United States General Accounting Office

GAO

Report to the Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate

February 2004

INTERCITY PASSENGER RAIL

Amtrak's Management of Northeast Corridor Improvements Demonstrates Need for Applying Best Practices

GAO-04-94

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Highlights

Highlights of GAO-04-94, a report to the Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate

Why GAO Did This Study

In the 1990s, the National Railroad Passenger Corporation (Amtrak) undertook the Northeast High-Speed Rail Improvement Project to make infrastructure improvements that would enable Amtrak to meet a statutory goal of providing 3-hour intercity passenger rail service between Boston and New York City. Amtrak shared responsibility for implementing the project with commuter rail authorities and state governments, and the Federal Railroad Administration (FRA) developed a master plan for the project and provided federal funds to Amtrak. GAO reviewed (1) the status of the project, (2) Amtrak's management of the project, (3) FRA's oversight of the project, and (4) best practices for managing future large-scale rail infrastructure projects.

What GAO Recommends

GAO recommends that Amtrak apply best practices for managing large-scale infrastructure projects to future major intercity passenger rail projects and that FRA require these best practices and develop guidance for how to do this. GAO also recommends that FRA seek legislative authority to oversee such projects in the future. Amtrak did not comment directly on GAO's specific recommendations but said it was incorporating many of the best practices discussed in the report as part of its management restructuring. Amtrak also raised some issues concerning GAO's report findings. FRA agreed with our recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-04-94.

To view the full product, including the scope and methodology, click on the link above. For more information, contact JayEtta Z. Hecker at (202) 512-2834 or heckerj@gao.gov.

What GAO Found

Amtrak has not yet met the 3-hour trip-time goal established by the 1992 Amtrak Authorization and Development Act although electrified service between Boston and New York City was initiated in January 2000 and Amtrak began limited high-speed rail service in December 2000. Currently, this trip is scheduled to take 3 hours 24 minutes. Furthermore, 51 of 72 work elements that FRA identified in its 1994 master plan as necessary to reduce trip times (e.g., electrify tracks and acquire high-speed trains), enhance capacity (e.g., construct sidings), rebuild or extend the life of physical assets (e.g., replace bridges), or make other improvements are incomplete or their status is unknown. Fifteen of these work elements are on non-Amtrak owned sections of track and are important for achieving and maintaining 3-hour service as rail traffic increases over time. Through March 2003, Amtrak and others had spent about $3.2 billion on the project.

Neither Amtrak nor FRA exercised effective management or oversight of the Northeast High-Speed Rail Improvement Project. Amtrak's management was not comprehensive, and it was focused primarily on the short term. Amtrak focused on managing the electrification and acquisition of new high-speed trains, and did not sufficiently address major infrastructure improvements needed to attain the trip-time goal. In addition, Amtrak did not fully integrate the interests of stakeholders (commuter rail authorities and state governments) into the project, even though work that involved them was critical to achieving 3-hour service. FRA served as a conduit for federal appropriations to the project but did not have the resources or the authority to oversee Amtrak's management of the project.

Best practices—including comprehensive planning, risk assessment and mitigation, comprehensive financial management, accountability and oversight, and incorporation of diverse stakeholders' interests—provide a framework for effectively managing future large-scale intercity passenger rail infrastructure projects. These best practices have proved effective in managing large-scale infrastructure projects and could assist in managing future projects like the Northeast High-Speed Rail Improvement Project.

Best Practices for Managing Large-Scale Infrastructure Projects

Sources: GAO; Nova Development, PhotoDisc, and Corel (photos).

Contents

Figures

Abbreviations

4R Act	Railroad Revitalization and Regulatory Reform Act
Amtrak	National Railroad Passenger Corporation
BART	Bay Area Rapid Transit
CDOT	Connecticut Department of Transportation
DOT	Department of Transportation
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
MBTA	Massachusetts Bay Transportation Authority
MTA	Metropolitan Transportation Authority
NECIP	Northeast Corridor Improvement Project
OMB	Office of Management and Budget
PMO	project management oversight

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

February 27, 2004

The Honorable John McCain
Chairman, Committee on Commerce,
Science, and Transportation
United States Senate

Dear Mr. Chairman:

Intercity passenger rail service is a critical component of the transportation system in the densely populated Northeast Corridor, which is generally defined as the area between Boston and Washington, D.C. The Northeast Corridor is the busiest passenger rail line in the country—some 200 million intercity and commuter rail passengers use this line, or some portion of it, each year. Although the National Railroad Passenger Corporation (Amtrak) is the primary owner of the Northeast Corridor between Washington, D.C., and New York City, track ownership between Boston and New York City is divided among Amtrak, commuter rail agencies, and state governments. Amtrak acquired its portion of the Northeast Corridor in 1976. Recognizing the importance of the Northeast Corridor and the need to make critical infrastructure improvements to the rail line, Congress established the Northeast Corridor Improvement Project in 1976. This project, which consisted of infrastructure improvements designed to enable high-speed rail service between Boston and Washington, D.C., was one of the largest rail infrastructure projects undertaken in recent times and represented the single largest federal investment in intercity passenger rail service in the last century.

In the 1990s, the focus of the Northeast Corridor Improvement Project was on infrastructure improvements between Boston and New York City. In particular, in 1992 the Amtrak Authorization and Development Act directed the Secretary of Transportation to develop a master plan for a program of improvements that would permit regularly scheduled, safe, and dependable rail passenger service between Boston and New York City in 3 hours or less. In 1994, the Federal Railroad Administration (FRA) issued such a plan. The plan contained three milestones—initiating electrified train service between Boston and New York City, initiating 3-hour train service, and completing infrastructure improvements designed to enhance track capacity and extend the useful life of existing assets (called "recapitalization")—and identified 72 work elements that would be needed to complete the project. FRA estimated that the first milestone could be completed by mid-1997, the second by 1999, and the third by the end of

2009. FRA also estimated that about $3.1 billion (1993 dollars)[1] would be needed to enable 3-hour service between Boston and New York City and complete capacity enhancement and recapitalization work to maintain this schedule. Improvements to achieve the 3-hour service included electrifying the route between New Haven, Connecticut, and Boston;[2] upgrading and improving tracks, signals, and other infrastructure; and acquiring 26 high-speed passenger trains. Amtrak was responsible for managing these efforts, which collectively became known as the Northeast High-Speed Rail Improvement Project, and shared responsibility for implementing the project with several other entities, including commuter and freight railroads and state governments, which we refer to in this report as "stakeholders."

This report responds to your request that we examine Amtrak's management of the Northeast High-Speed Rail Improvement Project. In particular, the report discusses (1) the status of the project, (2) Amtrak's management of the project, (3) FRA's oversight of the project, and (4) the use of best practices as a framework for managing future large-scale intercity passenger rail infrastructure projects. Best practices in the context of capital projects are defined as those "practices that have been successfully implemented by organizations recognized for their outstanding capital decision-making practices."[3]

To determine the status of the Northeast High-Speed Rail Improvement Project, we reviewed applicable laws related to both it and the Northeast Corridor Improvement Project and reviewed documents on its cost, schedule, and status. To address Amtrak's management of the project, we reviewed documents related to the project's organization and management and interviewed Amtrak, FRA, and other officials about the project's management. To address FRA's oversight of the project, we reviewed laws related to FRA's legislative authorities, discussed FRA's oversight of the project with FRA officials, and reviewed documents related to the Federal Transit Administration's (FTA) project management oversight program. Finally, to address the use of best practices as a framework for managing

[1]In this report, all financial amounts are in nominal dollars unless otherwise noted.

[2]In 1994, this section of the Northeast Corridor was not electrified, and Amtrak had to switch from electric to diesel locomotives at New Haven.

[3]U.S. General Accounting Office, *Executive Guide: Leading Practices in Capital Decision-Making*, GAO/AIMD-99-32 (Washington, D.C.: December 1998).

future large-scale intercity passenger rail projects, we conducted a literature search to identify best practices related to infrastructure management and discussed infrastructure management best practices with Amtrak, FRA, and other officials. We then synthesized this information into the framework presented. Appendix I discusses our overall scope and methodology, appendix II discusses our methodology for identifying best practices related to infrastructure project management, and appendix V lists GAO and other products associated with project management best practices.[4]

Results in Brief

Amtrak has not yet met the statutory goal of 3-hour rail service between Boston and New York City, although it has reduced the scheduled trip time from about 4 hours to 3 hours 24 minutes. To achieve this reduction, it completed the first milestone in FRA's 1994 master plan—initiate electrified train service between Boston and New York City—in January 2000, and it acquired enough high-speed trains to begin limited high-speed rail service in December 2000. However, it initiated these activities about 3 years later than planned. In addition, according to the latest available data (March 2003), only 5 of the 17 work elements needed to complete the second milestone of FRA's 1994 master plan—initiate 3-hour service—are complete. Progress toward achieving the third milestone—completing infrastructure improvements designed to enhance track capacity and extend the useful life of existing assets—has also been slower than planned. In total, as of March 2003, Amtrak, commuter rail authorities, and other stakeholders had completed 21 of the project's 72 work elements—51 of the work elements were incomplete or their status was unknown.

[4]In November 2001, one of the contractors manufacturing the Acela Express trains (Bombardier) filed suit against Amtrak in the United States District Court for the District of Columbia seeking damages for, among other things, Amtrak's alleged interference with the manufacture of the equipment. In November 2002, Amtrak filed a countersuit against the manufacturers alleging, among other things, breach of contract. As of February 2004, these suits were still pending. In addition, Amtrak officials indicated that the Department of Justice and the U.S. Attorney's Office were conducting investigations related to the contract for electrification work done under the Northeast High-Speed Rail Improvement Project. As of February 2004, these investigations were also still pending. Nothing in this report is intended to have any impact on the outcome of these suits or investigations, and this work was not performed in relation to either the suits or the investigations. As discussed further in appendix I, this report does not analyze detailed information regarding either the high-speed trains or electrification procurements. However, we do not believe that such scope restraints negatively affected our ability to review and evaluate information on the overall management of the Northeast High-Speed Rail Improvement Project and draw conclusions about how Amtrak managed the project.

According to FRA and commuter rail officials, several of the work elements that are incomplete or for which their status is unknown (such as realignment of curves) are important to achieving the 3-hour goal. As of March 2003, Amtrak, commuter railroads, and other stakeholders had spent about $3.2 billion on the project. How much more work will be done is uncertain. Several Amtrak officials said they consider the project complete, even though the trip-time goal has not been met and many capacity enhancement and recapitalization work elements are incomplete or their status is unknown. Work is continuing, or is planned, for some of the master plan's work elements, but there does not appear to be an effort to complete the project or meet the trip-time goal.

Amtrak could have exercised more effective management of the Northeast High-Speed Rail Improvement Project had its management of the project been more comprehensive and had it focused greater attention on critical infrastructure issues needed to attain the 3-hour trip-time goal. Although FRA's 1994 master plan laid out the blueprint for the Northeast High-Speed Rail Improvement Project, Amtrak did not adopt this plan and did not prepare a comprehensive management plan of its own. Instead, Amtrak generally focused on managing individual project components, particularly the electrification and acquisition of high-speed trains. Although Amtrak senior management obtained a substantial amount of information about these two aspects of the Northeast High-Speed Rail Improvement Project, it did not consistently use this information effectively to minimize the impact of problems on the overall project. Amtrak also relied on annual appropriations to plan work rather than on a more comprehensive financial plan that considered long-term funding needs. Finally, although Amtrak worked closely with stakeholders—commuter railroads and state governments—to coordinate some project work, it did not fully integrate their interests into project goals. The participation of stakeholders was, and continues to be, essential for completing work critical for meeting the 3-hour trip-time goal.

FRA provided little oversight of the Northeast High-Speed Rail Improvement Project. Although FRA—the primary federal agency supporting the project—was the conduit of millions of federal dollars to the project, FRA management adopted the position that it had only limited authority to oversee the project. FRA was legally responsible for and carried out other activities related to the project, such as conducting environmental assessments and developing safety regulations to accommodate high-speed rail service. FRA officials said they did not take an active role in overseeing the project because (1) the agency did not have

the resources or the legislative authority to change Amtrak's project management, (2) Congress did not specifically authorize FRA to oversee the project, and (3) FRA did not have a formal mechanism to perform oversight. We agree with FRA's view that it had only limited authority to oversee the project. For fiscal year 2003, Congress increased FRA's responsibility to provide oversight of and accountability for federal funds used for intercity passenger rail service, but this responsibility extended only to fiscal year 2003 funds.

Project management best practices can provide a framework for effectively managing future large-scale intercity passenger rail projects. Through our analyses of management approaches across a broad spectrum of national activities, we have identified key components of a best practices framework for project management. These components include (1) conducting comprehensive project planning, (2) assessing risks and identifying mitigation measures, (3) comprehensively managing project finances, (4) establishing accountability for and oversight of projects, and (5) incorporating stakeholders' interests in planning and implementing projects. Comprehensive planning helps manage and control projects' implementation. Assessing risks and identifying mitigation measures assist in meeting projects' goals by recognizing and responding to problems earlier. Comprehensively managing project finances is important for estimating and controlling projects' costs. Establishing accountability for and oversight of projects better ensures the prudent use of resources, including federal resources. Incorporating diverse stakeholders' interests helps facilitate projects' successful implementation by ensuring there is a clear understanding of roles, responsibilities, and potential concerns.

We make recommendations to Amtrak to adopt elements of the best practices framework when planning and implementing future large-scale infrastructure projects, like the Northeast High-Speed Rail Improvement Project. This includes developing project management and finance plans. We also make recommendations to the Secretary of Transportation to direct FRA to require managers of federally funded large-scale intercity passenger rail infrastructure projects to adopt elements of the best practices framework, including preparing project management and finance plans and conducting risk assessments, as part of their receipt of federal funds for such projects, and that FRA provide guidance on how to do this. Finally, we recommend that FRA seek legislation authorizing it to establish a program to oversee such federally funded large-scale intercity passenger rail infrastructure projects in the future.

We provided a draft of this report to Amtrak and the Department of Transportation for their review and comment. The president of Amtrak observed that our report raised many of the issues that he has had to address since he took office and that on a regular basis he has had to deal with many of the consequences of decisions made during the life of the Northeast High-Speed Rail Improvement Project. Although Amtrak said it was unable to comment because of matters under litigation, it believes our findings and conclusions were incomplete because we did not consider how the actions of contractors might have influenced Amtrak's management of the project. Amtrak also believes we placed too great a reliance on FRA's master plan to measure their project management. We recognize that contractor actions can influence project implementation and management. However, our findings are directed to Amtrak's overall management of the Northeast High-Speed Rail Improvement Project, including the preparation and use of comprehensive project management plans, rather than the actions of contractors or the planning and implementation of specific project components (e.g., high-speed train acquisition). Although Amtrak agreed that FRA's statutorily required master plan constituted a blueprint for the project, we found that Amtrak did not use this plan to manage the project or create its own comprehensive management plan to oversee the program of improvements needed to bring 3-hour passenger rail service between Boston and New York City. Amtrak did not directly comment on our specific recommendations but instead said it was incorporating many of the best practices discussed in our report as part of its management restructuring. FRA responded for the Department of Transportation and agreed with our recommendations. FRA said that their proposed Passenger Rail Investment Reform Act would create an oversight program similar to what we are recommending. We continue to believe that the recommendations in this report are valid.

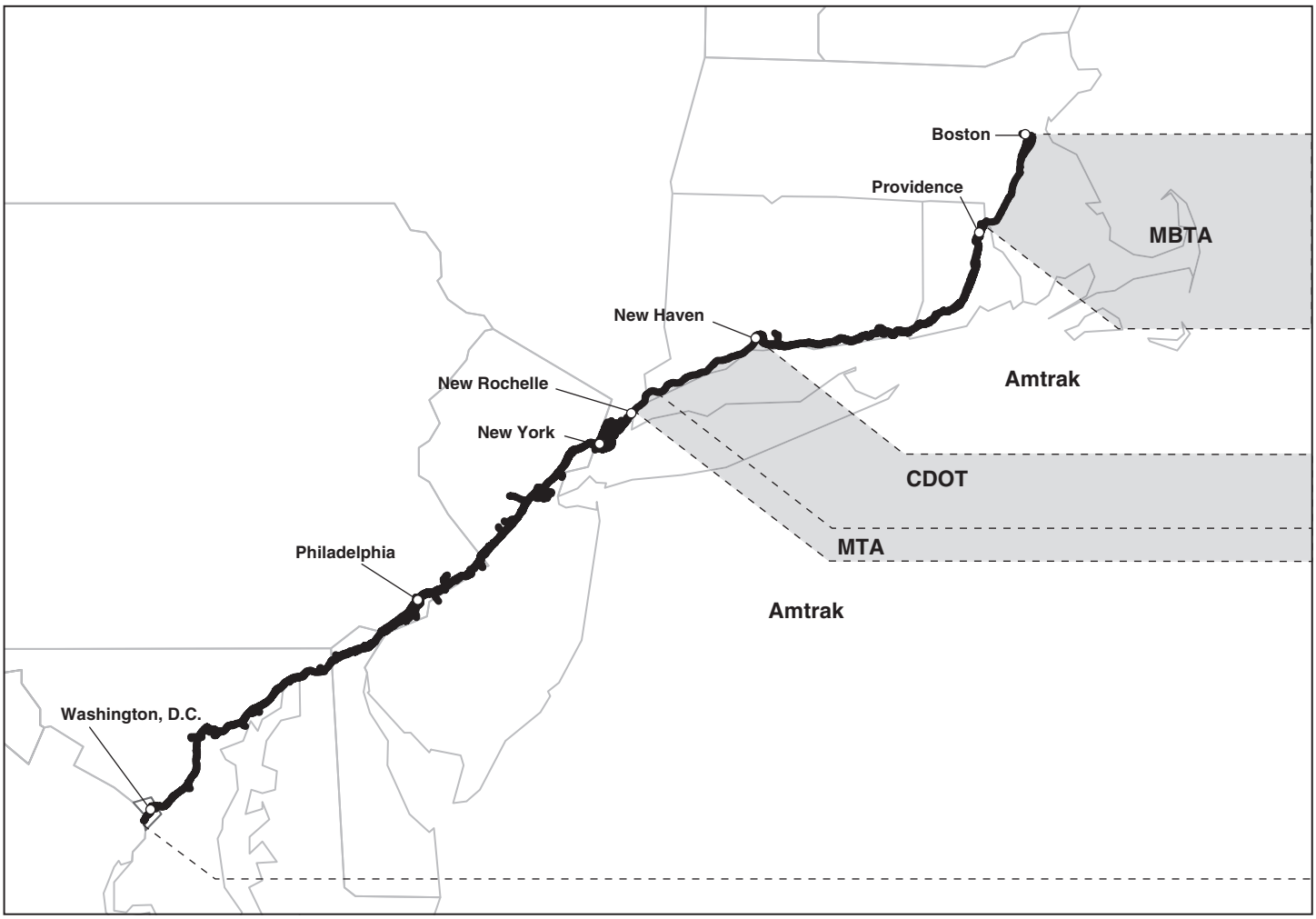
Background

The Rail Passenger Service Act of 1970 created Amtrak to provide intercity passenger rail service because existing railroads found such service to be unprofitable. Amtrak operates a 22,000-mile network, primarily over freight railroad tracks, providing service to 46 states and the District of Columbia. Amtrak owns about 650 miles of track, primarily on the Northeast Corridor between Boston and Washington, D.C. In fiscal year 2002, Amtrak served 23.4 million passengers, or about 64,000 passengers per day. According to Amtrak, about two-thirds of its ridership is wholly or partially on the Northeast Corridor.

Amtrak acquired the Northeast Corridor in 1976 from the Consolidated Rail Corporation as part of the disposition of the Penn Central Transportation Company's assets. At the time, the Penn Central Transportation Company and certain other Northeastern railroads were in bankruptcy. As required by the Regional Rail Reorganization Act of 1973, the purpose of this acquisition was to facilitate improved high-speed passenger rail service. However, Amtrak is neither the exclusive owner nor the exclusive user of the Northeast Corridor. Although Amtrak is the owner and operator of the Northeast Corridor between New York City and Washington, D.C. (called the "south-end"), other organizations, including the Massachusetts Bay Transportation Authority (MBTA), the Connecticut Department of Transportation (CDOT), and the Metropolitan Transportation Authority of New York (MTA), own significant portions of the Northeast Corridor between Boston and New York City (called the "north-end"). (See fig. 1.) Both Amtrak and commuter rail trains operate on these segments of track: MBTA provides commuter rail service between Boston and Providence, Rhode Island; Shore Line East provides commuter rail service between New London and New Haven, Connecticut; and Metro-North Railroad provides commuter rail service between New Haven and New Rochelle, New York. In fiscal year 2002, Amtrak accounted for 10 percent of the number of intercity and commuter rail trains operated on the north-end of the Northeast Corridor, and commuter railroads accounted for 90 percent.[5] Six freight railroads also operate on the Northeast Corridor and, in fiscal year 2001, these freight railroads operated 38 trains per day on the Northeast Corridor. In contrast, in the same year Amtrak and commuter railroads operated approximately 470 trains per day on just the north-end of the Northeast Corridor.

[5]Number of trains is measured as the train volume at the point of maximum line utilization. Although Amtrak does not operate as many trains as commuter rail operators, it accounts for a larger percentage of train-miles. A train-mile is a train traveling 1 mile. In fiscal year 2002, Amtrak accounted for about 60 percent of train-miles on the north-end of the Northeast Corridor, compared with about 40 percent for commuter rail operators.

Figure 1: Ownership of the Northeast Corridor



Source: GAO.

The Railroad Revitalization and Regulatory Reform Act of 1976 (4R Act) formally established the Northeast Corridor Improvement Project. Among other things, the 4R Act authorized Amtrak to make improvements to the right-of-way between Boston and Washington, D.C., needed to enable high-speed rail service, and it established certain goals for the project. In particular, within 5 years of the 4R Act's enactment, the project was to achieve regularly scheduled and dependable intercity passenger rail service between Boston and New York City in 3 hours 40 minutes, and between

New York City and Washington, D.C., in 2 hours 40 minutes. The ultimate goal was to achieve service between Boston and New York City in 3 hours, and between New York City and Washington, D.C., in 2 hours 30 minutes. The act directed the Secretary of Transportation to determine the practicability of meeting these latter goals and authorized $1.75 billion to accomplish them as well as make certain other improvements on routes related to the Northeast Corridor (such as Harrisburg, Pennsylvania, and Springfield, Massachusetts). The act did not specify a time by which these latter goals were to be met, but did require a status report within two years after the 4R Act was enacted. Under the act, FRA was the project manager. Amtrak was a subcontractor primarily responsible for track and signal work.

The Passenger Railroad Rebuilding Act of 1980 (P.L. 96-254) called for transferring responsibility for the Northeast Corridor Improvement Project from FRA to Amtrak by October 1985.[6] FRA officials told us that at the time of this transfer, they generally considered the project to be complete in that additional funding for remaining major work elements was not envisioned. Although the project had achieved significant improvements to the entire Northeast Corridor, its principal focus had been on the south-end of the corridor because of the significant deterioration of the infrastructure on this segment of the line. An Amtrak official told us that the emphasis had been largely on addressing infrastructure maintenance and repair issues, not on enhancing the Northeast Corridor to accommodate high-speed rail service. Consequently, although the project met the 2-hour-40-minute trip-time goal on the south-end of the Northeast Corridor between New York City and Washington, D.C., it did not meet either the 3-hour-40-minute or the 3-hour trip-time goals on the north-end of the Northeast Corridor between Boston and New York City. FRA attributed the failure to meet the trip-time goals for the north-end to a lack of funding, which prevented electrifying the line north of New Haven and making other improvements to track and structures. During the 1980s, funding for the project was reduced several times, and these reductions limited the scope of the project and led to the elimination of the north-end electrification work.

In 1992, the Amtrak Authorization and Development Act (P.L. 102-533) required the Secretary of Transportation to develop a master plan for a new project, the goal of which was to provide intercity passenger rail service

[6]In September 1985, FRA entered into a grant agreement that transferred responsibility for the Northeast Corridor Improvement Project to Amtrak as of October 1, 1985.

between Boston and New York City in 3 hours or less. The act authorized a total of $470 million for fiscal years 1993 and 1994 to plan this effort and make capital investments. Amtrak established the Northeast High-Speed Rail Improvement Project in response to this act. In July 1994, FRA issued a master plan for the project that called for a series of improvements designed to meet the act's 3-hour trip-time goal and permit initiation of 3-hour service by 1999.[7] FRA estimated a cost of about $3.1 billion (in 1993 dollars)[8] for the project, of which about $1.9 billion (1993 dollars) would be required to achieve 3-hour rail service. The project was to be complete by the end of 2009. (See app. III for more information on the history of the Northeast Corridor Improvement Project and the Northeast High-Speed Rail Improvement Project.)

Since its inception in 1970, Amtrak has struggled to earn revenues and operate efficiently. These struggles have continued in recent years, leading to proposals for restructuring the provision of intercity passenger rail service. These proposals range from keeping Amtrak intact and providing increased funding to improve its equipment and infrastructure, to breaking Amtrak up and introducing competing rail service. The creation of a separate infrastructure company has also been proposed as a means to maintain and rehabilitate the Northeast Corridor and other infrastructure for providing intercity passenger rail service. Finally, a proposal has been made to delegate much of the responsibility for intercity passenger rail service to states and have states (acting through interstate compacts) provide a larger share of the funding and make decisions about intercity passenger rail service. As of September 2003, these proposals were pending before Congress. One or more of these proposals may influence how large-scale intercity passenger rail infrastructure projects are managed in the future.

The federal government is also likely to be involved in future large-scale intercity passenger rail infrastructure projects as high-speed rail corridors are developed around the country. As of January 2002, there were 10 federally designated high-speed rail corridors nationwide. We reported in March 2001 that 34 states were participating in the development of high-speed rail corridors and that those states had invested more than $1 billion

[7]U.S. Department of Transportation, Federal Railroad Administration, *The Northeast Corridor Transportation Plan, New York City to Boston* (July 1994). For purposes of this report, this plan is referred to as the "FRA master plan."

[8]This is about $3.6 billion in 2002 dollars.

to improve local rail lines for that purpose.[9] Federally designated corridors may be eligible for federal funds. The total cost to develop high-speed rail corridors is unknown. However, in April 2003, we reported that preliminary estimates of the cost to develop these corridors could be between $50 billion and $70 billion over the next 20 years.[10]

Northeast High-Speed Rail Improvement Project Has Not Achieved Trip-Time Goal

Amtrak has not met the goal of 3-hour rail service between Boston and New York City, although it has reduced the scheduled trip time from about 4 hours in 1994 to 3 hours 24 minutes in 2003. To do this, it completed the first milestone in FRA's 1994 master plan—initiate electrified train service between Boston and New York City—in January 2000, and it acquired enough high-speed trains to begin limited high-speed rail service in December 2000. However, it initiated these activities later than planned, and, according to the latest available data (from March 2003), nearly three-quarters of the work elements (12 of 17 work elements) needed to complete the second milestone—initiate 3-hour service—are incomplete or their status is unknown.[11] Progress toward completing the third and final milestone—completing infrastructure improvements designed to enhance track capacity and extend the life of existing track assets—has also been slower than planned. In total, as of March 2003, Amtrak, commuter rail authorities, and other stakeholders had completed 21 of the project's 72 work elements—51 were either incomplete or their status was unknown. Of these 51 work elements, according to FRA and commuter rail officials, several (such as realignment of curves) are important to achieving the 3-hour goal. As of March 2003, Amtrak, commuter railroads, and other

[9]U.S. General Accounting Office, *Intercity Passenger Rail: Assessing the Benefits of Increased Federal Funding for Amtrak and High-Speed Passenger Rail Systems*, GAO-01-480T (Washington, D.C.: March 2001).

[10]U.S. General Accounting Office, *Intercity Passenger Rail: Issues for Consideration in Developing an Intercity Passenger Rail Policy*, GAO-03-712T (Washington, D.C.: April 2003).

[11]Status unknown means that either Amtrak did not know the status of the work element or we were unable to obtain information about a work element's status from Amtrak or commuter railroads. It should be recognized that not all work elements might be of equal importance, scale, or complexity. For example, completing electrification of the line between New Haven and Boston (which is considered 1 work element) is significantly more important to achieving project goals and more complex than something like eliminating a railroad-highway grade crossing (which is also considered to be 1 work element). Also, as discussed later in this report, not all of the work elements were located on Amtrak-owned track.

stakeholders had spent about $3.2 billion on the project. How much more work will be done is uncertain. Several Amtrak officials said that they consider the project complete, even though the 3-hour trip-time goal has not been met and many work elements are incomplete. Work is continuing, or is planned, for some of the master plan's work elements, but there does not appear to be an effort to complete the project or meet the trip-time goal.

FRA's Master Plan Identified Milestones and Work Elements and Estimated Costs for the Northeast High-Speed Rail Improvement Project

FRA's 1994 master plan for the Northeast High-Speed Rail Improvement Project divided the project into three milestones and identified dates for their completion. These milestones were as follows:

- Initiate electrified service. This milestone consisted of 16 work elements[12] and required the completion of such things as the installation of an electrification system between Boston and New Haven—the line between New Haven and New York City was already electrified—and the realignment of curves on the Boston to New Haven segment of track. According to the master plan, the installation of the electrification system was expected to take the most time, and its completion would control the achievement of the first milestone. FRA estimated this milestone could be completed by mid-1997.

- Initiate 3-hour train service. This milestone consisted of 17 work elements and required the completion of such things as the partial delivery of high-speed trains (at least eight trains were expected to be delivered to meet this milestone) and the realignment of curves between New Haven and New Rochelle. FRA anticipated the initiation of limited 3-hour service between Boston and New York City in 1999, followed by full 3-hour service using all 26 high-speed trains in 2001.

- Complete capacity enhancement and recapitalization work elements necessary to maintain 3-hour service. This milestone consisted of 43 work elements and included the completion of several capacity enhancement and recapitalization projects, such as construction of

[12]The total number of work elements for all three milestones is 76, rather than 72, because FRA counted 4 work elements twice—curve realignments, constructing high-level platforms, reconfiguring existing interlockings (places where trains can be switched from one track to another track), and constructing passing sidings—since they could help achieve more than one milestone.

passing sidings and the replacement of movable bridges—that is, bridges that can be lifted or pivoted to accommodate maritime traffic. This milestone was to be completed by the end of 2009 to accommodate projected intercity, commuter, and freight traffic levels in 2010.

To accomplish the project's three milestones, FRA's 1994 master plan also laid out the work elements in four categories. (See app. II for a list of all the work elements.) The categories were

- trip time reduction—20 work elements were designed to reduce trip times through such efforts as electrifying the line from Boston to New Haven and acquiring high-speed trains;

- capacity enhancement—18 work elements were designed to enhance capacity by, for example, reconfiguring interlockings to accommodate traffic growth;

- recapitalization—15 work elements were designed to rebuild or extend the useful life of the infrastructure by, for example, replacing bridges;[13] and

- other—19 work elements, labeled as "other," including fiber optic communications lines and pedestrian bridges, were designed to provide more general benefits to rail passengers and others.

Under the master plan, Amtrak, commuter railroads, and state departments of transportation shared responsibility for implementing the work elements. According to FRA's analysis, some of these elements exclusively or primarily benefited Amtrak's intercity passenger rail service, while other elements primarily benefited commuter and freight rail service.

The 1994 master plan recognized that completing the work elements would be expensive. FRA estimated that the work elements designed to reduce trip times, enhance capacity, and perform recapitalization work would cost about $3.1 billion (in 1993 dollars). This worked out to about $1.3 billion for trip-time reductions, about $600 million for capacity enhancements, and

[13]These items were also to restore track and other infrastructure to a "state of good repair." A state of good repair is the outcome expected from the capital investment needed to restore Amtrak's right-of-way (track, signals, and auxiliary structures) to a condition that requires only routine maintenance.

about $1.2 billion for recapitalization. FRA did not include a cost estimate for the 19 other work elements.[14] (See table 1.) Of the $3.1 billion cost estimate, FRA estimated that about $1.9 billion (about 60 percent) would be required to enable 3-hour service between Boston and New York City. The 1994 master plan also did not assign funding responsibility to particular organizations, but it did indicate that about 40 percent of the project's estimated costs would cover work that would provide significant benefit to commuter railroads. The plan recognized that funding would come from a variety of sources, including direct appropriations to FRA, appropriations authorized under the Intermodal Surface Transportation Efficiency Act of 1991, and state and local governments. The plan further recognized that allocating funding responsibility and identifying funding sources would involve negotiations between relevant parties.

Table 1: FRA's Estimated Cost of the Project, by Major Category

Dollars in millions

Work element	Number of work elements	Estimated cost[a]
Trip-time reduction	20	$1,255.1
Capacity enhancement	18	606.4
Recapitalization	15	1,230.4
Other	19	[b]
Total	**72**	**$3,091.9**

Source: GAO analysis of FRA data.

[a]In 1993 dollars.

[b]Not available.

Amtrak generally agreed with FRA's 1994 master plan in their written comments provided to FRA. However, in commenting on the plan, Amtrak did not agree with certain cost estimates or with all of the plan's work elements that FRA identified as essential to achieve the 3-hour trip-time goal. For example, Amtrak did not agree that FRA should have included some capacity enhancement and recapitalization work elements (such as the installation of concrete ties in commuter rail territory) in its estimate of the cost to complete the project. However, Amtrak recognized that both the

[14]FRA indicated that the cost estimates were based on information provided by government agencies and the railroads themselves. For those work elements for which cost estimates were not directly available, FRA contractors developed conceptual estimates.

capacity enhancement and recapitalization work elements were ultimately essential to reliably and cost effectively support projected increases in rail service over the following 20 years. Furthermore, Amtrak said that to achieve a reliable 3-hour schedule it was not depending on improvements to the non-Amtrak-owned sections of track (such as those owned by commuter rail authorities) that FRA had identified as essential to achieve the 3-hour trip-time goal. Finally, Amtrak stated its expectation that improvements such as capacity enhancements would be funded by the state or local agency or organization primarily benefiting from the improvement, even if that agency or organization did not own the track.

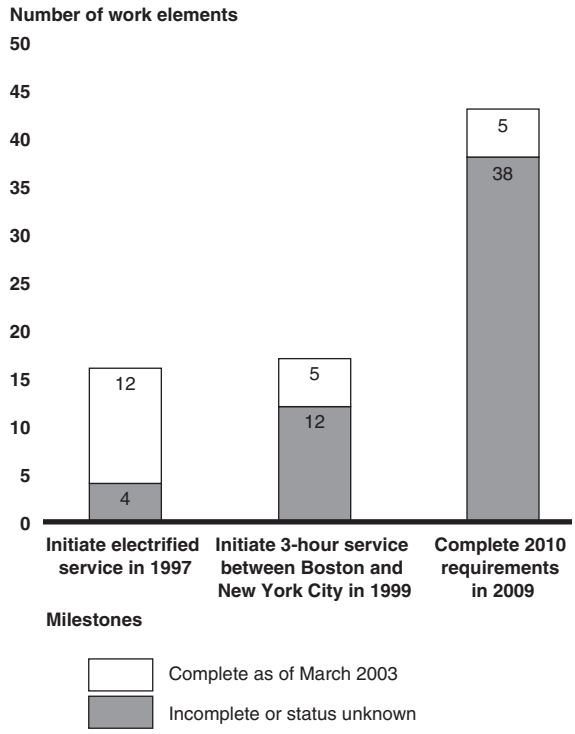
In subsequent discussions with Amtrak officials, they said that, while Amtrak had commented on FRA's master plan during its development and acknowledged its issuance, Amtrak did not adopt the plan or manage its high-speed rail projects in accordance with it. According to Amtrak, the master plan was never intended by Amtrak, Congress, or FRA to be used as a "blueprint" or planning directive for the high-speed work and that the document, once released, was virtually obsolete. This contradicts information that was provided during our work. At that time, both Amtrak and FRA officials agreed that the 1994 master plan was a blueprint for the Northeast High-Speed Rail Improvement Project. A former Amtrak project director had told us that FRA's plan could be considered a baseline for the overall project.

Northeast High-Speed Rail Improvement Project Has Not Achieved 3-Hour Goal and Is Far from Complete

Amtrak believed it could achieve a reliable 3-hour trip time by the summer of 1999—about 2 years earlier than FRA had projected in the master plan. Despite its belief that it could meet this goal by 1999, Amtrak has not yet done so, and progress on the project has been slower than FRA initially estimated. (See fig. 2.) As of March 2003, a total of 51 of the project's 72 work elements were not complete or their status was unknown. Most of these were in the third milestone. Although 49 of the project's 72 work elements were supposed to have been completed before 2003, as of March 2003, less than 40 percent (19 of the 49 work elements) had actually been completed by that date. In addition, 2 other work elements that were

scheduled for completion after 2003 were actually completed by March 2003.[15]

Figure 2: Status of Work Elements Listed in FRA's 1994 Master Plan, by Milestones, as of March 2003



Source: GAO analysis of Amtrak and commuter railroad data.

Note: The total number of completed work elements shown in figure 2 is 22, rather than 21, because 1 of the work elements that help to achieve two milestones (curve realignments) is partially complete (the portion needed to initiate electrified service) and partially incomplete (the portion needed to initiate 3-hour service).

[15]Of the 21 work elements completed by March 2003, all, or part of, 5 work elements were completed early—that is, ahead of their scheduled completion date. This included 1 work element (replace/upgrade overhead bridges in Rhode Island) that was completed in 1999—about 10 years ahead of its scheduled completion date in 2009. It also included 1 work element—the track program (installation of concrete ties, track resurfacing, and ballast cleaning)—that was completed about 3 years ahead of its scheduled completion date. An Amtrak official told us that much of the track and infrastructure work was accelerated once delays in electrification began to occur.

According to the master plan, Amtrak was scheduled to complete the first milestone—initiate electrified service—by mid-1997, but it did not initiate such service between Boston and New York City until January 2000, and the electrification was not substantially completed until July 2000[16]—about 3 years later than expected. The electrification was delayed, in part, because Amtrak changed contractors in 1995 after the first electrification contractor went out of business and the contract was terminated. Amtrak then had to hire a new contractor to complete the work and lost about 2 years in work time. As of March 2003, 4 of the work elements for this milestone were still incomplete, including the line electrification work element, for which final acceptance is still pending.[17]

Amtrak has yet to attain the second milestone—initiate 3-hour service. Amtrak did begin limited Acela Express high-speed train service in December 2000, but this service is scheduled to take 3 hours 24 minutes from Boston to New York, not 3 hours. The 3-hour goal has not been met, in part, because work elements on the 56-mile segment of track between New Haven and New Rochelle that is operated by Metro-North Railroad have not been completed. Amtrak did not believe work on this line segment was necessary to achieve 3-hour service. However, both FRA and commuter rail officials told us that work on this track segment is essential for achieving the 3-hour goal. Among the work elements that have not been completed is the reconfiguration of the New Rochelle ("Shell") interlocking. Originally this was to include the construction of a "flyover" (elevated track), called the Shell Flyover. According to Amtrak officials, at-grade improvements are now planned rather than a flyover because of high costs. Work at New Rochelle is critical because of the severe train congestion in this area—Connecticut Department of Transportation officials said more than 200 commuter trains a day go through the Shell interlocking. As of March 2003, about three-quarters of the work elements (12 of 17 work elements) needed to reach this milestone were incomplete or their status was unknown. According to Amtrak, work on some elements under this milestone is actively under way. For example, the Stamford center island platforms were completed in the summer of 2003, and final curve modifications were

[16]"Substantially complete" means that most of the construction work related to electrifying the line, such as installing foundations, erecting poles, and constructing electric substations and related facilities, had been completed. However, it does not mean that all the work was done or that there are no unresolved disputes concerning the work.

[17]For purposes of this report, we consider electrification incomplete since final acceptance of the system was still pending as of March 2003. It was still pending as of February 2004.

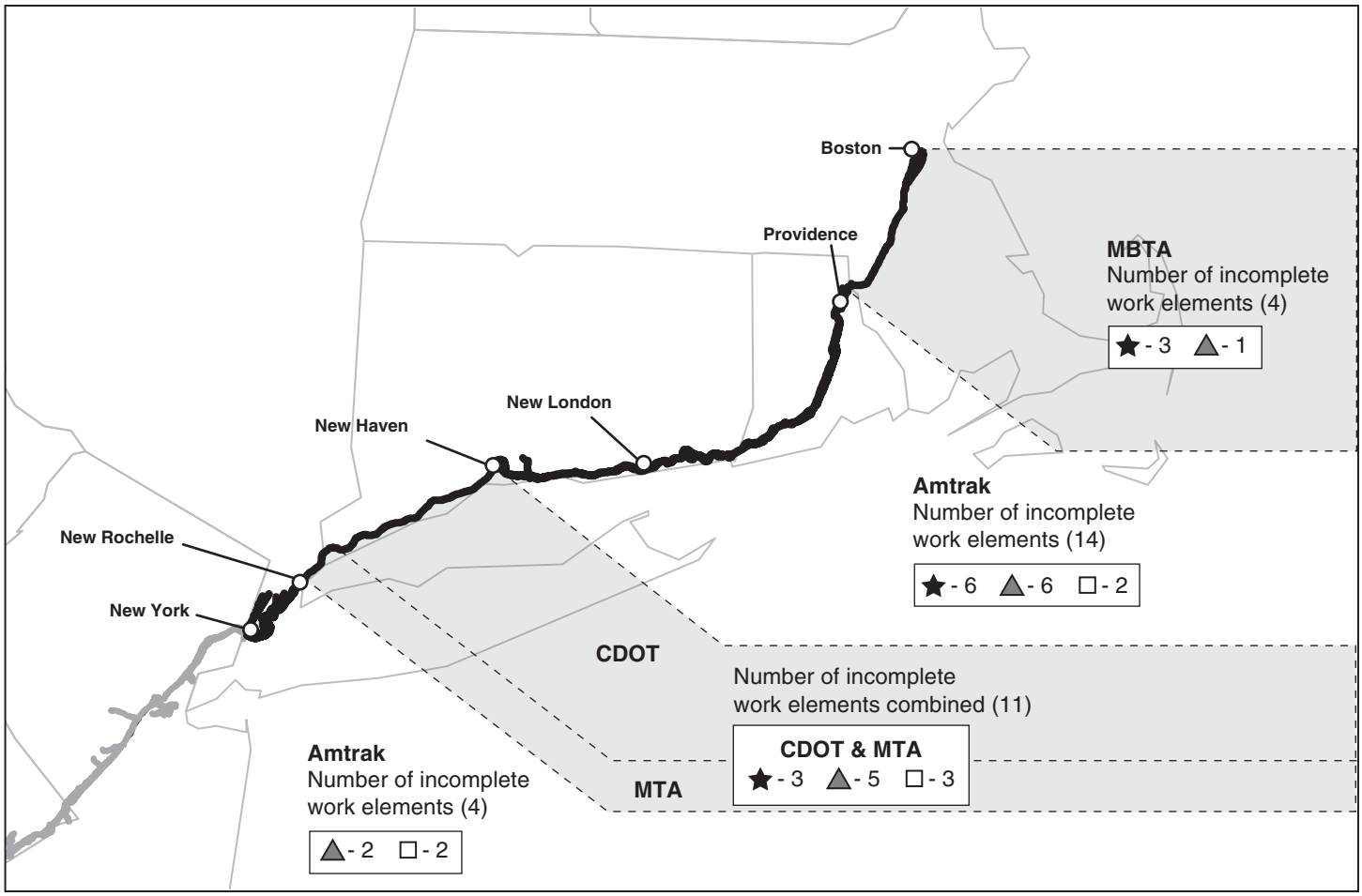
under design. Amtrak said that this, in conjunction with completion of the Connecticut Department of Transportation's catenary[18] program would, among other things, allow it to travel 90 miles per hour between New Haven and New Rochelle and generate about 7 minutes of trip-time savings.

Finally, progress toward the third milestone—complete capacity enhancement and recapitalization work—has been slower than planned, and nearly 90 percent of the work elements for this milestone (38 of 43 work elements) were incomplete or their status was unknown as of March 2003. Of the 38 work elements that were incomplete or their status was unknown, 2 were related to trip-time reduction (a noise and vibration study and construction of a transfer facility at Kingston, Rhode Island), 12 were categorized as capacity enhancement (including construction of passing sidings), 10 were recapitalization (including bridge replacements), and 14 were categorized as other (including construction of layover facilities and commuter parking).

As of March 2003, 15 of the 51 work elements (about 30 percent) that had not been completed or whose status was unknown were on track not owned by Amtrak. (See fig. 3.) Of these 15 work elements, Amtrak was expected to be the major beneficiary of 9. Some of these work elements, including certain curve realignments and track clearances, are critical for achieving the 3-hour trip time. For example, Amtrak is not currently able to use a key feature of the new high-speed trains—a mechanism that allows the trains to "tilt" and, therefore, take curves at a higher speed—in part, because track centers are too close on the segment of track between New Haven and New Rochelle. The Connecticut Department of Transportation and the Metropolitan Transportation Authority of New York own this track. According to an Amtrak official, the tilt mechanism on the high-speed trains is turned off between New Haven and New Rochelle. FRA's 1994 master plan identified track curvature as the most severe constraint on trip time, and both FRA and commuter rail officials told us that curves on the north-end of the Northeast Corridor are a severe constraint on the achievement of faster trip times.

[18]The overhead wire that delivers the electricity to the locomotive for traction, or movement.

Figure 3: Geographic Location of Remaining Work Elements and Major Beneficiaries, as of March 2003



Source: GAO analysis of Amtrak, commuter, and freight railroad data.

Note: The above does not include 18 work elements that were not geographically specific—that is, they applied to all or a portion of the track between Boston and New York City (e.g., electrification and acquisition of high-speed trains), or involved studies or actions not tied to specific geographic locations.

Through March 2003, a total of about $3.2 billion (2003 dollars) had been spent on the Northeast High-Speed Rail Improvement Project—or just less

than 90 percent of the $3.6 billion (2002 dollars)[19] project cost estimated in FRA's 1994 master plan. Amtrak has spent about $2.6 billion[20] and three commuter railroads, two freight railroads, and two state governments have spent about $625 million.[21] Most of Amtrak's spending was for the acquisition of high-speed trains and related maintenance facilities (about $1.1 billion),[22] electrification of the route (about $717 million), and track and infrastructure projects ($652 million). (See table 2). Of the amounts spent by commuter and freight railroads and the state governments, the most—about $141 million—was spent by the Connecticut Department of Transportation to replace a bridge. The Connecticut Department of Transportation also plans to spend an additional $250 million to replace catenary between the New York/Connecticut state line and New Haven.

[19]$3.1 billion in 1993 dollars.

[20]This figure does not include about $100 million in disputed costs between Amtrak and the electrification contractor.

[21]This represents information from Long Island Rail Road, Metro-North Railroad, the Massachusetts Bay Transportation Authority, CSX Transportation Inc., Providence and Worchester Railroad, Connecticut Department of Transportation, and the Rhode Island Department of Transportation.

[22]Of the $1.1 billion total for acquisition of trains, locomotives, and maintenance facilities, $753 million was financed. The $1.1 billion includes amounts spent for 15 high horsepower locomotives for non-high-speed train operations on electrified lines, and about $5.7 million for the Advanced Civil Speed Enforcement System.

Table 2: Amounts Spent by Amtrak on the Northeast High-Speed Rail Improvement Project, by Category of Spending, as of March 2003

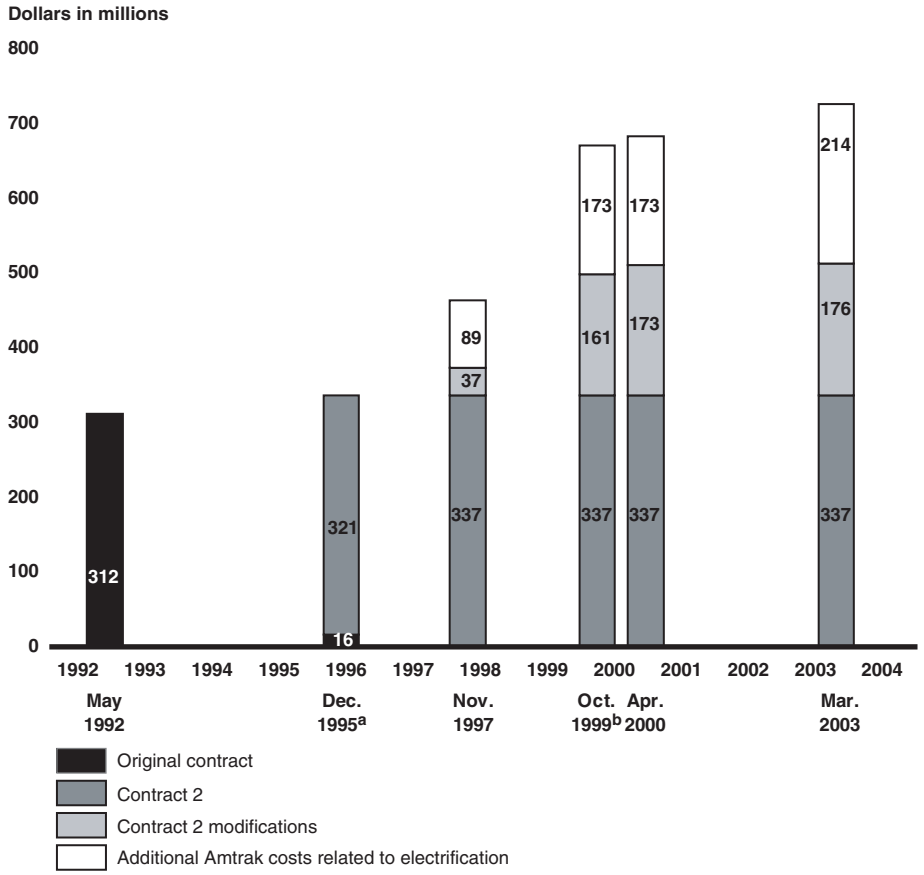
Dollars in milions	
Spending category	**Amount spent**
Acquisition of trains, locomotives, and maintenance facilities	$1,127.2
Electrification	716.7
Track and infrastructure	652.1
Environmental impact statement mitigation activities	94.7
Product development	33.8
Total	**$2,624.5**

Source: GAO analysis of Amtrak data.

Note: The spending in this table is shown in the categories Amtrak used to track project spending. Although requested, Amtrak was unable to reconcile its categories of spending to the work elements and three milestones contained in FRA's master plan.

While Amtrak did not track costs of improvements relative to the original projections, it is clear that the cost of some work elements was higher than expected. For example, the estimated cost of electrification increased from about $300 million in 1992 to about $727 million in 2003. (See fig. 4.) As of March 2003, Amtrak had spent about $717 million. According to Amtrak's data, much of the cost increase (more than $200 million) was attributable to unexpected and unplanned items. Amtrak incurred approximately $120 million in unplanned costs because, according to an Amtrak official, the contractor frequently revised the geographic location of the electrification work, and each revision triggered the need for safety protection work, called "flag protection," that was provided by workers standing along the track and at highway-railroad grade crossings holding flags. Under collective bargaining agreements, Amtrak was required to advertise this work for 7 to 10 days so that its unionized employees could express their interest in doing the work. The extra time required for Amtrak to comply with this requirement delayed the electrification work and increased Amtrak's costs.

Figure 4: Growth in Estimated Cost of Route Electrification, May 1992 to March 2003



Source: GAO analysis of Amtrak data.

[a]The original contract was terminated in late 1995. Amtrak spent $16 million on this original contract. In subsequent bars the $16 million is included in contract 2 amounts.

[b]Contract 2 was scheduled for completion in October 1999.

Similarly, the cost of acquiring trains, locomotives, and maintenance facilities also increased, from an original estimate of about $186 million for 26 trains in FRA's 1994 master plan to about $800 million for 20 trains plus three maintenance facilities in 1996.[23] Through March 2003, Amtrak had spent about $1.1 billion for these items. Amtrak attributed much of the cost

[23]In June 1992, Amtrak had estimated a cost of about $450 million for high-speed trains.

increase to, among other things, the addition of the three maintenance facilities, various modifications to the trains, and a higher-than-expected bid to manufacture the trains. Amtrak also said that an additional $100 million was incurred to add a second power car to each train (an extra 20 power cars) to comply with new FRA passenger car safety standards. An Amtrak official said it was difficult to estimate the cost of trains, since the acquisition went from a relatively simple procurement of train equipment to a complex high-speed rail program that included the acquisition of equipment capable of traveling at speeds of up to 150 miles per hour. The acquisition cost of both the trains and maintenance facilities was financed, and debt service on this financing began in fiscal year 2002 and will continue through fiscal year 2023 for the high-speed trains and through fiscal year 2042 for the maintenance facilities unless an early buyout offer is exercised. Amtrak expects the interest on this financing to total about $426 million.[24]

Amtrak stated that FRA's involvement with the Northeast High-Speed Rail Improvement Project also affected project cost and schedule. (See below for a discussion of FRA's role in this project.) For example, according to Amtrak, the environmental impact statement that FRA developed for the project was over a year late and imposed significant and costly mitigation measures. Also, FRA's new track standards required development of the technologically challenging and expensive Advanced Civil Speed Enforcement System—a system for automatic train control on the entire Northeast Corridor. Because all trains that operate on the Northeast Corridor would be required to use this system, Amtrak agreed to fund the equipment upgrades for various railroads that use the Northeast Corridor, including commuter railroads.[25] Finally, FRA's passenger car safety standards required the 20 additional power cars discussed above as well as an expensive crash-energy absorption system on the trains. FRA officials told us that Amtrak was intimately involved with development of the track and passenger car standards and that, in some instances, the standards were specifically developed to accommodate the Northeast High-Speed Rail Improvement Project. In general, FRA officials said there was no extra cost for Amtrak to comply with FRA's new safety regulations. However,

[24]This is interest on the permanent financing only. It does not include interest paid on interim loans used during construction of the equipment or facilities.

[25]According to an Amtrak official, phase I of this system was scheduled for completion in summer 2003 with phase II (to permit remote enforcement of speed restrictions) scheduled to be completed in 2005.

they acknowledged the additional cost to develop the Advanced Civil Speed Enforcement System but said Amtrak could not operate high-speed trains without this system.

Some Consider Project Complete Even Though Work Is Not Finished

Several Amtrak officials told us that they consider the Northeast High-Speed Rail Improvement Project complete, even though Amtrak has not achieved the 3-hour goal and the work is not finished. As of March 2003, 41 of the work elements identified in FRA's master plan were incomplete, and on an additional 10 work elements there was no information or their status was unknown. It is not clear how many work elements will be completed or whether Amtrak is committed to achieving the 3-hour goal. A former director of the Northeast High-Speed Rail Improvement Project told us that Amtrak hopes to reduce the trip time to 3 hours 10 minutes in the future if funding is available. But the former director doubted there was much of a market for 3-hour service between Boston and New York City.[26] In the past, however, Amtrak had stated that it was relying on meeting the 3-hour goal to help it attract the ridership and revenue needed to attain operational self-sufficiency, as called for in the Amtrak Reform and Accountability Act of 1997.[27] As recently as 2000, the Chairman of Amtrak's Board of Directors testified before Congress that Amtrak would achieve the 3-hour trip-time goal between Boston and New York City.

Although several Amtrak officials told us they consider the project complete, work is continuing, or is planned, for some of the master plan's work elements. For example, Amtrak's most recent 5-year capital plan (covering fiscal years 2004 through 2008), issued in April 2003, includes 12 of the 51 work elements in FRA's master plan that, as of March 2003, were incomplete or whose status was unknown. These work elements consist primarily of replacing bridges, reconfiguring interlockings, and completing fire and life safety improvements in and around Pennsylvania Station in New York. Amtrak's 5-year capital plan also contains $52 million through

[26]Amtrak officials stated to us that they believe such a trip time is "achievable" with completion of the Metro-North improvements and completion of the Advanced Civil Speed Enforcement System.

[27]The Amtrak Reform and Accountability Act of 1997 prohibited Amtrak from using federal funds for operating expenses after 2002. The prohibition against using federal funds for operating expenses does not apply when Congress specifically appropriates funds for Amtrak to cover operating expenses in a particular year, as Congress did for fiscal year 2003 (see the Consolidated Appropriations Resolution, 2003) and 2004.

fiscal year 2008 for the at-grade improvements at the Shell interlocking. In total, Amtrak's capital plan budgets about $380 million for the work elements associated with the Northeast High-Speed Rail Improvement Project. However, there does not appear to be an effort to complete the project or meet the trip-time goal, and Amtrak did not characterize its recent capital plan as encompassing the completion of the Northeast High-Speed Rail Improvement Project. Rather, the plan was characterized as aiming to stabilize the railroad by returning its plant and equipment to a state of good repair, controlling operating deficits, and restoring liquidity.

Commuter rail agencies and state governments along the north-end of the Northeast Corridor also plan to continue some of the work associated with the Northeast High-Speed Rail Improvement Project. Commuter rail agencies and state governments we contacted said they planned to continue work on at least 20 of the work elements contained in the 1994 master plan. For example, one commuter rail authority (Metro-North Railroad) plans to finish improving stations, rehabilitating movable bridges, and upgrading power, communications and signal systems. Two state governments (Connecticut and Rhode Island) said they plan to replace bridges and catenary on the New Haven rail line, as well as construct passing sidings and improve clearances for freight railroad operations. Commuter rail and state officials estimated that these work elements could cost hundreds of millions of dollars. Officials with the Connecticut Department of Transportation, for example, said their state plans to spend more than $800 million between 2003 and 2010 on at least 9 work elements associated with the Northeast High-Speed Rail Improvement Project, including bridge and catenary replacements and station relocations.

Even though Amtrak has not reached the project's 3-hour goal and many important work elements remain to be completed, Amtrak officials maintain that they achieved noteworthy successes, particularly in light of the challenges they faced. Noting that Amtrak does not own major portions of the Northeast Corridor, that freight and commuter rail operations continued throughout the life of the project, and that funding was provided annually in varying amounts, Amtrak officials consider the electrification of the Northeast Corridor a significant success. According to one Amtrak official, the entire project represents a success, because the Northeast Corridor now enables freight trains to operate at 30 miles per hour while intercity passenger trains travel up to 150 miles per hour. The official said that some states outside the Northeast Corridor that are considering upgrading their rail lines to accommodate both freight traffic and high-speed passenger trains have sought assistance from Amtrak.

Amtrak Did Not Exercise Effective Management of the Northeast High-Speed Rail Improvement Project

Amtrak could have exercised more effective management of the Northeast High-Speed Rail Improvement Project had its management of the project been more comprehensive and had it focused greater attention on critical infrastructure issues needed to attain the 3-hour trip-time goal. Although FRA's master plan laid out the blueprint for the Northeast High-Speed Rail Improvement Project, Amtrak did not adopt this plan and did not prepare a comprehensive management plan of its own. Instead, Amtrak generally focused on managing individual project components, particularly the electrification and acquisition of high-speed trains. Although Amtrak senior management obtained a substantial amount of information about these two aspects of the Northeast High-Speed Rail Improvement Project, it did not consistently use this information effectively to minimize the impact of problems on the overall project. Amtrak also relied on annual appropriations to plan work rather than on a more comprehensive financial plan that considered long-term funding needs. Finally, although Amtrak worked closely with stakeholders—commuter railroads and state governments—to coordinate some project work, it did not fully integrate their interests into project goals. The participation of stakeholders was, and continues to be, essential for completing work critical for meeting the 3-hour trip-time goal.

Amtrak's Project Management Was Focused on Selected Components, Not Attainment of Project Goals

Amtrak's management of the Northeast High-Speed Rail Improvement Project contributed to its inability to achieve project goals. Project management was not comprehensive but rather was focused on selected components, not project goals. As discussed earlier, FRA's 1994 master plan laid out the work elements needed to complete the project, estimated their costs, and identified those elements that would benefit Amtrak or others. However, Amtrak did not adopt this plan or manage to it. Instead, Amtrak focused on managing selected components of the project—primarily the work associated with electrifying the line between Boston and New Haven and acquisition of the high-speed trains. This occurred even though there were critical infrastructure improvements that were required in order to achieve the 3-hour trip time between Boston and New York City. Amtrak did not ignore infrastructure improvements, but as the project evolved, and costs increased and schedules slipped, the emphasis shifted to completing those infrastructure improvements required to begin electrified service between Boston and New York City, not those needed to achieve the 3-hour trip-time goal. As of February 2004, some infrastructure improvements (such as reconfiguring the Shell interlocking) that are critical to achieving the 3-hour trip time had not been completed.

Amtrak received a substantial amount of information about selected components of the project. Amtrak's senior management and the Board of Directors received periodic information about the project, including monthly progress reports about the project. Amtrak also received monthly progress reports from the consortium manufacturing the high-speed trains. Amtrak used integrated program schedules that were updated monthly to visually depict start and end dates for various project tasks. Such information allowed Amtrak management to track work status and to identify actual or potential problems. For example, an October 1996 monthly progress report on the high-speed trains noted that progress in this component was "significantly less" than had been planned, and by December 1996 the progress report noted that the high-speed train acquisition program was no longer likely to finish on time, even with planned late finish dates.

Amtrak did not use the information it received to effectively manage problems that arose. While Amtrak attempted to take action to address various problems that developed, those actions did not prevent significant delays in completing either the electrification or high-speed train work. For example, in 1997 Amtrak proposed hiring a second contractor to help install electric pole foundations when installation rates decreased to an unacceptable level, and, in 1998, Amtrak made acceleration payments to help finish the electrification work. Despite these efforts, the line between Boston and New Haven was not fully energized until July 2000—about a year later than planned.[28] Amtrak attempted to use recovery plans—plans designed to identify specific actions to be taken to get a project "back on track"—to address problems. But Amtrak did not assemble any program-level (projectwide) recovery plan for the project as a whole. A former project director said a program-level recovery plan was not used because the components of the Northeast High-Speed Rail Improvement Project were not mutually dependent on each other.

Not assembling comprehensive project management or program-level recovery plans made it difficult for Amtrak's senior management and Board of Directors to effectively manage the project and assign accountability for project results. A comprehensive project management plan similar to FRA's 1994 master plan could have allowed senior management and the Board of Directors to clearly understand the status of the project at any given point

[28]As of fall 2003, the electrification work had still not been completed and Amtrak had not accepted the final system.

and how problems in one project component could be affecting other project components. Such a plan could also have facilitated understanding how difficulties in one or more project components could affect the ultimate success of the entire project and achievement of project goals. For example, as noted earlier, FRA's 1994 master plan identified the planned improvements to Metro-North Railroad's New Rochelle interlocking (the "Shell interlocking") as critical for achieving 3-hour service. Metro-North officials said that Amtrak did not work collaboratively with them on improving the Shell interlocking but instead imposed its own solution for improving the interlocking. In the late 1990s, cost increases to the proposed flyover led Amtrak to scale back its design to an at-grade improvement. Based on the documents we reviewed, it was not clear that Amtrak's Board of Directors had an understanding of the effect of not completing either the Shell interlocking or other critical infrastructure improvements. Moreover, the lack of program-level recovery plans made it difficult to identify specific actions being taken to correct problems, who was responsible for these actions, when they would be completed, and expected outcomes. Such information was critical for maintaining accountability for the project and the conditions affecting the project's outcomes. Again, project documents we reviewed did not indicate that Amtrak's Board of Directors had a comprehensive understanding of project recovery efforts and expected outcomes.

Financial Management of the Project Was Also Not Comprehensive and Was Largely Focused on the Short Term

Amtrak's financial management of the project was also not comprehensive, and it also focused primarily on the short term. Amtrak's plans for financial management were similar to its project management plans, in that they addressed only individual work elements. In addition, these plans, which Amtrak called "spend plans," were based largely on annual appropriations and focused on spending for a single fiscal year. Although the spend plans contained many of the elements of a financial plan—such as the total cost of each major work element in current-year dollars, a cumulative estimate of expected spending on each of these elements through the end of the current fiscal year, and the cumulative spending on each element to date—they were not comprehensive and only allowed Amtrak to identify short-term funding shortfalls for individual work components and not longer-term funding needs and potential shortfalls for the entire project. The spend plans also did not track the three milestones and 72 work elements laid out in the FRA master plan or incorporate funding needs and spending by non-Amtrak stakeholders, both of which would have allowed a more comprehensive financial management of the entire project and potentially linked spending to a "useful segment." OMB defines a "useful segment" as a

component that either (1) provides information allowing an organization to plan the capital project, develop the design, and assess benefits, costs, and risks before proceeding to full acquisition, or (2) results in a useful asset for which the benefits exceed the costs even if no further funding is appropriated.

Not having a stable, long-term source of funding for the project contributed to the effects of Amtrak's short-term approach to financial management. To fund its portion of the project, Amtrak relied on annual appropriations, and the amount of appropriations was not certain from year to year. Although direct appropriations for the project from 1992 through 1998 (when direct appropriations ended) averaged just under $200 million per year, they ranged from $250 million in 1998 to $115 million in 1996. According to FRA's master plan, about $265 million per year (in 1993 dollars) would be needed from all parties from 1995 through 2001 to achieve 3-hour service. Both Amtrak and FRA officials told us that dependence on annual appropriations hurt the project, and one Amtrak official said this type of funding cycle constrained capital planning and financing for the project and focused on the short rather than long term.

Amtrak Worked With Stakeholders on Numerous Project Work Elements, but Did Not Fully Integrate Stakeholders' Interests into the Project

Amtrak worked with numerous stakeholders on certain work elements, but did not fully integrate their interests into the project. Not fully integrating stakeholders' interests—particularly, non-Amtrak track owners and users, such as commuter and freight railroads—into the Northeast High-Speed Rail Improvement Project hindered Amtrak's achievement of the project's goals, particularly along sections of the north-end of the Northeast Corridor that Amtrak does not own. In its 1994 master plan, FRA emphasized that it was critical for Amtrak to involve other stakeholders in planning, designing, and financing the project to ensure its completion and to achieve the 3-hour trip time between Boston and New York City. The 1994 master plan also emphasized the importance of completing stakeholder-related work, including capacity enhancement, in order to ensure the future reliability of high-speed service in light of expected intercity and commuter rail traffic growth. According to Amtrak, one premise of the project laid out in the FRA master plan was that improvements made to benefit Amtrak were not to adversely affect other track users—that is, other track users were to be "held harmless" for these improvements. Amtrak officials said this premise significantly increased the importance of involving stakeholders. To help ensure that federal, state, and local concerns would be addressed, Amtrak established a project office in Old Saybrook, Connecticut.

Amtrak communicated with other Northeast Corridor track owners and users, holding regularly scheduled meetings and entering into work agreements with them. Amtrak worked with commuter rail and state officials to accommodate work that was required to begin electrified service between Boston and New York City. For example, Amtrak worked closely with MBTA on several work elements, including refurbishment of Canton Viaduct and construction of new platforms at the Route 128 passenger rail station, to make sure electrified service could begin. Some officials we spoke with complimented Amtrak's handling of stakeholder involvement.

Yet other commuter rail and state officials believed that Amtrak did not fully integrate their interests into the project's goals. For example, some track users alleged that after Amtrak obtained their agreement to proceed with the Northeast High-Speed Rail Improvement Project, it managed the project with little regard for their interests. In their view, Amtrak did the work required to accommodate high-speed trains and reduce trip times, but it did little to focus on capacity enhancement or other work needed to accommodate expected growth in commuter and freight rail traffic in future years—a key aspect of FRA's master plan for achieving and maintaining faster trip times. An official with the state of Rhode Island, for example, told us that Amtrak's management of corridor improvements "bogged down" its efforts to complete their Freight Rail Improvement Project—a program to facilitate and grow freight railroad traffic in Rhode Island. Regarding the latter, Amtrak observed that this project was significantly behind in its development and that it paid to do preliminary design work related to the project in order to facilitate placement of catenary poles for the electrification work. Officials from Metro-North Railroad also told us that Amtrak's agenda has generally been to take care of its own needs and spend money on its tracks, and commuter railroads could take care of their own needs. In their opinion, better cooperation and collaboration would have made the work go faster and more smoothly.

Completing the Northeast High-Speed Rail Improvement Project—particularly the goal of 3-hour service between Boston and New York City—will continue to require collaboration between Amtrak and other stakeholders. Most of the work elements critical for achieving the trip-time goal that are not yet completed are on sections of track that Amtrak does not own, particularly on the 56-mile section of track owned by the Metropolitan Transportation Authority of New York and the Connecticut Department of Transportation. According to Metro-North officials, hundreds of millions of dollars in additional funds will be needed to

address infrastructure issues between New Haven and New Rochelle to achieve 3-hour service between Boston and New York City. They estimated that at least four bridges (costing $130 million to $150 million each) would require replacement and most of the 60 curves between New Haven and New York City would require modification. This might not only be prohibitively expensive but also potentially require property acquisition, which, because the track is in an urban setting, could be difficult due to existing development and involve significant condemnation issues. A Metro-North Railroad official estimated that gaining 1 minute or so in trip-time savings could cost $200 million or more.

FRA's Oversight of the Northeast High-Speed Rail Improvement Project Was Limited

Although providing millions of federal dollars to the Northeast High-Speed Rail Improvement Project, FRA—the primary federal agency involved with the project—provided little oversight of the project, generally because its management adopted the position that it lacked legislative authority to do so. Instead, FRA saw itself only as a conduit for funds from the federal government to Amtrak—a role entailing far less oversight than the Federal Transit Administration's role as the manager of a project management oversight program for the recipients of federal grants for major mass transit projects. FRA was also legally responsible for preparing environmental assessments for the project and developing track and passenger railcar safety standards, and it carried out these responsibilities. FRA officials said the agency provided little oversight because (1) it did not have the resources or the authority to change Amtrak's project management, (2) Congress did not grant FRA specific legislative authority to conduct such oversight, and (3) FRA did not have a formal mechanism (such as a project management oversight process) for providing oversight. We agree with FRA's view that it had limited authority to oversee the Northeast High-Speed Rail Improvement Project. For fiscal year 2003, Congress increased FRA's responsibility to provide oversight of and accountability for federal funds used for intercity passenger rail service, but this responsibility extends only to fiscal year 2003 funds.

FRA Adopted Position That It Had Limited Authority to Oversee the Project

In general, FRA adopted the position that it lacked specific authority to oversee the Northeast High-Speed Rail Improvement Project. According to the agency, its primary responsibility is to enforce federal law as it relates to railroad safety. To protect railroad employees and the public, FRA carries out this responsibility by developing and administering safety statutes, regulations, and programs; conducting research on railroad safety

and national transportation policy; and inspecting railroad track, equipment, signals, and railroad operating practices. It also plays a role in enforcing regulations applicable to the transportation of hazardous materials by rail. According to FRA officials, the agency did not have specific legislative authority to oversee the Northeast High-Speed Rail Improvement Project. Consequently, it did not have any particular authority to direct Amtrak's management of the project by, for example, requiring Amtrak to prepare project management or finance plans.

FRA officials told us they saw themselves as responsible primarily for making federal funding available for the project. While FRA, as grantor for the government, is responsible for ensuring that grant funds are used for their intended purposes, FRA officials said they did not believe they were responsible for exercising any specific management oversight of continuing work on the Northeast Corridor improvements or for ensuring the success of high-speed rail after Amtrak assumed the responsibility for managing the Northeast Corridor Improvement Project in 1985. In their view, both of these responsibilities lay with Amtrak. Accordingly, FRA officials provided little guidance for planning or for assessing and mitigating risks to major capital rail projects after 1985—a position they believed was consistent with congressional direction that limited FRA's oversight of grants to Amtrak before fiscal year 2003.

Under the 1985 grant agreement that transferred the Northeast Corridor Improvement Project to Amtrak, FRA retained responsibility to formally accept completed work and to audit the expenditure of funds to ensure that monies provided by the federal government were spent for their intended purposes. Amtrak was required to periodically provide reports concerning work status, budget, and accounting matters. Between 1986 and 1998, the grant agreement was amended 21 times. Some of these amendments added work covered by the Northeast High-Speed Rail Improvement Project, such as the electrification work. In 1992, FRA and Amtrak amended the agreement to allow FRA to provide support to and coordination of the project. According to FRA, this included getting the environmental assessment started, preparing the 1994 Master Plan, and helping coordinate project activities among Amtrak, commuter railroads, and others. However, under the agreement Amtrak retained full authority to decide issues pertaining to property it owned and operated.

Given these circumstances, we agree with FRA's view that it was not authorized to exercise direct oversight of the project. Over time, Congress removed responsibility for the management and execution of

improvements to the Northeast Corridor from FRA and gave it to Amtrak. As part of the Passenger Railroad Rebuilding Act of 1980, Congress directed the Secretary of Transportation to enter into an agreement with Amtrak to reallocate authority and responsibility for track improvements connected with the Northeast Corridor Improvement Project and to transfer responsibility for the project to Amtrak by October 1, 1985. This transfer made Amtrak responsible for implementing project goals Congress had previously mandated, and thus relieved FRA of its responsibilities in this regard. Congress later imposed additional duties on the Secretary of Transportation in relation to Northeast Corridor improvements. For example, the 1992 Amtrak Authorization and Development Act directed the Secretary of Transportation to prepare a program master plan for Northeast Corridor improvements in consultation with Amtrak and commuter and freight railroads. Congress continued to reaffirm Amtrak's central role in managing these improvements and high-speed rail work. Prior to 2003, there was no clear indication that Congress intended for FRA to reassume responsibility for conduct of the Northeast High-Speed Rail Improvement Project. Rather, according to FRA, Congress intended for the agency to principally act as a conduit of project funds appropriated for Amtrak's use. Therefore, we believe there is a basis in law for FRA acting primarily as a conduit of project funds and not to conduct oversight.

FRA's limited oversight role contrasts with the stronger oversight role that Congress assigned to the Federal Transit Administration (FTA) in 1987, when it directed FTA to establish a project management oversight program[29] to better safeguard the federal investment in transit projects funded through the agency's fixed guideway grants program (called the "New Starts" program).[30] Under the project management oversight program, contractors serve as an extension of FTA's technical staff to assess the project management and technical capacity of New Starts grantees and their capability to successfully implement major capital projects. In addition, contractors monitor projects to make sure they are on time, within budget, and in accordance with their plans and specifications. In 1998, FTA expanded its oversight efforts to include an assessment of

[29]The Surface Transportation and Uniform Relocation Assistance Act of 1987 authorized FTA's project management oversight program. This program is codified at 49 U.S.C. §5327 and implemented through regulations codified at 49 C.F.R. part 633.

[30]New Starts is an FTA program for starting fixed guideway projects to fund up to 80 percent of the cost of transit system projects that use separate and exclusive rights-of-way, as well as for extensions of existing systems.

grantees' financial capacity and the financial impact of major projects on existing transit systems. These reviews, conducted by independent accounting firms, assess a grantee's financial health and are performed before FTA commits funds for construction. The program is financed by a set-aside of funds available under various FTA programs.[31] FRA does not have a project management oversight program similar to FTA's.

FRA Focused on Environmental and Safety Activities, Not Oversight

While FRA had little clear oversight responsibility for the project, it was involved with other activities, such as assessing the environmental impact of electrifying the line between Boston and New Haven and developing safety regulations for the high-speed rail service planned for the Northeast High-Speed Rail Improvement Project.[32] Federal laws and requirements dictated FRA's involvement with these activities:

- Consistent with the National Environmental Policy Act of 1969 and the Council of Environmental Quality's requirements, FRA's *Procedures for Considering Environmental Impacts* requires that either an environmental assessment or an environmental impact statement be prepared for all major FRA actions that could have a significant effect on the quality of the human environment. According to an FRA official, FRA prepared an environmental impact statement for the Northeast High-Speed Rail Improvement Project's electrification work because the project was considered to be a "major action" that could have significant impact on the environment.

- FRA, as the federal agency responsible for railroad safety, was also required to develop safety standards to facilitate the high-speed rail service planned under the Northeast High-Speed Rail Improvement Project. The Rail Safety Enforcement and Review Act of 1992[33] required FRA to review and revise its track safety standards. As part of this review, in July 1997 FRA issued a Notice of Proposed Rulemaking to

[31]FTA's project management oversight program is financed from 0.75 percent of funds available under 49 U.S.C. §5309, and 0.5 percent of funds available under 49 U.S.C. §5307 and §5311. In fiscal year 2002, FTA received about $29 million to conduct its project management oversight program.

[32]According to Amtrak, FRA had some involvement with the acquisition of the high-speed trains. This included numerous meetings between Amtrak and FRA officials and FRA participation in planning, requirements testing, and design work.

[33]As amended by the Federal Railroad Safety Authorization Act of 1994.

amend its track safety standards to include new standards for track to be used by high-speed trains. The revised standards, made final in 1998, included three additional classes of track that would permit passenger rail trains to travel up to 200 miles per hour.[34] FRA officials said the standards for high-speed rail service were developed at Amtrak's request to accommodate train speeds of up to 150 miles per hour envisioned under the Northeast High-Speed Rail Improvement Project.

- In addition, the Federal Railroad Safety Authorization Act of 1994 required FRA to develop safety standards for passenger equipment, including passenger rail cars. Such standards did not previously exist. FRA issued an Advance Notice of Proposed Rulemaking establishing safety standards for passenger rail cars in 1996, a Notice of Proposed Rulemaking in 1997, and a Final Rule in 1999. According to FRA, these standards reflected the agency's desire to ensure safety in the context of an ever more complex passenger railroad operating environment (including higher train speeds). These standards accommodate high-speed rail service.

Apart from these activities, FRA's direct involvement with the Northeast High-Speed Rail Improvement Project was limited, reflecting a decrease, FRA officials said, in the resources that FRA devoted to the project after the management of the Northeast Corridor Improvement Project was transferred from FRA to Amtrak in 1985. At that time, about 50 to 60 individuals who had been detailed to FRA to work on the Northeast Corridor Improvement Project returned to the Federal Highway Administration (FHWA),[35] and FRA closed its project office and reduced the number of FRA full-time employees working on the project from between 8 and 10 to less than 1. FRA officials said the latter individual was primarily responsible for monitoring the completion of outstanding work on the Northeast Corridor Improvement Project, ensuring compliance with the final environmental record of decision, and serving as an ombudsman between FRA and Amtrak. In addition, this individual helped coordinate

[34]Federal regulations currently have nine classes of railroad track (Class 1 through Class 9) that permit passenger trains to operate at speeds of between 15 miles per hour (Class 1) and 200 miles per hour (Class 9). Track standards were prepared for speeds up to 200 miles per hour to accommodate the development of high-speed rail systems around the country.

[35]According to an FRA official, FHWA employees were detailed to work on Northeast Corridor Improvement Project activities because they had both engineering and infrastructure management expertise and because they would be needed only temporarily (up to 5 years), since the project was expected to be short term.

the project with local agencies as well as commuter and freight railroads. Although FRA tracked federal spending on the Northeast High-Speed Rail Improvement Project and checked on project progress, agency officials said FRA's authority to change how Amtrak managed this project was limited. FRA could raise matters of concern at meetings of Amtrak's Board of Directors, they said, but the agency was one of seven votes and had no unilateral authority to change Amtrak's decisions. Finally, FRA officials said, Congress did not specify a desire for them to be proactive in overseeing the project. Rather, in the officials' view, FRA was to serve largely as a conduit of federal funds to Amtrak and little else.

Amtrak's management of the Northeast High-Speed Rail Improvement Project was also subject to limited oversight from the Inspector General for Amtrak and the U.S. Department of Transportation's (DOT) Inspector Generals. Although Amtrak's Inspector General devoted 8 to 10 staff and created two groups to review the project's activities, much of this work was specific to contract matters rather than program management issues. Amtrak's Inspector General told us that ongoing claims disputes, criminal investigations, and litigation over the Acela Express trains have precluded his office from conducting broader audits of the Northeast High-Speed Rail Improvement Project's program management. In addition, he said that because the project is not yet considered complete, it would not currently be appropriate to conduct a programmatic review of the project. Amtrak's Inspector General also told us there are certain lessons learned from the Northeast High-Speed Rail Improvement Project that he has recently reinforced with Amtrak's Chief Engineer. Similarly, DOT Inspector General officials said they had not conducted much oversight of the project either. The Amtrak Reform and Accountability Act of 1997 required the DOT Inspector General to annually assess the financial requirements of Amtrak. As a result, the office produced several reports on this issue. However, only one report issued by the DOT Inspector General directly addressed the Northeast High-Speed Rail Improvement Project. This report discussed the progress of the electrification work.[36]

In Amtrak's fiscal year 2003 appropriations legislation, Congress adopted measures to increase the Secretary of Transportation's responsibility for providing oversight of and accountability for the federal funds used for intercity passenger rail service. Among other things, these measures

[36]U.S. Department of Transportation, Office of Inspector General, *Amtrak's High-Speed Rail Electrification Project* (December 1999).

require that Amtrak transmit a business plan to the Secretary of Transportation and Congress, supplemented by monthly reports describing work completed, changes to the business plan, and reasons for the changes. The business plan was to describe the work to be funded using federal funds. Furthermore, on or after March 1, 2003, Amtrak was only permitted to use fiscal year 2003 and 2004 federal capital expense and improvement grant funds for purposes included in its business plans.[37] Finally, Amtrak was required to agree to certain terms and conditions that would, among other things, improve its financial controls and accounting transparency and seek operating cost reductions. Although these measures acted to impact DOT's role with respect to the expenditure of federal funds provided to Amtrak, the measures apply only to expenditures financed with fiscal year 2003 and 2004 funds and are not necessarily directed to the oversight of any particular infrastructure project that might be financed with funds provided prior to fiscal year 2003. FRA officials also said that the appropriations act did not provide any additional resources analogous to that given to FTA (such as a takedown from various program funds) to conduct oversight.

Best Practices Framework Would Support Effective Management of Large-Scale Intercity Passenger Rail Infrastructure Projects

Through our work on the Northeast High-Speed Rail Improvement Project and our analyses of reports and guidance published by our office, the Office of Management and Budget (OMB), FTA, and FHWA,[38] we have identified key components of a best practices framework for effectively managing large infrastructure projects, including future intercity passenger rail projects. These best practices offer guidance for project managers and decision makers and include the following:

- Conduct comprehensive planning. Effective planning can include developing a preconstruction planning process, using the resulting preconstruction plans to implement a project, and evaluating the project's success by comparing the actual results with those planned.[39]

[37]Additional restrictions were placed on grants to cover operating losses.

[38]See app. III for a discussion of the methodology we used to compile this framework and app. V for a list of best practices sources.

[39]Planning is linked to an organization's strategic goals, which are based on a needs assessment that identifies the need for a project.

- Assess risks and identify mitigation measures. Early identification and assessment of risks to a project allow for prompt intervention.

- Comprehensively manage the project's finances. Tools for financial management can include project financial plans that provide for accurately estimating and effectively controlling costs.

- Establish accountability and oversight for prudent use of resources. Assigning responsibility for a project and tying its performance to pay and personnel decisions can help ensure accountability for the project's results. Independent assessments of the project's plans and implementation can provide oversight to help protect the federal investment.

- Incorporate the interests of diverse stakeholders. Coordination and communication with stakeholders, including states, communities, and others are important in identifying problems, reaching agreement on solutions, and avoiding delays.

This framework applies to projects across their preconstruction, construction, and postconstruction phases (see fig. 5).

Figure 5: Best Practices Framework for Managing Large-Scale Infrastructure Projects

EFFECTIVE PROJECT MANAGEMENT			
Project Phase[a]	**Preconstruction**	**Implementation - Construction**	**Postconstruction**
 **Comprehensive planning**	Conduct preconstruction planning	Use project plans for implementation Update project plans	Evaluate project, comparing results to planned outcomes
 **Risk assessment**	Identify project risks and develop mitigation strategies	Recognize problems and promptly intervene Develop recovery plans if necessary	N/A[b]
 **Comprehensive financial management**	Review and refine cost estimates Develop financial plans Account for inflation and stability of funding	Control project costs to stay within planned budgets	N/A[b]
 **Accountability and oversight**	Assign responsibility for project results. Conduct independent assessment of plans and other preconstruction documents	Track project progress and monitor implementation. Tie project performance to pay and personnel decisions Conduct independent assessment of implementation	Tie project performance to pay and personnel decisions Conduct independent assessment of project results
 **Stakeholder involvement**	Coordinate and communicate with stakeholders through project planning	Mitigate project impacts to stakeholders Coordinate and communicate with stakeholders through implementation	Coordinate and communicate with stakeholders through postconstruction

Source: GAO analysis of best practices literature.

[a]Preconstruction refers to the planning, preliminary engineering, design, and other work that precedes construction. Construction refers to the work involved in building a project. Postconstruction refers to evaluation of a project's results.

[b]Not applicable—postconstruction elements of risk assessment and financial management may be captured under project lessons learned or other categories.

Conduct Comprehensive Project Planning

Comprehensive planning serves as a foundation for effectively managing large-scale infrastructure projects, both for agencies or organizations that manage multiple capital projects and for individual projects. Such planning helps manage and control one or more projects' implementation, costs, schedules, scope of work, and achievement of goals. As we reported in 1998, a long-term capital plan documents the specific projects an organization intends to pursue and the resources it expects to use over the long term and establishes priorities for implementation.[40] Officials from four Class I railroads we contacted prepare and develop multiyear capital plans that establish organizational priorities and assist in developing current and future budgets for the successful completion of capital projects.[41] Plans for individual projects can take years to complete. For instance, preconstruction planning for the Alameda Corridor Project lasted more than a decade.[42] However, the time spent on planning can help organizations and agencies avoid costs and delays later. Officials from the Alameda Corridor Project credited that project's comprehensive, long-term planning process for helping them complete the 20-mile corridor within budget and on schedule.

An important tool for comprehensive planning is the project management plan, which typically uses performance baselines for goals, costs, schedules, major milestones, and risks to manage and control a project's implementation. Developing a project management plan focuses organizations, including those managing large-scale intercity passenger rail projects, on implementation issues early in the life of a project. These plans are not intended to be rigid, but rather, flexible and dynamic. During implementation, the plans are updated and otherwise revised to reflect changes in the project, such as changes in its cost, schedule, or scope of work. After a project has been implemented, its success can be measured by comparing its actual cost, schedule, and other outcomes with those that

[40]See GAO/AIMD-99-32.

[41]The four Class I railroads we contacted were the Burlington Northern and Santa Fe Railway Co., Norfolk Southern Corporation, CSX Transportation Inc., and Union Pacific Railroad Company. In 2001, these were the four largest Class I railroads. For 2001, Class I railroads were those railroads that earned at least $266.7 million per year in revenue.

[42]Called the Alameda Corridor because of the street it parallels, the project created a 20-mile, $2.4 billion railroad express line connecting the ports of Los Angeles and Long Beach to the transcontinental rail network near downtown Los Angeles. The project eliminated approximately 200 street-level railroad crossings, thereby alleviating congestion and improving mobility for cargo.

were planned. The recently introduced Passenger Rail Investment Reform Act (S. 1501) would similarly require organizations managing and receiving funds for intercity passenger rail capital projects to submit a project management plan for the Secretary of Transportation's approval.

To help ensure effective uses of federal funds, FTA requires grantees agreeing to federal fixed guideway project funds to develop project management plans as a condition of receiving federal financial assistance. These plans typically include budgets, implementation schedules, procedures for controlling documents and keeping records, reporting requirements, and cost and schedule controls.[43] When project management plans are not developed or used, projects can encounter problems, such as cost overruns and schedule delays. As we reported in March 2000, the Bay Area Rapid Transit (BART) expansion project to San Francisco International Airport experienced costs that were $300 million more than estimated. According to FTA, this was in part due to management not fully committing to the project management plan.[44] More specifically, managers did not update the plan or submit monthly budget and schedule updates. As a result, FTA said, cost and schedule trends were difficult to anticipate, and overruns were hard to manage effectively.

Assess Risks and Identify Mitigation Measures

Risk assessments allow project managers to identify and manage risks related to a project's costs, schedules, and other aspects and to develop mitigation measures that can increase the number of projects meeting established goals. Best practices suggest that managing organizations identify the risks to a project and their potential impact and then develop mitigation strategies. As we reported in 1998, early recognition of problems allows for prompt intervention, which increases the likelihood that corrective action will get the project back on track before there is significant deviation from its goals.[45] Assessing and mitigating risks reduces the probability of later encountering problems that can cause cost

[43]U.S. Department of Transportation, Federal Transit Administration, EG&G Dynatrend Inc., *Project and Construction Management Guidelines, 1996 Update* (Wellesley, Mass.: June 1996).

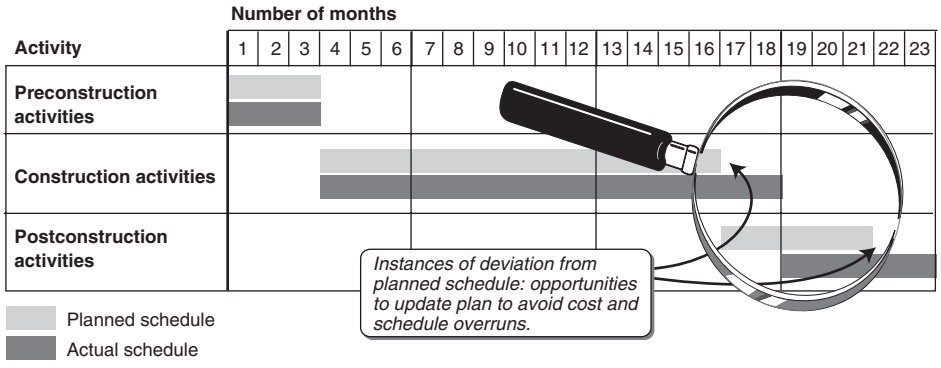
[44]U.S. General Accounting Office, *Mass Transit: Review of the Bay Area Rapid Transit District's Airport Extension Finance Plan*, GAO/RCED-00-95R (Washington, D.C.: Mar. 31, 2000).

[45]See GAO/AIMD-99-32.

increases and schedule delays. Potential risks to projects include cost increases, funding reductions, schedule delays, and environmental, political, and legal issues.

There are various techniques for performing risk assessments. Some of the Class I freight railroads we contacted (1) include a risk management group in planning a project to assess its risks, (2) conduct rigorous financial analyses, or (3) monitor monthly status reports to identify risks. FHWA and FTA suggest using what is called a critical path method to boost a project's efficiency and predictability, thereby potentially reducing its risks. This method relies on computer technology to identify the most efficient sequence of events to complete the project over the shortest time. The computer technology identifies each task to be completed and calculates a set schedule (see fig. 6). Managers can then visualize the impact of potential delays on the project's schedules and costs.

Figure 6: Critical Path Method Graphical Representation of Project Schedule



Sources: GAO and Nova Development (clip art).

Strategies for mitigating risks include developing recovery plans that may be integrated into the project management plan. Efforts to assess and mitigate risks can take place from the beginning to the end of a project. FHWA officials stated that no matter how much analysis is done before construction begins, unknowns can always threaten a project's estimated costs, schedules, and goals. When risks start to affect a project's progress, developing a recovery plan can help the managing organization reevaluate the project and outline changes to its scope, cost, schedule or other elements that will mitigate the negative effects of the risks. In the context of transit projects, FTA officials said recovery plans are not developed very

often because FTA's project management oversight process acts as a first line of defense to identify and address potential problems. However, when recovery plans are developed, they are intended to demonstrate a managing organization's ability to complete a project, protect federal funding, and still achieve the project's goals in the form of transit benefits to the community. Recovery plans help get a project "back on track" by considering potential changes to its management, engineering, funding sources, and other elements.

Comprehensively Manage Project Finances

Comprehensive financial management through accurately estimating and controlling costs helps to ensure efficient uses of funds. Estimating and controlling costs is important because the costs of large-scale infrastructure projects can increase significantly. Best practices suggest that managing organizations review and refine cost estimates as projects move closer to implementation to improve accuracy. A project financial plan, which shows a project's estimated funding needs, funding sources, and funding responsibilities, is one tool for estimating and controlling costs. These plans enable project managers to compare actual costs with planned expenditures, identify deviations, and take actions to address potential problems.

Because of the large federal investment in major infrastructure projects and the need to ensure sufficient funding to complete them, a financial plan may be required for a project to receive federal financial assistance. For example, since 1998, the Transportation Equity Act for the 21st Century has required recipients of federal assistance under Title 23, United States Code, to submit annual financial plans to DOT for projects estimated to cost $1 billion or more.[46] FHWA has developed guidance that requests that state financial plans include a total cost estimate for each project, annual updates and adjustments for inflation, estimates of future cost increases, a schedule for completing the project, a description of construction financing sources and revenues, a cash flow analysis, and a discussion of any other factors affecting the project's cost. According to FHWA's guidance, annual updates to these financial plans can also integrate changes in cost estimates that may arise as a project enters construction and its plans and designs are more complete. In July 2003, the DOT

[46]U.S. General Accounting Office, *Federal-Aid Highways: Cost and Oversight of Major Highway and Bridge Projects—Issues and Options*, GAO-03-764T (Washington, D.C.: May 8, 2003).

Inspector General testified before Congress that, in his opinion, financial plans should be prepared for projects costing $100 million or more.[47] S. 1501 would require a detailed financial analysis to accompany grant requests for federal funds, plus a business plan describing capital and operating work to be funded, cost estimates, and a schedule for completion. Monthly supplemental reports to the business plans would also be required.

Accounting for the effects of inflation in a financial plan, as FHWA's guidance directs, can increase the accuracy of a multiyear project's cost estimate. Best practices suggest that cost estimates for multiyear projects account for inflation to avoid deviations between actual and estimated costs as years pass and the value of currency changes. The Boston Central Artery/Tunnel project,[48] for example, which started in 1985, was originally expected to cost $2.6 billion, but as of May 2003, FHWA estimated that it would cost $14.6 billion—about $12 billion more than originally estimated. According to one FHWA official, about half of this cost increase can be attributed to inflation. Although inflation has generally decreased since the 1980s, it can still have a significant impact on a project's costs, as illustrated by the Central Artery/Tunnel project.

A financial plan can also help control a project's costs after construction has begun by estimating the amount of funding needed to complete the project and the availability of that funding. This information helps an organization and its contractors to assess the impact of changes that can cause a project's schedules to slip and costs to rise. Particularly during the first years of a project's development and construction, the funding received can be considerably less than the funding requested, especially when the funding is incremental—that is, the practice of providing budget authority for only a portion of a capital acquisition or part of a usable asset. As we have reported, incremental funding without the certainty of future

[47]U.S. Department of Transportation, *Controlling Costs and Improving the Effectiveness of Federal Highway Administration and Federal Transit Administration Programs*, CC-2003-148 (Washington, D.C.: July 22, 2003).

[48]The Central Artery/Tunnel project, an Interstate Highway System project in Boston is building or reconstructing about 7.5 miles of urban highways—about half of them underground. The project includes (1) extending Interstate 90 east, mostly in tunnels, through South Boston, under Boston Harbor (through the Ted Williams Tunnel), and 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.

funding can result in poor planning, higher costs, delays, and even a project's termination.[49] We have advocated full funding of capital projects—that is, providing budget authority for the full costs of a capital acquisition or project at the time decisions are made to provide financial resources—as a way to increase the recognition of implied commitments embodied in budgetary decisions. Because a financial plan can demonstrate the need for funding at particular times and the impact of funding delays on the project's costs and schedule, it can help an organization and its contractors stay within cost estimates and keep their project on schedule as well as determine full funding needs.

While incremental funding can create uncertainty and hamper planning, funding a project in meaningful phases can help to control costs. As we reported in 1998, best practices suggest breaking up a project's capital planning and budgeting cycle into phases before, during, and—in some cases—after construction.[50] Funding is provided for one of these phases at a time, and future funding is generally tied to achieving milestones. Under this approach, the initial design work can proceed far enough for higher-quality, more reliable cost estimates to be available for decision makers to consider before deciding whether to complete the design and construct the project—and before a substantial federal investment has been made. OMB and a 2000 DOT task force have also recommended establishing separate funding categories for preconstruction activities before making a commitment to full construction.[51] Some large-scale infrastructure projects are already funded in phases. For example, projects funded by FTA's fixed guideway program ("New Starts") are funded through federal grant agreements after preconstruction work has given decision makers a sense of a project's costs, benefits, and financial viability.[52]

[49]See GAO/AIMD-99-32.

[50]See GAO/AIMD-99-32.

[51]Report of the ONE DOT Task Force on Oversight of Large Transportation Infrastructure Projects (December 2000).

[52]FTA terms these agreements "full funding grant agreements," where funding is committed subject to annual appropriations.

Establish Accountability and Oversight for Prudent Use of Federal Resources

Best practices suggest that organizations be held accountable for adhering to planned budgets and schedules, achieving goals, and other project outcomes in order to ensure the prudent use of federal resources. By monitoring a project's performance against cost, schedule, and technical performance goals, as well as establishing incentives to meet those goals, organizations can increase the likelihood of the project's successful completion. Organizations can also hold project managers and other personnel accountable for the project's results. Some of the Class I freight railroads we contacted use internal sign-offs to assign responsibility for decisions about a project. They also often tie pay and personnel decisions to results. Under these decisions, project managers are held directly responsible for the project's success or failure. Large-scale infrastructure projects can also face external factors during implementation, such as reductions in funding from federal, state, or local jurisdictions, that might affect accountability decisions. In such circumstances, external factors can be recognized and accountability can be maintained by developing a system that only holds project managers responsible for their particular actions.

Independent oversight of a project is a best practice designed to promote the prudent use of federal resources. Independent assessments help protect the federal investment in a project by reviewing the implementation of its plans, monitoring its construction, and reporting problems. One method of providing independent oversight is to use an approach similar to FTA's project management oversight (PMO) program. As we reported in September 2000, this program has yielded benefits, including improved project controls and cost savings.[53] For example, for one project in the San Francisco area, a PMO contractor's recommendation led the grantee to appoint a coordinator and prepare a comprehensive project management plan that has improved the implementation of three interrelated projects. We also reported that the PMO program has been instrumental in providing FTA with a better understanding of issues surrounding complex construction projects and a better awareness of potential problems that could lead to cost increases and schedule delays.[54] For example, PMO contractors assigned to three projects identified significant cost increases and schedule delays early in construction and helped FTA and the grantees

[53]U.S. General Accounting Office, *Mass Transit: Project Management Oversight Benefits and Future Funding Requirements*, GAO/RCED-00-221 (Sept. 15, 2000).

[54]See GAO/RCED-00-221.

develop strategies to address these issues. In addition, financial assessments, also a part of FTA's PMO program, have helped ease FTA's concerns about grantees not having the capacity to complete new projects without adversely affecting their existing transit systems.

Incorporate the Interests of Diverse Stakeholders

Incorporating the interests of diverse stakeholders (including commuter and freight railroads and the public) into a project can increase its chances of success. This is especially important during the planning stages, when considering stakeholders' interests can help project managers identify needs and problems and develop action plans to address them. Best practices suggest frequent communication and involvement through such means as meetings and correspondence. These approaches allow stakeholders like local governments and others to convey their concerns and problems and work with project managers to address them.

Involving stakeholders in large-scale infrastructure projects, such as the Alameda Corridor Project, has shown positive results. This project developed community-based programs that provided business outreach, job training and development, and a conservation corps for community beautification. An official with this project said that managers frequently involved local jurisdictions along the route, and, in her opinion, their involvement helped achieve local buy-in and avoided delays through agreements that set the parameters of state and local reviews. For some highway and bridge projects, FHWA has included stakeholders by using neighborhood liaisons, community advisory councils, and public workshops.

Conclusions

Although federal investments in the Northeast High-Speed Rail Improvement Project have yielded infrastructure improvements and faster trip times, Amtrak did not act to comprehensively plan or manage the project. The trip-time goal has not been achieved, and work related to capacity enhancement and recapitalization is yet to be completed—much of which is on track Amtrak does not own and is critical if Amtrak is still planning to achieve a 3-hour trip time. Amtrak's management approach and poor integration of stakeholder interests into the project contributed to the project not meeting its goals. For example, Amtrak did not develop project management or finance plans that could have been used to better control costs and schedule delays. Amtrak also could have done a better job of

integrating stakeholder interests into the project, which could have facilitated completion of work elements on track not owned by Amtrak.

The lack of federal oversight also hindered the project's successful implementation. As experience has shown with other federally financed infrastructure programs, including large transit projects, increased federal oversight has the potential not only to facilitate a project's management but also to facilitate early intervention to correct problems once they develop. Oversight is critical for protecting federal investments in capital projects. The Northeast High-Speed Rail Improvement Project's performance has demonstrated that future large-scale intercity passenger rail infrastructure projects, including any future projects to recapitalize the Northeast Corridor, will require better management and oversight. In our view, these projects would benefit from a project management framework that is rooted in best practices, including comprehensive planning and financial management, risk assessment and mitigation, clear accountability and oversight, and incorporation of diverse stakeholders' interests.

Recommendations for Executive Action

To ensure that any future federally funded major intercity passenger rail infrastructure projects that might be undertaken by Amtrak are implemented as efficiently and effectively as possible, we recommend that the President of Amtrak work with Amtrak's Board of Directors to do the following:

1. Adopt policies and procedures for managing infrastructure projects that are based on best practices for managing large-scale infrastructure projects, and require adherence to such policies and procedures before approving or initiating significant changes to such projects. These policies and procedures should address the following:

- Preparation of comprehensive project management plans that are updated as needed.

- Preparation of comprehensive project financial plans that are updated at least annually.

- Requirements for assessing a project's risks and the methodologies for performing such assessments. The assessments should be comprehensive and include those risks that can be reasonably foreseen before construction begins. When warranted, a risk assessment should be prepared before a project is approved and updated as conditions

indicate, and it should include measures to mitigate the potential identified risks. The risk assessment should clearly indicate the potential effects of the different types of risks that could be encountered, and especially how those risks could affect a project's costs and schedules.

- Preparation of program-level recovery plans. The policies and procedures should establish the conditions under which these plans would be prepared and the elements they would include.

- Mechanisms to ensure accountability for a project's success. Such mechanisms should clearly indicate the individuals responsible for implementing the project, the expectations for their performance and the ways their performance will be measured, and the potential consequences for failing to meet expectations.

2. Adopt policies and procedures to help ensure that appropriate stakeholders, especially those external to Amtrak, are included in project planning, decision making, implementation, and, where appropriate, mechanisms to indicate stakeholders' agreement with or approval of project management and financial plans.

To better ensure the future oversight of federally financed, large-scale intercity passenger rail infrastructure projects, we recommend that the Secretary of Transportation seek legislation authorizing it to establish a project management oversight-like program to oversee these types of projects in the future. The legislation should do the following:

1. Specify the Federal Railroad Administration's responsibilities for the oversight of federal expenditures on major intercity passenger rail infrastructure projects and permit as necessary, to oversee such projects, the establishment and implementation of a project management oversight-like program at the Federal Railroad Administration similar to that authorized by the Surface Transportation and Uniform Relocation Act of 1987.

2. Require the Federal Railroad Administrator to develop regulations for administering the project management oversight-like program and to specify the requirements for complying with such a program.

3. Establish a funding mechanism to finance the program established by the Federal Railroad Administration. Among the mechanisms available

is direct appropriation or a statutorily limited set-aside of funds appropriated for designated Federal Railroad Administration programs.

To ensure that federally funded major intercity passenger rail infrastructure projects are implemented as effectively as possible and to better ensure the protection of federal investments in such projects, we recommend that the Secretary of Transportation, subsequent to a clarification of the oversight authority of the Federal Railroad Administration, direct the Federal Railroad Administrator to do the following:

1. Require managers of major intercity passenger rail infrastructure projects to adopt elements of the best practices framework, including the development of project management plans and financial plans and the assessment of risks to such things as the projects' costs, schedules, and implementation and completion. The risk assessment should identify measures, as appropriate, to mitigate the risks.

2. Require managers of major intercity passenger rail infrastructure projects to monitor the projects' implementation and, where appropriate, to develop project-level recovery plans once problems arise that threaten the projects' costs, schedules, or implementation or completion. Each plan should identify, at a minimum, the actions to be taken, the individuals or organizations responsible for the actions, the expected outcomes, and an implementation time frame.

3. Develop guidance, based on best practices, and make it available to states, railroads, and others to assist in managing large-scale intercity passenger rail infrastructure projects. The guidance could cover the preparation of such things as project management and finance plans, risk assessments, and recovery plans that address issues that threaten projects' costs, schedules, or implementation or completion.

Agency Comments and Our Evaluation

We provided a draft of this report to Amtrak and the Department of Transportation for their review and comment. Amtrak provided its comments in a letter from its President and Chief Executive Officer (see app. VI). In general, the President of Amtrak said that our report raised many of the issues that he has had to address since he took office and that on a regular basis he has had to deal with many of the consequences of decisions made during the life of the project. He further said that after he arrived he restructured Amtrak's management and budget processes

because he believed that Amtrak had lost focus in a number of critical areas, including management of capital projects. In addition, he observed that as part of the management restructuring, project accountability, and budget-based financial reporting changes he has made since arriving at Amtrak in May 2002, Amtrak has incorporated many of the best practices discussed in our report. Amtrak did not comment on our specific recommendations directly but instead said they had incorporated many of the best practices as part of their management restructuring. FRA responded for the Department of Transportation and agreed with our recommendations and said that the Passenger Rail Investment Reform Act (S. 1501) incorporates many of our recommendations.

Amtrak stated that it was not in a position to provide specific comments on our findings or conclusions because of allegations related to ongoing litigation associated with the electrification and high-speed train acquisition activities of the Northeast High-Speed Rail Improvement Project. Although Amtrak said it was unable to comment on our report because of matters under litigation, it believes our findings and conclusions are incomplete because we did not consider how the actions of contractors might have negatively affected Amtrak's project management. For example, Amtrak believes the outcome of the Justice Department investigation of the electrification contractor would impact an assessment of its project management. In addition, Amtrak believes our reliance on FRA's master plan to establish the criteria for costs and schedules in measuring their management of the Northeast High-Speed Rail Improvement Project was misplaced. We recognize that contractor actions can influence the implementation and management of capital projects. However, our work focused on Amtrak's overall management of the project and the extent that Amtrak prepared and used comprehensive project management and financial plans in implementing the project, not the actions of contractors or the planning and implementation of specific project components (e.g., high-speed train acquisition). As our report notes, Amtrak did not have comprehensive project management or financial plans for the project—plans that could have been used to better control costs and schedule delays. We also disagree that our use of FRA's master plan to evaluate Amtrak's management of the project was misplaced. The Amtrak Authorization and Development Act of 1992 required this plan. It represented a comprehensive program of improvements that would permit regularly scheduled, safe, and dependable rail passenger service between Boston and New York City in 3 hours. Although Amtrak agreed that this plan constituted a blueprint for the project, we found that Amtrak did not use this plan to manage the project or create its own comprehensive

project management plan. We do not believe that Congress meant for FRA's plan to be ignored and not used in scoping and managing the project, particularly in the absence of an Amtrak prepared plan.

Amtrak commented that it felt our conclusion about not fully integrating stakeholder interests was undeserved criticism. Amtrak said that it held countless meetings with stakeholders with often competing interests and entered into numerous agreements with them that specified their respective obligations and rights regarding work that was and was not contained in FRA's master plan. While we recognize the work that Amtrak did with various stakeholders, including state departments of transportation and commuter railroads, we continue to believe that Amtrak did not fully integrate stakeholder interests into project goals. The FRA master plan highlighted the criticality of stakeholder involvement in achieving the 3-hour trip-time goal. Amtrak's not achieving that goal is due, in part, to its inability to fully incorporate stakeholder interests into the project. Doing so could have identified stakeholder responsible work, the priority of such work, and required stakeholder financial contributions. Moreover, our report also states that some of the incomplete work elements on the Northeast High-Speed Rail Improvement Project as of March 2003 that were critical to achieving the 3-hour trip-time goal were on stakeholder owned property. This included infrastructure improvements such as curve realignments and at-grade improvements at the Shell interlocking. Preparation and use of a comprehensive project management plan would have not only helped identify these projects but also ensured they were prioritized so that project goals could be met.

Amtrak also commented that our report failed to adequately account for a change in the trip-time goal for the Northeast High-Speed Rail Improvement Project and the effects this change might have had on Amtrak's management of the project. Amtrak said that as early as 1995 it was assumed that the 3-hour trip time could only be achieved using a non-stop high-speed train from Boston to New York. Regularly scheduled service with intermediate stops was planned for 3 hours and 10 minutes. Amtrak also questioned whether the cost effectiveness of making the infrastructure improvements necessary to achieve a 3-hour trip time would currently be financially justified by the net ridership increase resulting from such a trip-time reduction. This contradicts information we obtained during our review. As the report notes, following enactment of the Amtrak Reform and Accountability Act of 1997, which prohibited Amtrak from using federal funds for operating expenses after 2002, Amtrak stated that it was relying on meeting the 3-hour trip-time goal to help it attract the

ridership and revenue to attain this goal. As recently as 2000, the Chairman of Amtrak's Board of Directors testified before Congress that Amtrak would achieve the 3-hour trip-time goal between Boston and New York City. Such statements indicate that, rather than abandoning the 3-hour trip-time goal, Amtrak continued to publicly represent until at least 2000 that it would attain this goal—a goal established by the 1992 Amtrak Authorization and Development Act. Finally, our work focused on Amtrak's management of the Northeast High-Speed Rail Improvement Project in achieving the 3-hour trip-time goal. It was beyond the scope of this work to determine whether a 3-hour trip time should or should not have been the project goal or if further improvements would be financially justified in achieving this goal.

Finally, Amtrak commented that there was a need for dependable funding of capital projects. Amtrak's President observed that the Northeast High-Speed Rail Improvement Project suffered, especially in the early years, from a lack of certain and dependable federal funding and that the amount of financial support from year-to-year was inconsistent. In his opinion, the success of any future projects will require stable federal financial support and, without this, effective project planning and financial accountability would be extremely difficult. We agree that dependable financial support is important to the success of any capital project. However, as our report notes, comprehensive financial management is an equally important component in successfully planning and implementing capital projects. In particular, preparation and use of financial plans are important tools for estimating and controlling project costs. Financial plans are also important in demonstrating the need for funding at particular times and the impact of funding delays on project costs and schedules. We found that Amtrak had no comprehensive financial plan for the Northeast High-Speed Rail Improvement Project, and that Amtrak focused on the short-term, not long-term, funding needs of the project. Preparation and use of a comprehensive financial plan would not only have facilitated the effective use of the financial resources provided but also have potentially demonstrated the need for additional resources where warranted.

The Department of Transportation's FRA said that it was in agreement with our recommendations. FRA noted that the Passenger Rail Investment Reform Act (S. 1501) would incorporate all of our recommendations by creating a program based on the Federal Transit Administration model for oversight. According to FRA, the structure of the capital program in S. 1501 was closely modeled after the Federal Transit Administration's Transit New Starts program. It will have the same sort of eligibility criteria, require the

same planning and analysis by applicants (including the development of project management plans with regular updates), and will include the same safety, procurement, management, and compliance reviews and audits as the Department undertakes with recipients of Federal Transit Administration funding. In addition, FRA said that S. 1501 proposes the same mechanism to fund the oversight of capital projects as used by the Federal Transit Administration, specifically authorizing the Secretary of Transportation to retain a portion of the grant to fund the Department's oversight activities.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 7 days from the date of this letter. At that time, we will send copies of the report to congressional committees with responsibilities for intercity passenger rail issues; the President of Amtrak; the Secretary of Transportation; the Administrator, Federal Railroad Administration; and the Director, Office of Management and Budget. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or heckerj@gao.gov. Key contributors to this report included Matthew Cail, Elizabeth Eisenstadt, Bert Japikse, Richard Jorgenson, Nancy Lueke, Steve Martin, and E. Jerry Seigler.

Sincerely yours,

JayEtta Z. Hecker
Director, Physical Infrastructure Issues

Scope and Methodology

To address the status of the Northeast High-Speed Rail Improvement Project, we reviewed documents related to the project's costs and schedules. These documents, obtained from Amtrak, the Federal Railroad Administration (FRA), and others, included spending plans, progress reports, and correspondence between Amtrak and FRA on the status of the project and related issues. With the assistance of Amtrak, commuter rail agencies, the Connecticut and Rhode Island Departments of Transportation, CSX Transportation Inc., and the Providence and Worchester Railroad, we also determined the status of the Northeast High-Speed Rail Improvement Project's work elements as of March 2003. These work elements appeared in FRA's July 1994 master plan for the project. The information we compiled included, for each work element, the completion status, the actual or expected completion date, and the location of the work to be completed. Additionally, with the assistance of Amtrak, commuter rail agencies, the Connecticut and Rhode Island Departments of Transportation, and the freight railroads using the Northeast Corridor between Boston and New York City, we determined the amount of federal, state, and local funds spent on the Northeast High-Speed Rail Improvement Project through March 2003. To assess the reliability of the financial information obtained from Amtrak, commuter railroads, and others, we compared the financial data with original cost estimates and, to the extent feasible and appropriate, with contract documents. We found no obvious errors of completion or accuracy. In addition, we had extensive discussions with Amtrak and commuter railroad officials about project finances and our use of the financial data. Since the information was primarily used to illustrate the magnitude of changes in project and project component costs, we believe the data were sufficiently reliable for use in this report.

To address Amtrak's management of the Northeast High-Speed Rail Improvement Project, we reviewed applicable law related to this project and to the Northeast Corridor Improvement Project, as well as the legislative history of certain changes to the high-speed rail project. We also reviewed documents showing how the project was organized and managed, including project management schedules, information on the electrification and train acquisition contracts, and quarterly status reports. We also reviewed memorandums, letters, and other information about cost and schedule issues, including an Amtrak-acquired assessment of cost and schedule issues related to its acquisition of the high-speed trains. Finally, we discussed the project's management and implementation with Amtrak, FRA, commuter rail agencies, and other officials. We did not evaluate how, if at all, alternative structures for providing intercity passenger rail could

affect the potential management of future large-scale infrastructure projects.

To address the federal government's oversight of the Northeast High-Speed Rail Improvement Project, we reviewed FRA's legislative and regulatory authority in relation to railroads, and to Amtrak in particular. We also reviewed the October 1985 grant agreement between FRA and Amtrak (and its subsequent amendments) to identify oversight and reporting requirements related to the Northeast Corridor Improvement Project and to the Northeast High-Speed Rail Improvement Project. Finally, we reviewed information about FTA's project management oversight program, including the applicable law establishing the program and how it is funded. We also reviewed previous GAO reports discussing the program, its implementation, and the benefits attributable to it. We discussed with Amtrak, FRA, and Inspector General officials from the U.S. Department of Transportation the oversight of the Northeast High-Speed Rail Improvement Project and how this oversight was conducted. Our discussions with FRA officials covered their role in the Northeast High-Speed Rail Improvement Project, their legal authority to oversee the project, how they exercised the oversight of the project, how oversight of the project changed after Amtrak assumed responsibility for improvements on the Northeast Corridor in October 1985, and FRA's current authority and ability to oversee major passenger rail infrastructure projects.

To address the use of best practices as a framework for the management of large-scale passenger rail infrastructure projects, we conducted a literature search to identify best practices related to infrastructure management. The literature included previous GAO reports and guidelines on best practices related to the acquisition and management of capital assets. It also included publications from the Office of Management and Budget (OMB), the Federal Highway Administration (FHWA), and the Federal Transit Administration (FTA) addressing best practices and infrastructure project management issues. From this literature search, we compiled a list of best practices related to the management of large-scale infrastructure projects. We also discussed infrastructure management best practices with Amtrak, FRA, FHWA, FTA, and commuter rail officials. The Amtrak officials included managers and others associated with the Northeast High-Speed Rail Improvement Project. Finally, we discussed infrastructure management best practices with officials from four Class I freight railroads and the Alameda Corridor project in Los Angeles. We then synthesized this information into the best practices framework presented in this report.

We do not believe that our review of Amtrak's overall project management was materially or negatively affected by ongoing investigations and litigation. In November 2001, one of the contractors manufacturing the Acela Express trains (Bombardier) filed suit against Amtrak in the United States District Court for the District of Columbia seeking damages for, among other things, Amtrak's alleged interference with the manufacture of the equipment. In November 2002, Amtrak filed a countersuit against the manufacturers alleging, among other things, breach of contract. As of February 2004, these suits were still pending. In addition, Amtrak officials indicated that the Department of Justice and the U.S. Attorney's Office were conducting investigations related to the contract for electrification work done under the Northeast High-Speed Rail Improvement Project. As of February 2004, these investigations were also still pending. Nothing in this report is intended to have any impact on the outcome of these suits or investigations, and this work was not performed in relation to either the suits or the investigations.

Subsequent to completion of our audit work, and in response to Amtrak's October 2003 comments made on a draft of our report that, because of its concerns about the litigation, it had withheld critical documents during our work, Amtrak made available to us additional material related to their management of the Northeast High-Speed Rail Improvement Project. This included, among other things, monthly progress reports and quality manuals that were used for the electrification work and high-speed train acquisition, selected minutes from Amtrak Board of Directors meetings, and project schedules that were used to track the progress of various project components. We reviewed this material at both Amtrak's High-Speed Trainset office in Philadelphia and at Amtrak's headquarters in Washington, D.C. We also interviewed a former manager of the Northeast High-Speed Rail Improvement Project who had not previously been available to us. We discussed with this individual Amtrak's management of the project. We used this additional information to further assess Amtrak's management of the Northeast High-Speed Rail Improvement Project, the effectiveness of this management, and the extent to which Amtrak involved stakeholders in project management.

We conducted our work from November 2002 through February 2004 in accordance with generally accepted government auditing standards.

Northeast Corridor High-Speed Rail Improvement Project Work Elements, by Category and Status as of March 2003

Category	Work element	Status
Trip-time reduction (Work elements either contributing directly to lowering trip time or permitting higher speeds.)	Realign curves	Incomplete
	Reconfigure Shell interlocking	Incomplete
	Stamford, Conn. station center island platforms	Incomplete
	Reconfigure New Haven, Conn., terminal area	Complete
	Reconfigure Old Saybrook, Conn., station	Incomplete
	Track program (installation of concrete ties, track resurfacing/relining, ballast cleaning)	Complete
	Replace miter rails	Incomplete
	Canton Viaduct clearance improvements	Complete
	Install 25kV 60Hz center-fed system	Incomplete
	Provide clearance for electrification	Complete
	Noise and vibration mitigation program	Incomplete
	Install signal system compatible with electrification	Complete
	Extend centralized electrification and traffic control from New Haven to Providence	Complete
	Install positive stop/civil speed enforcement system	Incomplete
	Route 128 improvements	Complete
	Kingston, R.I., station intermodal transportation facility	Incomplete
	Construct Amtrak New Haven service facility	Complete
	Procure Amtrak high-speed trains	Incomplete
	Grade crossing elimination program	Incomplete
	Install approach warning signs and bells	Complete

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Category	Work element	Status
Capacity enhancement (Work elements providing additional capacity to preserve the 3-hour trip time while accommodating higher intercity, commuter, and freight train frequencies.)	Penn Station—extend platform 11 (tracks 20 and 21) and 5x switch connection	Complete
	Reconfigure Harold interlocking	Incomplete[a]
	South station capacity improvements	Incomplete
	Reinstall Devon, Conn., to New Haven fourth track	Incomplete
	Construct Shore Line East passing sidings	Incomplete
	Construct New London, Conn., to Providence, R.I., passing sidings	Incomplete
	Construct Providence to Boston passing sidings	Incomplete
	Shore Line East both sides fully accessible stations	Incomplete
	Provide third track for freight service	Incomplete
	Reconfigure existing interlockings	Incomplete
	Install high-speed universal interlockings	Complete
	Install gauntlet tracks	Incomplete
	Install new interlockings	Unknown
	Canton Junction, Mass., to Boston signal modifications	Complete
	Construct high level platforms	Incomplete
	Construct Amtrak Boston service facility	Complete
	Amtrak medium and heavy overhaul facility	Unknown
	Modify onboard cab signal equipment	Unknown
Recapitalization (Work elements to reconstruct or extend the useful life of the railroad's physical assets or to comply with up-to-date building codes.)	Pelham Bay Bridge replacement	Unknown
	Walk Bridge/Saga Bridge replacement	Incomplete
	Peck Bridge replacement	Complete
	Niantic Bridge replacement	Incomplete
	Groton Bridge replacement	Incomplete
	Convert open deck bridges	Complete
	Replace deteriorated bridges and culverts	Incomplete
	Replace/upgrade overhead bridges in Rhode Island	Complete
	Hellgate Line hanging beam removal	Incomplete
	New Haven Line substation replacement	Incomplete
	New Haven Line catenary replacement	Incomplete
	Commuter equipment testing	Unknown
	Fence selected sensitive areas	Complete
	Penn Station fire, life safety improvements	Incomplete
	Step and touch traction return mitigation	Complete

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Category	Work element	Status
Other work elements (Work elements planned by participating organizations in addition to those in the above categories.)	Reconfigure Kingston station	Unknown
	Construct direct connection to Middleboro, Mass., secondary	Unknown
	Maintenance and operating costs allocation study	Incomplete
	Freight clearance improvements	Incomplete
	New Haven Line go/no-go signal improvements	Complete
	Install New Haven Line fiber optics system	Incomplete
	Install public address system	Incomplete
	Construct pedestrian bridges	Incomplete
	Shore Line East South Side station relocations	Incomplete
	Provide improved intercity and commuter parking	Incomplete
	Provide key station Americans with Disabilities Act access	Incomplete
	Construct Amtrak station improvements	Incomplete
	Construct Davisville, R.I., layover facility	Unknown
	Construct Readville, Mass., layover facility	Unknown
	Construct New Haven Line and Shore Line East New Haven car storage yard/New Haven Yard modifications	Incomplete
	Construct Providence layover facility	Incomplete
	Construct Connecticut Department of Transportation New Haven shop	Complete
	Extend Shore Line East from Old Saybrook to New London	Complete
	Add Rhode Island Department of Transportation Kingston to Providence service	Unknown

Source: GAO analysis of Amtrak, FRA, and commuter railroad data.

[a]According to Long Island Rail Road officials, this work element has been absorbed into another project.

Methodology Used to Develop a Framework of Best Practices for Managing Intercity Passenger Rail Infrastructure Projects

This appendix discusses our development of a best practices framework for the management of large-scale infrastructure projects, including how we defined and classified best practices, what reports and organizations we consulted, and what limitations apply to our framework.

Definition and Classification of Best Practices

We defined best practices as those "practices successfully implemented by organizations recognized for their outstanding capital decision-making practices."[1] Best, or leading, practices can provide a beneficial model for other organizations to use to improve efficiency and performance. In this case, best practices form a framework to boost efficiency and performance when managing large-scale infrastructure projects.

We identified 28 best practices related to project management and grouped these 28 best practices into five umbrella categories to create a framework. (See table 2.) These umbrella categories include (1) conducting comprehensive project planning, (2) assessing risks and identifying mitigation measures, (3) comprehensively managing project financing, (4) establishing accountability and oversight, and (5) incorporating the diverse interests of stakeholders.

Table 3: Best Practices, by Framework Category

Conduct comprehensive project planning
Prepare written, comprehensive, long-term plan
Good data and information systems, in addition to effective information control systems, are essential to supporting sound capital planning and decision making
Establish goals; goals should be written, clear, and detailed
Establish project master schedule; set milestones and implementation dates
Project plan—a flexible and dynamic document that is reviewed and updated throughout project
Project plan is used to manage and control project implementation; plan includes performance measurement baselines for scheduling and cost, major milestones, target dates, and risks associated with the project

[1]See GAO/AIMD-99-32.

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Conduct risk assessments
Conduct risk analysis and manage risks through mitigation measures
Assess risks regarding schedule, cost, feasibility, and project failure
Determine how risk affects the technical, legal, political, social, and financial aspects of the project from beginning to completion
Conduct comprehensive financial management
Cost controls—techniques to restrain actual costs within the limits of the project budgets while satisfactorily accomplishing project objectives (critical during construction)
Consider full life-cycle costs of projects
Develop good, firm, reasonable, realistic cost estimates; maintain cost baselines
Incremental funding may result in project cancellation, schedule slippage, and rising costs; balance budgetary control and managerial flexibility when funding capital projects
Allow for inflation in multiyear projects; include all costs in year of expenditures
Encourage accountability and oversight
Adhere to planned budgets
Follow planned schedules with minimal revisions
Measure actual costs and schedules against those in project plan baseline; investigate deviations
Strengthen accountability for achieving goals
Can break up and fund project in separate phases; funding not guaranteed from one phase to the next (separate funding for planning)
Key management group functions as a single point-of-contact, and is responsible for project accomplishment
Establish incentives for accountability—tie performance to pay and personnel decisions
Hold project managers accountable for meeting cost, schedule, and performance goals
Monitor project performance against goals (cost and schedule)
Conduct independent assessments and/or reviews
Require reporting to external organizations
Incorporate stakeholder interests
Involve federal, state, local, interest groups, 3rd party service providers, public, and other stakeholders in strategic planning
Conduct public and community outreach, to include community wishes; satisfy objections; account for quality of life issues
Communicate frequently with stakeholders

Source: GAO.

Literature Reviewed and Organizations Contacted to Identify Best Practices

To identify the 28 best practices, we reviewed literature on, and interviewed organizations involved in, the management of large-scale infrastructure projects. This literature included previous GAO reports on or related to best practices; documents from OMB, FTA, and FHWA. We primarily relied on our 1998 *Executive Guide: Leading Practices in Capital Decision-Making* as a base for the framework.[2] We supplemented this literature with material from FTA's *Project and Construction Management Guidelines*, OMB's *Capital Programming Guide*, and other sources.[3]

We also interviewed representatives of the following organizations to substantiate our selection of the best practices identified in the literature:

- Alameda Corridor Transportation Authority,
- Burlington Northern and Santa Fe Railway Company,
- Connecticut Department of Transportation,
- CSX Corporation,
- Federal Highway Administration,
- Federal Railroad Administration,
- Federal Transit Administration,
- Long Island Rail Road,
- Massachusetts Bay Transportation Authority,
- Norfolk Southern Corporation,

[2]See GAO/AIMD-99-32.

[3]U.S. Department of Transportation, Federal Transit Administration, EG&G Dynatrend Inc., *Project and Construction Management Guidelines*, *1996 Update* (Wellesley, Mass.: June 1996). Office of Management and Budget, *Capital Programming Guide Version 1.0*, Office of Management and Budget (Washington, D.C.: July 1997).

- Providence and Worchester Railroad,
- Rhode Island Department of Transportation, and
- Union Pacific Railroad.

Limitations

Our report highlights the best practices we identified through our review of federal agency reports and interviews. As such, it is not intended to suggest that the identified best practices are the only methods for managing large-scale intercity passenger rail infrastructure projects or that other management methods are flawed. In addition, our best practices framework is not meant to be all-inclusive. There may be other best practices that would also be applicable to the management of large-scale infrastructure projects. Finally, difficulties in managing the Northeast High-Speed Rail Improvement Project may have arisen even when best practices were used. Best practices serve as a useful framework for effectively managing large-scale intercity passenger rail infrastructure projects, but they are not meant to cover every aspect of project management and may not address all problems or difficulties that organizations encounter during project management.

Brief History of the Northeast Corridor and Northeast High-Speed Rail Improvement Projects

Although interest in improving passenger rail service on the Northeast Corridor dates to the 1960s, it was the Railroad Revitalization and Regulatory Reform Act of 1976 (4R Act) that formally established the Northeast Corridor Improvement Project (NECIP)—a program of infrastructure improvements designed to enable high-speed passenger rail service between Boston and Washington, D.C. Among other things, the 4R Act established certain goals for NECIP and authorized Amtrak to make necessary improvements in its rights-of-way between Boston and Washington, D.C., to enable high-speed rail service. In particular, by 1981, Amtrak was to have achieved regularly scheduled and dependable intercity passenger rail service between Boston and New York City (called the "north-end" of the Northeast Corridor) in 3 hours 40 minutes, and between New York City and Washington, D.C. (called the "south-end" of the Northeast Corridor), in 2 hours 40 minutes. The act further directed the Secretary of Transportation to determine the practicability of establishing regularly scheduled and dependable passenger rail service between Boston and New York City in 3 hours, and between New York City and Washington, D.C., in 2 hours 30 minutes. The 4R Act authorized $1.75 billion to accomplish these goals. Congress appropriated about $1.5 billion for fiscal years 1976 to 1980.

FRA initially managed NECIP and developed a program of improvements that included rehabilitating and upgrading the line between Boston and Washington, D.C.; electrifying the line between Boston and New Haven, Connecticut; and rehabilitating and upgrading the track electrification system between New York City and Washington, D.C. It also included repairing, rehabilitating, or replacing bridges; eliminating most railroad-highway grade crossings; and improving stations. Amtrak was a subcontractor to FRA and was primarily responsible for track and signal work. The project was to be substantially completed by 1981.

The project began to experience problems early. In a February 1978 report to Congress, the U.S. Department of Transportation (DOT) concluded that because of funding problems and a need to better coordinate elements of the project with various users of the Northeast Corridor (such as commuter and freight railroads), it was not likely that NECIP would be completed by 1981 and that additional investment in infrastructure improvements and passenger rail equipment would be required to achieve a 3-hour trip

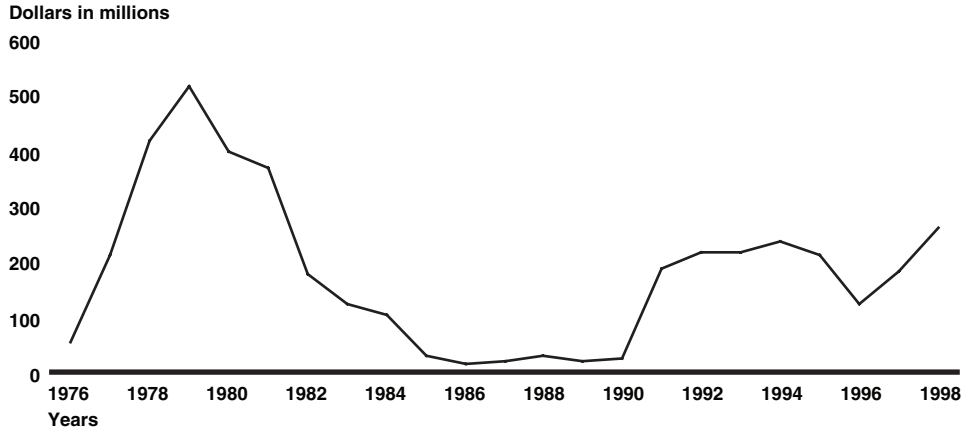
between Boston and New York City.[1] In January 1979, DOT further stated not only that the project had been inadequately planned, but also that another $750 million would be needed to complete the project (for a total of $2.5 billion). Completion would be delayed until at least 1983.[2] In May 1980, the Passenger Railroad Rebuilding Act of 1980 authorized an additional $750 million for NECIP. It also required FRA to transfer responsibility for the project to Amtrak by October 1, 1985. The project's legislative history suggests that Congress was concerned about the project's schedule delays and growing costs. Congress was also interested in seeing the project completed by the transfer date.

Funding difficulties during the 1980s led to changes in the project. (See fig. 7 for NECIP appropriations.) By January 1982, because of federal budget constraints, plans for the project had largely eliminated the construction of many larger-cost items, such as electrifying the line between New Haven and Boston. According to a former NECIP project director, these changes also resulted from a desire by the federal government to hold the project's cost escalation to predetermined levels.

[1]U.S. Department of Transportation, *Two-Year Report on the Northeast Corridor* (February 1978).

[2]U.S. Department of Transportation, *Northeast Corridor Improvement Project, Redirection Study* (January 1979).

Figure 7: NECIP Appropriations, Fiscal Years 1976 to 1998



Source: FRA.

Note: In fiscal year 1998 direct appropriations for NECIP ended. However, after fiscal year 1998 funding for the project was obtained from other sources, including the Taxpayer Relief Act of 1997.

When FRA transferred NECIP to Amtrak in October 1985, FRA officials generally considered the project complete in that additional funding for remaining major work elements was not envisioned.[3] A total of about $1.2 billion (out of the $2.5 billion authorized) had been spent on the project at the time of transfer. Although NECIP achieved significant improvements to the Northeast Corridor's infrastructure and met some goals of the 4R Act, such as reducing the travel time between New York City and Washington, D.C., to 2 hours 40 minutes, it failed to achieve other goals, such as reducing the travel time between Boston and New York City to 3 hours 40 minutes.[4] FRA primarily attributed this shortcoming to a lack of funds for electrifying the line from New Haven to Boston. Both FRA and Amtrak officials told us that NECIP had largely focused work on the south-end of the Northeast Corridor, not the north-end, because of significant

[3]Although NECIP was considered generally complete at the time of transfer, there were still a number of items, such as signal installation and construction of service facilities, to be finished. These were estimated to cost about $187 million. As part of the grant agreement, FRA required Amtrak to complete the construction of all elements of NECIP by September 1988.

[4]In November 1986, FRA reported that the trip time between Boston and New York City was 3 hours 57 minutes. See U.S. Department of Transportation, *Northeast Corridor: Achievement and Potential* (November 1986).

deterioration of the infrastructure on the south-end resulting from years of deferred maintenance and neglect. In November 1986, DOT reported that when Congress authorized and funded NECIP in 1976, the Northeast Corridor had literally begun to disintegrate at both its northern and southern ends.[5]

Between 1985 and 1990, funding for NECIP decreased sharply. During this time, appropriations for the project averaged about $21 million per year, compared with about $250 million annually during fiscal years 1976 through 1984. As the result of efforts by various organizations in the mid- and late 1980s, including the Coalition of Northeast Governors,[6] interest again rose in high-speed passenger rail service between New York City and Boston, because of its potential to mitigate increasing highway and air congestion, as well as air pollution levels. These efforts culminated in the 1992 Amtrak Authorization and Development Act. The act required the Secretary of Transportation to develop a master plan for a coordinated program of improvements that would result in regularly scheduled, safe, and dependable passenger rail service between Boston and New York City in 3 hours or less. A total of $470 million was authorized for fiscal years 1993 and 1994 to plan this effort and make capital investments. Congress actually appropriated $429 million. Amtrak established the Northeast High-Speed Rail Improvement Project to implement this act.

In July 1994, FRA issued the master plan for the high-speed rail project required by the Amtrak Authorization and Development Act.[7] The plan established three milestones for the project: (1) initiate electrified train service between Boston and New York City, (2) initiate 3-hour train service between these cities, and (3) complete the infrastructure improvements designed to enhance track capacity and extend the useful life of existing assets. FRA identified 72 work elements to achieve these milestones. These work elements related to three main categories—trip-time improvement, capacity enhancement, and recapitalization of the infrastructure. The trip-time improvements, which included electrifying the line between Boston

[5]See U.S. Department of Transportation (1986).

[6]The Coalition of Northeast Governors is a nonprofit organization formed to facilitate communication between the governors of states in the Northeast. It conducts studies of various issues, including transportation. The states represented are those in the Northeast, from New Jersey to Maine.

[7]U.S. Department of Transportation (1994).

and New Haven and acquiring high-speed trains, were intended to either directly lower trip times or increase trains' operating speeds. The capacity enhancements, such as reconfiguring "interlockings" (where trains can switch from one track to another track), were intended to maintain the 3-hour trip time while accommodating the increased train traffic planned by Amtrak and other users of the Northeast Corridor. The recapitalization improvements, such as replacing various bridges, were intended to rebuild or extend the useful life of the Northeast Corridor.

FRA's plan estimated that the total cost of the trip time, capacity, and recapitalization improvements would be about $3.1 billion (in constant 1993 dollars) and that the project would be completed by January 1, 2010. Electrification was to be completed by the fall of 1997, and there was to be full 3-hour service between Boston and New York City in 2001. The plan assumed adequate funding from the federal government and users of the Northeast Corridor (such as commuter railroads), as well as close coordination of the project's work elements between Amtrak and various stakeholders, such as states, transportation agencies, and commuter railroads. Coordination with stakeholders was particularly important, since (1) Amtrak did not own various sections of the north-end of the Northeast Corridor, including the sections between New Haven, Connecticut, and New Rochelle, New York, and between Boston and the Massachusetts/Rhode Island state line, and (2) there was significant commuter railroad traffic on the north-end of the corridor.

Amtrak was the manager of the Northeast High-Speed Rail Improvement Project and began work using both contractors and its own workforce. It relied on contractors primarily to electrify the line and manufacture the high-speed trains. Amtrak used its own workforce to perform infrastructure work, such as track improvements and signal work. Amtrak initiated electrified service in January 2000, even though the electrification work was not substantially completed until July 2000.[8] High-speed rail service was initiated in December 2000. Through March 2003, a total of about $3.2 billion had been spent—about $2.6 billion by Amtrak and an additional $625 million by commuter rail agencies and state governments.

[8]According to Amtrak, as of March 2003, the electrification work had not yet been fully completed, since the corporation had not yet accepted the work and certified it as complete. In addition, there were a number of contract claims that had been filed but not yet settled.

Selected Sources of Best Practices for Managing Large-Scale Infrastructure Projects

GAO Products

Federal-Aid Highways: Cost and Oversight of Major Highway and Bridge Projects—Issues and Options. GAO-03-764T. Washington, D.C.: May 8, 2003.

Mass Transit: Many Management Successes at WMATA, but Capital Planning Could Be Enhanced. GAO-01-744. Washington, D.C.: July 2, 2001.

Executive Guide: Leading Practices in Capital Decision-Making. GAO/AIMD-99-32. Washington, D.C.: December 1998.

Non-GAO Products

U.S. Department of Transportation, Federal Highway Administration. *FHWA Major Projects–Resource Manual for Oversight Managers*. Washington, D.C.: January 2002. http://www.fhwa.dot.gov/programadmin/mega/mega.htm (viewed 5/19/03).

U.S. Department of Transportation, Federal Highway Administration. *FHWA Guidance–Financial Plans*. Washington, D.C.: May 2000. http://www.fhwa.dot.gov/programadmin/contracts/fpgatt.htm (viewed 5/19/03).

Office of Management and Budget. *Capital Programming Guide Version 1.0, Supplement to Circular A-11, Part 3: Planning, Budgeting, and Acquisition of Capital Assets*. Washington, D.C.: July 1997.

U.S. Department of Transportation, Federal Transit Administration. EG&G Dynatrend Inc., *Project and Construction Management Guidelines, 1996 Update*. Wellesley, Mass.: June 1996.

Comments from the National Railroad Passenger Corporation

NATIONAL RAILROAD PASSENGER CORPORATION
60 Massachusetts Avenue, NE, Washington, DC 20002
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David L. Gunn
President and Chief Executive Officer

February 12, 2004

Ms. JayEtta Z. Hecker
Director
Physical Infrastructure Team
United States General Accounting Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Hecker:

Amtrak appreciates the opportunity to review GAO's Report on the management of Northeast High-Speed Rail Improvement Projects ("Northeast Projects"). These Projects represented an important first step in this country in the development and implementation of high-speed corridor service. Clearly, the success of future projects like this will depend on appropriate levels of funding, accountable project management and oversight, and comprehensive yet flexible project planning.

Upon my arrival as President and Chief Executive Officer of Amtrak in May of 2002, I immediately restructured Amtrak's management and budget processes. It was my belief that the Company had lost focus in a number of critical areas including management of Capital projects. We have gotten control of our budget and we have streamlined the organization – reducing duplication and establishing clear lines of authority and accountability. Our recently published Five-Year Strategic Plan is based on accountable project management and comprehensive budget-based financial controls.

The comments in the Report regarding Amtrak's management of the Northeast Projects, which spanned nearly a ten-year period, raise many of the same issues that I have had to address during my brief tenure at Amtrak. Indeed, on a regular basis, I deal with many of the consequences of decisions made during the life of these Projects. It is safe to say that I would have handled certain issues differently, but it would be unfair of me to comment, with the benefit of hindsight, on specific historical decisions. I would make two general observations, however.

1. It is clear that the Northeast Projects suffered, especially during the early critical years, from a lack of certain and dependable federal funding. The amount of financial support from year-to-year was inconsistent; in some years, funding was earmarked for specific projects, while in other years the funding was in the form of a general capital appropriation. Though I doubt that the

nation will undertake soon another rail development project of the size and complexity of the Northeast Projects, the success of any future project will require certain and dependable federal financial support. Effective project planning and financial accountability is extremely difficult to achieve if the amount of and uses for financial support is uncertain from year-to-year. With regard to the Master Plan repeatedly referenced in your Report, it appears to have been more of a wish list than a plan. Amtrak apparently did not use it as a planning tool for the Northeast Projects and we have not used it in developing our current Strategic Plan applicable to Northeast Corridor infrastructure improvements. Our current plan to bring the Northeast Corridor to a state of good repair is, in fact, far more detailed than the Master Plan.

2. I note the Report recommendations regarding adoption of best practices for future projects. These practices strike me as common sense approaches to sound project management and financial accountability. While Amtrak does not currently have any projects of the magnitude of the Northeast Projects, we have incorporated, as appropriate, many of these practices as part of the management restructuring, project accountability and budget-based financial reporting changes that I have implemented since my arrival in May 2002. Amtrak's management of the Fire and Life Safety Tunnel Project in New York and the Oakland Maintenance Facility in California are examples of projects on which some of these changes are being implemented.

We have also enclosed additional general comments to the Report and we would appreciate their inclusion in the Report.

Sincerely,

David L. Gunn
President and Chief Executive Officer

Enclosures

Comments of the National Railroad Passenger Corporation on the GAO's Report to the Chairman, Committee on Commerce, Science, and Transportation, U. S. Senate concerning Amtrak's Management of Northeast Corridor Improvements

1. GAO's investigation of Amtrak's management of High Speed Rail Improvement Projects focused on three components: 1) Amtrak's acquisition of high speed electric trainsets and locomotives ("Trainset Acquisition Project"); 2) electrification of the Northeast corridor between New Haven and Boston ("Northend Electrification Project"); and 3) other infrastructure improvements to the Northeast Corridor between New York City and Boston. GAO was informed by Amtrak at the beginning of the investigation that with respect to the Trainset Acquisition and Northend Electrification Projects – the two most significant components of Amtrak's high speed program in terms of budget (together, these Projects represent approximately two-thirds of the funds expended to date by Amtrak on its high-speed rail program) and scope – – Amtrak was involved in complex and extended litigation with the contractors for these Projects involving potentially millions of dollars of losses and damages. The GAO assured Amtrak that it did not intend to affect the course or result of the litigation and for the most part it successfully steered clear of issues relevant to the litigation during the course of the investigation.

   Because of this ongoing litigation involving the Northend Electrification and Trainset Acquisition Projects, Amtrak is not in a position to provide specific comments with respect to the Report's findings and conclusions as such may be impacted by the specific allegations in these cases. However, Amtrak's inability to comment should not be considered agreement by Amtrak that the Report is factually accurate or complete, or that the GAO's investigation of these matters and release of the Report, at this time, are appropriate.

   In general, Amtrak would note that issues related to project management, costs, schedule and utilization of best practices are directly related to allegations raised in the litigation of these Projects. This information is essential to understanding Amtrak's management of high-speed projects in general. The GAO did not consider in its Report how the actions of the contractors for these Projects affected Amtrak's management of these Projects and its overall program. For instance, the contractor for the Northend Electrification Project is currently being investigated by the United States Department of Justice ("DOJ") for possible civil and criminal fraud violations in connection with their handling of that Project. Given the working relationship between Amtrak and the contractor on this very important Project, the outcome of DOJ's investigation would most certainly impact a determination of whether the scheduling, budget and other aspects of Amtrak's management of the Project were appropriate. Accordingly, the GAO's investigation of Amtrak's management of these Projects and its high-

speed program was limited, and Amtrak believes that the findings of fact and conclusions of the Report are necessarily incomplete.

2. The Report's reliance on the FRA Master Plan as the key source document to establish criteria for costs and schedules for measuring Amtrak's management of work elements included in that Plan is misplaced. Amtrak did not specifically adopt the Plan or manage its high-speed projects in accordance with it. The GAO acknowledges this fact in its Report yet insists nonetheless in measuring Amtrak's performance against the Plan. By 1994, when the Plan was released, Amtrak's high-speed work program was already fully underway. In fact, by that time, Amtrak was already in the process of replacing its initial electrification contractor and the Environmental Impact Statement for the Northend Electrification Project, which ultimately identified a number of new mitigation projects, was in process.

   The FRA's Master Plan essentially amounted to a collection and integration of wish lists of potential projects identified by Amtrak, the FRA and the commuter authorities for ways to address deferred maintenance of the rail line, reduce trip time and improve reliability as the commuter and intercity service increased. The Plan predates any serious or in-depth engineering of the identified projects or any environmental reviews. Indeed, a number of the projects either proved inappropriate, not capable of implementation, or environmentally unjustified once further examined. The Master Plan does not attempt to prioritize the work or fully define the scope of any of the projects. Some of the improvements were, in fact, included in Amtrak's work program, only to be deleted at a later date due to cost – e.g., replacement of the Thames and Niantic River bridges. Other work continues to this day – e.g., Amtrak has an extensive program under way with Metro North and the State of Connecticut to continue the curve modification program and implement the Shell interlocking improvements. Because none of the complexities of this work was ever considered in the Master Plan, it does not represent an accurate cost estimate or work schedule for the various projects.

   Finally, GAO's focus on the Master Plan as the exclusive measuring stick for evaluating progress on high-speed projects fails to take into account the dynamic nature of the overall program in particular as it relates to the initial 3-hour trip time goal between Boston and New York and the comparative costs and benefits associated with the various additional infrastructure projects necessary to achieve that goal. By as early as 1995, it was assumed that the 3-hour trip time could only be achieved using a non-stop high-speed train between Boston and New York. Regularly scheduled service with intermediate stops was planned for 3' 10". Amtrak's current schedule is approximately 15 minutes off that revised goal with elimination of this time possible once ACSES is fully implemented and other track improvements in Metro-North and ConnDot territory are completed. It is unclear if the costs of other infrastructure improvements necessary to further reduce the trip-time an

additional 10 minutes (to a true 3-hour service) would be financially justified by the net ridership increase resulting from such a trip-time reduction. The Report fails to adequately account for this change in trip-time goal and the effect it may have had on Amtrak's management of high-speed projects.

3. The Report fails to note that Amtrak's leadership and resultant management philosophy and practices related to rail infrastructure projects have changed since May 2002; and that many of the "best practices" listed in the Report were followed during Amtrak's management of high-speed improvement projects and many more are being implemented on a systematic basis under current management.

4. The Report's conclusions that Amtrak did not fully integrate stakeholder interests and that it did the work required to accommodate high-speed trains and reduce trip times but did little to focus on capacity enhancements are an underserved criticism of Amtrak's management of its high-speed rail program. Amtrak held countless meetings with dozens of stakeholders of often competing interests along the Northeast Corridor. Amtrak entered into numerous agreements with stakeholders that specified the parties' respective obligations and rights with respect to many of the projects identified in the FRA's Master Schedule and many projects that were not identified (copies of these agreements were provided to GAO). In addition, the GAO's Report fails to note that many of the capacity related improvements listed in the Master Plan resulted from anticipated operation of 52 intercity trains per-day, a level that Amtrak does not plan to achieve. As a result, coordination of such projects with stakeholders proved unnecessary.

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