The state's assumptions are predicated on continuation of the level of obligation limitations that existed under the fiscal year 1995 Appropriations Act. If, in the current budget environment, the Congress approves reductions in the federal highway program and obligation limitations drop below their 1995 level, the shortfall outlined above will increase.

Massachusetts is taking steps to address this shortfall with additional state funds. On January 11, 1995, the Governor sent a bill to the state Legislature to create a Metropolitan Highway System in Boston. This system would be operated by the Massachusetts Turnpike Authority and would consist of the Central Artery, the Massachusetts Turnpike extension, the Third Harbor Tunnel, the Tobin Memorial Bridge, the Sumner and Callahan Tunnels, and the Central Artery North Area. As part of this legislation, the authority was authorized to issue bonds for, among other purposes, paying the costs of acquiring the Third Harbor Tunnel and the Central Artery. In April 1995, the state House of Representatives rejected this proposal, calling instead for further study. However, to address the funding shortfall, the House approved the issuance of additional state general obligation bonds. As of May 1995, the matter was before the state Senate.

FUNDING AFTER 1997

With the expiration of the Interstate Construction Program, Massachusetts will rely on regular apportioned federal-aid highway formula funds (such as the National Highway System Program and the Bridge Program) and state funds to complete the CA/T project.<sup>1</sup> The ISTEA authorization expires on September 30, 1997. Funding after that is uncertain, given that the Congress has yet to make decisions on the size of the overall federal program and how funds will be apportioned to the states. How much federal funding Massachusetts receives after 1997 and what the final costs of the CA/T project are will determine whether funding in the post-ISTEA era is sufficient to complete the project by 2004.

Our analysis compares the funding required under cost estimates ranging from \$8.7 billion to \$10.6 billion (see our analysis of the cost estimate in enclosure V) and assesses the availability of federal funds under three scenarios:

- Scenario A assumes that the overall size of the federal-aid highway program will remain roughly the same as it is today and assumes the continuation of the current funding formula, including hold harmless and interstate segment reimbursement. This was identified in the December 1994 MHD finance plan as the "most likely" scenario. Massachusetts would receive an apportionment of about \$740 million a year under this scenario.
- Scenario B, also from the MHD finance plan, contains the same assumptions as above except that hold harmless and Interstate segment reimbursement would be discontinued. Under this scenario, Massachusetts would receive an apportionment of about \$470 million a year.
- Scenario C assumes that Massachusetts receives an annual amount approximately equal to its expected contribution to the Highway Trust Fund from gasoline

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<sup>1</sup>Although funding from the Interstate Construction Program will not be available in fiscal years 1996 and 1997, this will not substantially reduce the federal funds available to Massachusetts. This is because an equity adjustment provision of ISTEA--hold harmless--preserves the states' historic funding. For Massachusetts, this includes recognition of past IC funding.

and other taxes during the 1998-2004 period. Under this scenario, Massachusetts would receive an apportionment of about \$395 million a year.<sup>2</sup>

Our analysis assumes that \$6.2 billion will be committed to the CA/T project by the end of fiscal year 1997. This combines the funding already obligated at the end of fiscal year 1994, plus the amounts programmed in the current draft State Transportation Improvement Plan for the project in fiscal years 1995 and 1996, and estimated for fiscal year 1997. It further assumes that the statewide program will require \$175 million a year--the level estimated for fiscal year 1997--and that obligations will be constrained to 92 percent of apportioned amounts--the assumption used by the state to calculate the short-term financing needs (see enclosure VI). Finally, the analysis assumes that federal funds will cover 84 percent of project costs. The federal share varies depending on the source of funds used--MHD estimates the average federal share for all projects over the life of the CA/T project is 84 percent.

Finally, we have assumed that equal amounts are available to the project in each of the 7 years from 1998 to 2004. In reality, funds would have to be obligated within a more constrained time frame in order to complete the project by 2004.

Using these assumptions, our analysis shows that under MHD's "most likely" scenario (scenario A), federal formula funds would be generally sufficient to cover remaining project costs up to an estimate of about \$10.6 billion. Under the remaining scenarios, a shortfall of federal funding would exist. Under scenario C and a \$10.6 billion estimate, this shortfall could be as high as \$2.4 billion.

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<sup>2</sup>To calculate this amount, we took Massachusetts' 1993 contribution to the Highway Trust Fund, assumed that contribution would grow 3.5 percent a year (the annual level of growth in vehicle miles traveled cited in the U.S. Department of Transportation's 1993 biannual report on the condition and status of the nation's highways and bridges), and used the average for the 1998 to 2004 period. This amount does not include the receipts associated with the additional 2-cent per gallon fuel tax that will be credited to the highway account of the Highway Trust Fund beginning October 1, 1995, under the Omnibus Budget Reconciliation Act of 1993.

Table VII.1: Surplus/Shortfall Expected in CA/T Project's  
Funding, Fiscal Years 1998-2004

Billions of dollars

	\$8.7 billion estimate (\$2.5 billion to go post- <u>ISTEA</u> )	\$9.7 billion estimate (\$3.5 billion to go post- <u>ISTEA</u> )	\$10.6 billion estimate (\$4.4 billion to go post- <u>ISTEA</u> )
Scenario A: Current formula w/hold harmless & Interstate seg. reimbursement (\$740M/yr)	\$1.4	\$0.6	(\$0.2)
Scenario B: Current formula w/o hold harmless & reimbursement (\$470M/yr)	(\$0.3)	(\$1.1)	(\$1.9)
Scenario C: Highway Trust Fund contribution (\$395M/yr)	(\$0.8)	(\$1.6)	(\$2.4)

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