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Report to the Chairman, Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives

July 2005

INTERMODAL TRANSPORTATION

Potential Strategies Would Redefine Federal Role in Developing Airport Intermodal Capabilities

GAO-05-727

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Highlights

Highlights of GAO-05-727, a report to the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

With the number of airplane passengers using U.S. airports expected to grow to almost 1 billion by the year 2015, ground access to U.S. airports has become an important factor in the development of our nation's transportation networks. Increases in the number of passengers traveling to and from airports will place greater strains on our nation's airport access roads and airport capacity, which can have a number of negative economic and social effects. U.S. transportation policy has generally addressed these negative economic and social effects from the standpoint of individual transportation modes and local government involvement. However, European transportation policy is increasingly focusing on intermodal transportation as a possible means to address congestion without sacrificing economic growth.

This report addresses the development of intermodal capabilities at U.S. airports, including (1) the roles of different levels of government and the private sector; (2) the extent such facilities have been developed; (3) benefits, costs, and barriers to such development; and (4) strategies to improve these capabilities.

GAO provided a draft of this report to the Department of Transportation (DOT) and Amtrak. DOT generally concurred with the report, and Amtrak had no comments.

www.gao.gov/cgi-bin/getrpt?GAO-05-727.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Katherine Siggerud, (202) 512-2834, siggerudk@gao.gov.

What GAO Found

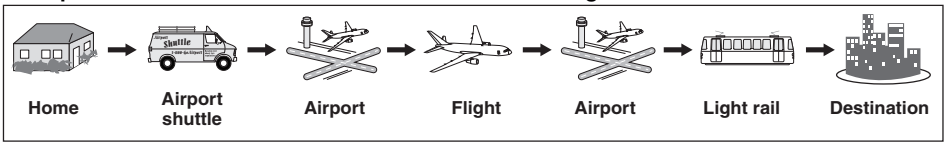
State and local government agencies have primary responsibility for developing intermodal capabilities at U.S. airports. Generally airports and local transit agencies are heavily involved, especially if these projects are part of a local transit system. The federal government has not established specific goals or funding programs to develop intermodal capabilities at airports. However, it provides funding for projects fitting the criteria of other programs. The private sector may undertake a variety of roles.

Most major U.S. airports have direct connections to local transit systems rather than to nationwide rail or bus systems. For example, 64 out of 72 airports have connections to local bus systems, and 27 airports have connections to local rail systems. At the same time, only 19 airports have connections to nationwide rail or bus systems. A number of airports have plans to enhance their connections to local rail and bus systems.

U.S. and European transportation officials and experts cited the benefits for intermodal capabilities at airports to include increased transportation options, reduced road congestion, and reduced short-haul flights. The costs of intermodal projects using rail are typically significant. Barriers cited include the difficulty of securing needed funding, disincentives for airport support such as potential reductions in airport parking revenue, geographical and physical land constraints, limitations of the existing nationwide rail network, and inconveniences in comparison to using cars that limit consumer demand.

Two differing strategies developed from our prior work would help public decision makers improve intermodal capabilities at airports. The first strategy would increase flexibility within current federal transportation programs to encourage a more systemwide approach to transportation planning and development. The second strategy would involve a fundamental shift in federal transportation policy's focus on local decision making by increasing the role of the federal government in order to develop more integrated air and rail networks and would be closer to the strategy followed in Europe. While the first strategy would most likely lead to a continued focus on the development of intermodal connections to local transit systems, the second strategy could develop more integrated air and rail networks, either nationwide or along particularly congested corridors. The second strategy would be costly, and high benefits, which would be difficult to achieve, would be needed to justify this investment.

Example of Intermodal Connections for an Airline Passenger



Source: GAO.

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Abbreviations

AIP	Airport Improvement Program
BART	Bay Area Rapid Transit
DOT	Department of Transportation
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
PFC	passenger facility charges
TEA-21	Transportation Equity Act for the 21st Century

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United States Government Accountability Office
Washington, D.C. 20548

July 26, 2005

The Honorable John L. Mica
Chairman
Subcommittee on Aviation
Committee on Transportation and Infrastructure
House of Representatives

Dear Mr. Chairman:

With the number of airplane passengers using U.S. airports expected to grow from over 688 million in 2004 to almost 1 billion by the year 2015, ground access to U.S. airports has become an important factor in the development of our nation's transportation networks. Since most travelers use cars, whether privately owned or taxis, to get to the airport, local cities and communities will face increased congestion on their airport access roads and highways. Moreover, increases in passenger air travel and the difficulty of building new airport capacity will place greater strains on our nation's airport runway and air space capacity. Increased road congestion and the strain on airport capacity can both have a number of negative economic and social effects, including wasting travelers' time and money, degrading air quality, slowing commerce, and increasing energy consumption. These effects are especially problematic in areas and transportation corridors that are already heavily congested.

While the U.S. passenger transportation system consists of a number of different transportation modes, including mass transit, roads, aviation, waterways, and railroads, U.S. transportation policy has generally addressed the negative economic and social effects of congestion from the standpoint of individual transportation modes and local government involvement. Compared to the United States, European transportation policy has increasingly focused on intermodal transportation—that is, a system that connects the separate transportation modes and allows a passenger to complete a journey using more than one mode. This focus has included improving the connections between airports and other transportation modes—particularly rail—as a possible means to address congestion and other issues without sacrificing economic growth. The European experience in this area might provide important lessons for the United States.

To determine how the mobility of the American public might be improved through enhanced rail, transit, and bus connections to airports and at what

costs, this report addresses the following questions: (1) What roles do federal, state, and local governments and the private sector play in developing intermodal capabilities at U.S. airports? (2) To what extent have intermodal services and facilities been developed at selected U.S. airports? (3) What benefits, costs, and barriers exist for developing additional intermodal capabilities at U.S. airports? and (4) What transportation strategies, including lessons learned from the European experience, may help public decisionmakers improve intermodal capabilities at U.S. airports?

Throughout this report, we defined intermodal transportation as direct connections for passengers traveling between airports and local public transit systems and nationwide rail and bus systems.[1] Because the ease of transfer between modes is critical to how likely passengers are to use a bus or rail system, we considered a direct connection to consist of a transfer point (such as a bus stop or rail station) that is accessible from airport terminals either by walking, an automated people mover, or direct shuttle.[2] To address the four questions, we obtained and analyzed information from a variety of sources. We surveyed all large and medium and selected small hub U.S. airports to obtain information on the extent intermodal services and facilities have been developed. These 72 airports accounted for approximately 90 percent of the enplanements for calendar year 2003. We conducted semi-structured interviews with key government transportation officials, airport officials, and private sector transportation representatives to obtain information for case studies of 16 U.S. airports located in the Los Angeles and San Francisco areas and San Jose, California; Miami, Florida; Baltimore, Maryland; Minneapolis/St. Paul, Minnesota; the New York City area; Portland, Oregon; Seattle, Washington; the Washington, D.C., area; and Milwaukee, Wisconsin. We also met with officials from the Federal Aviation Administration (FAA), the Federal Transit Administration (FTA), Amtrak, the Department of Transportation's (DOT) Office of Intermodalism, transportation experts, and industry associations. We interviewed officials from the European Union, France, Germany,

[1]Throughout this report, we define local agencies to include city, county, and multi-county (regional) agencies.

[2]More specifically, we considered a transfer point (such as a bus stop or rail station) to be a direct connection to the airport if: it was convenient for an average adult with luggage to walk to the transfer point from any of the airport's terminals; the airport had a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from the transfer point to any of the airport's terminals; or there was regular, fixed-route shuttle service from the transfer point to any of the airport's terminals.

Switzerland, and the Netherlands to obtain descriptive information on their airport-rail connections. In addition, we obtained and analyzed information from our past reports, as well as documents from DOT, the European Union, and research organizations. We conducted our work from July 2004 through July 2005 in accordance with generally accepted government auditing standards. Additional information on our scope and methodology appears in appendix I.

Results in Brief

State and local government agencies have primary responsibility for developing intermodal capabilities at U.S. airports while the federal government provides funding and oversight, and the private sector at times may undertake a variety of roles. Typically, one or more state or local transportation agencies (such as state departments of transportation, metropolitan planning organizations, and airport authorities) take the lead in developing an intermodal capability at an airport, which includes planning; securing funding from state, local, federal, or private sources; and arranging for the design and construction of the project. While the roles of each type of agency can vary, our research at 16 airports found that in most cases, airports are heavily involved in projects on airport property, local transit agencies are involved in projects that are part of a local transit system, and in certain cases, state departments of transportation or metropolitan planning organizations take leading roles. The federal government has not established specific goals or funding programs to develop intermodal capabilities at airports. However, it provides funding for these capabilities when they fit the criteria established for funding programs focused on surface transportation or aviation—including direct funding through grant programs and the approval of the collection and use of airport fees for some projects. In its oversight role, the federal government also ensures the compliance of intermodal capabilities with federal laws and regulations, including environmental requirements. The private sector's role varies and may include funding, project development under contractual agreement with state and local transportation agencies, and/or participating in the decision-making process during project planning.

Most major U.S. airports have some direct intermodal ground connections, but those connections are primarily to local bus or rail transportation systems rather than to nationwide bus or rail systems. For example, 64 out of 72 airports we surveyed reported having direct connections to local bus services, and 27 airports reported having direct connections to local rail systems. The level of convenience and access to these connections varies.

Thirteen airports reported that passengers could access a local rail station by walking or taking an automated people mover, while 22 reported that passengers could access the local rail station by shuttle. At the same time, while most of these airports are located in a metropolitan area with nationwide rail or bus service, such as Amtrak or Greyhound, only 13 airports have direct connections to an Amtrak station and 12 to nationwide bus stations. One airport reported that the Amtrak station could be accessed by an automated people mover, while the rest reported access only by shuttle. We also found that a number of airports have proposals and plans to improve their intermodal services, mostly by enhancing their connections to local rail and bus services.

Transportation and airport officials stated that the development of intermodal capabilities at airports can provide a range of benefits; however, they have not quantified these benefits through evaluations, and substantial costs and barriers to developing these capabilities also exist. Benefits cited for intermodal capabilities at airports include alternative transportation options for travelers—with the potential for reduced travel times and costs—and reduced road congestion with the potential for an associated reduction in vehicle emissions and improved air quality. Transportation industry experts and European transportation officials we interviewed also stated that airport connections to a nationwide rail system such as Amtrak can encourage passengers to use rail service instead of short-haul flights for a portion of their journey, which could potentially reduce the overall demand for short-haul flights and allow existing airport capacity to be used more efficiently. This situation has occurred in several cases in Europe, where some national governments have established policies to reduce the number of short-haul flights at their major airports and have supported these policies by funding high-speed rail infrastructure. The costs of intermodal projects vary widely, depending on the complexity and scope of the project. The costs of rail projects are typically substantial and can include costs to construct a station as well as track and other infrastructure to support the transit network. Almost all local transportation officials agreed that the most significant barrier to developing airport intermodal connections to rail transit is the difficulty of securing needed funding—including the competition for and difficulty of applying for limited federal grants, restrictions on the use of airport revenue, and the need to develop agreement about the project from a variety of local agencies with differing priorities. Other barriers mentioned include disincentives for airport support of intermodal projects such as the potential reduction in airport parking revenues and geographical and physical land constraints at airports that can make designing and constructing an intermodal capability

difficult. In addition, the existing nationwide rail network—Amtrak—does not support air-rail service requirements because rail lines do not go near some airports, passenger train schedules in some parts of the country are not frequent enough to effectively link to airline flight schedules, and transferring from air to rail poses inconveniences that limit consumer demand. Finally, planning along transportation corridors that cross multiple state and local boundaries can be challenging.

Two differing strategies, one of which incorporates lessons of the European experience, could help public decisionmakers improve intermodal capabilities at U.S. airports. Both of these strategies are based on a systematic framework that includes identifying national goals, defining the federal role, determining funding approaches, and evaluating performance. The first strategy would provide federal, state, and local transportation agencies with additional flexibility within current federal transportation programs to encourage a more systemwide approach to transportation planning and development. Alternative transportation funding approaches—such as performance-oriented funding and federal financial reward-based systems—could also be used to encourage the planning and development of intermodal capabilities. This strategy would maintain the focus on state and local government initiative and would most likely lead to a continued focus on the development of local intermodal connections rather than a fully integrated nationwide system. The second strategy would involve a fundamental shift in federal transportation policy's focus on state and local decisionmaking by increasing the role of the federal government in planning and funding intermodal projects in order to develop more integrated air and rail networks, either nationwide or along particularly congested corridors. This strategy would be closer to the intermodal development strategy followed by the European Union and several European countries, or to the strategy the federal government used to develop the interstate highway system. Such a strategy could increase intermodal options and American mobility through broad policy and funding changes, but in this time of fiscal constraints, the high cost of rail investments and the resulting high costs of this strategy would make it difficult to justify on a nationwide scale. Given the high costs of this strategy, benefits high enough to justify investment in intermodal facilities would be difficult to achieve, as demand for such services is likely to be low except in a few highly congested travel corridors. Moreover, high demand would be difficult to achieve. Due to the inconveniences of transferring from airplane to train or bus and other reasons including potentially higher travel times and out of pocket costs, many American travelers are likely to continue to prefer car travel over transit to access the

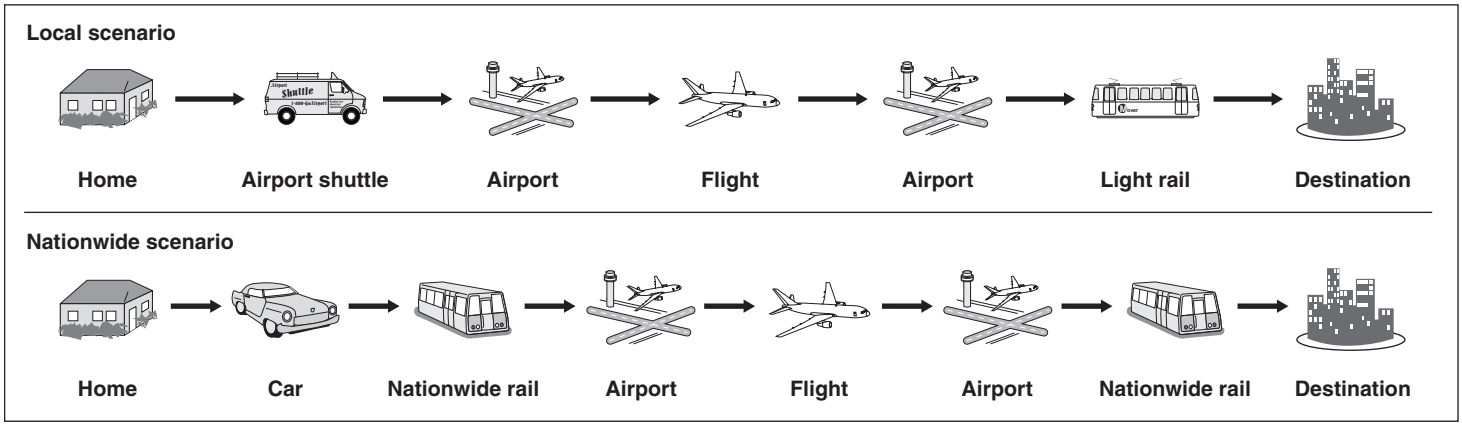
airport and short-haul flights over connections to a nationwide rail system as part of their overall journey. DOT generally concurred with our report and provided technical corrections, which we incorporated as appropriate. Amtrak had no comments on our report.

Background

The United States' passenger transportation system consists of a number of different modes, including mass transit systems, roads, aviation, waterways, and railroads—each of which plays a critical role in providing the American public with the mobility needed to sustain the nation's economic viability. Intermodal transportation refers to a system that connects the separate transportation modes and allows a passenger to complete a journey using more than one mode. An efficient intermodal capability provides a passenger with convenient, seamless transfer between modes; the ability to connect to an extended transportation network; and high frequency of service among the different modes. As shown in figure 1, an intermodal connection at an airport might involve a passenger arriving at the airport by private shuttle service, flying to another airport, and then transferring to local transit rail service[3] to reach a final destination. Opportunities also exist for using intermodal service to access nationwide transportation systems, such as Amtrak.

[3]Local transit rail includes commuter rail, light rail, subway systems, and trolleys.

Figure 1: Two Examples of Intermodal Connections for an Airline Passenger



Source: GAO.

While intermodal refers to the use of any two modes of transportation and therefore a trip that involves taking a private car or shuttle to the airport followed by air travel could be considered intermodal, for the purposes of this report, we are focusing on direct connections between airports and public bus and rail systems. Because the ease of transfer between modes is critical to how likely passengers are to use a bus or rail system, we considered a direct connection to consist of a transfer point (such as a bus stop or rail station) that is accessible from airport terminals either by walking, an automated people mover, or direct shuttle.[4]

Historically, federal transportation policy has focused almost exclusively on individual modes rather than intermodal connections. Federal transportation funding programs are overseen by different agencies within DOT—FAA oversees aviation, FTA transit, Federal Railroad Administration railways, and Federal Highway Administration (FHWA) highways—and no specific federal funding programs have been established that target intermodal projects for passengers at U.S. airports. In the United States, the

[4]More specifically, we considered a transfer point (such as a bus stop or rail station) to be a direct connection to the airport if: it was convenient for an average adult with luggage to walk to the transfer point from any of the airport's terminals; the airport had a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from the transfer point to any of the airport's terminals; or there was regular, fixed-route shuttle service from the transfer point to any of the airport's terminals.

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)[5] established an overall approach for surface transportation planning and decision making that gave local and state governments greater control over transportation decisions in their own regions than was done in the past. The act also viewed different transportation modes as part of a larger transportation network, but maintained separate funding for the individual modes. ISTEA established specific planning guidelines for metropolitan areas to prioritize the highway and transit needs of the entire region with the goal of promoting an integrated transportation system. The Transportation Equity Act for the 21st Century (TEA-21),[6] enacted in 1998, retained the basic policy and programs established by ISTEA and provided state and local governments the flexibility to use highway funds to support transit investments. DOT's Office of Intermodalism was established under ISTEA; however, this office deals mainly with intermodal freight issues and airports have had very limited involvement in that discussion.

Federal policy for aviation is established through other legislation. The planning and funding of U.S. airports is addressed under Vision 100-Century of Aviation Reauthorization Act.[7] This act authorizes funds for airport development and capital improvements, and while it does encourage the development of intermodal connections between airports and other local surface transportation systems, the primary focus of funding is on runway and terminal infrastructure. The planning for these projects is usually undertaken by airports, with no federal requirements for local and state surface transportation agency involvement as required by ISTEA and TEA-21.[8] The Rail Passenger Service Act of 1970 created Amtrak to provide nationwide passenger rail service, and the federal government

[5]P.L. 102-240 (1991).

[6]P.L. 105-178 (1998).

[7]P.L. 108-176 (2003).

[8]The FAA Airport Improvement Program Handbook provides guidance on coordination of intermodal airport projects. The FAA Airport Improvement Program Handbook states that federally funded airport access projects should be coordinated by the metropolitan planning organization and listed in its transportation improvement program. It also states that airports are encouraged to complete planning projects that are consistent with system forecasts, ground access and air quality studies, land use planning as well as other information, procedures, plans or policies. A provision in Vision 100 requires that large and medium hub airports provide metropolitan planning organizations, upon request, copies of proposed changes to airport layout plans or master plans showing certain projects (i.e., new runways and runway extensions).

has provided funding for both capital and operating expenditures to Amtrak. Amtrak operates a 22,000 mile passenger rail system, primarily over tracks owned by freight railroads.[9] As of January 2002, there were 10 federally designated high-speed rail corridors nationwide. These designated corridors are eligible for federal funds to upgrade rail infrastructure to support high-speed rail service, although most upgrades have not been completed and the amount of high-speed rail service in the United States remains limited.[10] The corridors are dispersed throughout the country and include service between some of the largest U.S. cities. For example, the Northeast Corridor provides service between Washington, D.C., New York, and Boston, and the Pacific Northwest Corridor provides service between Eugene, Oregon and Vancouver, Canada.

In comparison to U.S. transportation policy, European Union policy[11] and some European governments have focused on developing high-speed train service between major European cities as an alternative to air and car travel. This effort has also included developing intermodal ground connections between passenger high-speed rail systems and airports, an example of which is shown in figure 2.

[9]Amtrak owns about 650 miles of track, primarily on the Northeast Corridor between Boston, Massachusetts, and Washington, D.C.

[10]H.R. 1631 "The Rail Infrastructure Development and Expansion Act for the 21st Century" was introduced in April 2005 and would, among other things, authorize federal funds for a long-term rail infrastructure program to improve and expand our nation's rail infrastructure and develop a viable high-speed rail system.

[11]The European Union includes 25 countries that have reached agreement in certain policy areas, such as transportation policy, and operate as a single economic market.

Figure 2: German High-Speed Train at Frankfurt International Airport's Long-Distance Train Station

Source: Fraport.

Since 1992, the European Union has periodically published a common transportation policy[12] in response to increased ground and air congestion that has resulted from the unequal growth of road and air traffic compared with rail and maritime traffic. This growth in air traffic and the capacity constraints at most key European airports have caused the European Union to examine the potential of intermodal transportation. A key component of the European Union's intermodality policy is improving the connections between air and rail, thereby transforming competition between those modes into complementary service using high-speed train connections at European airports. While the European Union has developed a common transportation policy and provides limited funding for transportation networks that can connect to airports, the actual implementation and development of transportation infrastructure remains the responsibility of individual member nations. For example, a priority European Union project is the construction of a high-speed rail network

[12]The most recent report is the European Union's *White Paper, European Transport Policy for 2010: Time to Decide* (Luxembourg: 2001).

across Europe that will connect key airports, such as Brussels, Frankfurt, Cologne/Bonn, Paris Charles de Gaulle, and Amsterdam Schiphol. Although this project crosses a number of member states and is one of the European Union's priority projects, individual member states are responsible for funding the majority of the infrastructure and overseeing the construction of sections within their borders. For example, Belgium is responsible for providing the infrastructure from Brussels to the borders of France, Germany, and the Netherlands. In addition, in 2003, the European Union established the Rail Air Intermodality Facilitation Forum with the objective of developing recommendations to encourage the integration of rail and air service regarding operations, ticket sales, and legal issues.[13] (See app. II for additional information on intermodal connections at European airports.)

Each Level of Government and the Private Sector Play a Role in Developing Intermodal Capabilities at U.S. Airports

State and local transportation agencies have primary responsibility for developing intermodal capabilities at U.S. airports. The federal government has not established specific goals or funding programs to develop intermodal capabilities at airports, but it does provide oversight and funding when projects fit the criteria for funding programs focused on one or more individual modes. The private sector's role may include funding and, in some cases, project development through contractual agreements with state and local agencies.

State and Local Governments Have the Primary Responsibility for Developing Intermodal Capabilities

In line with federal transportation legislation's focus on state and local government decisionmaking, intermodal capabilities at U.S. airports are typically initiated and developed by state and local transportation agencies, including some combination of state departments of transportation, local transportation planning bodies (i.e., metropolitan planning organizations), airports, and local transit agencies. While the roles of any one stakeholder can vary, the development of most projects involves similar steps (see table 1), and one or more of these state and local transportation agencies will take the lead in moving a project through these steps.

[13]The Rail Air Intermodality Facilitation Forum included industry experts for both the rail and air transportation modes.

Table 1: Typical Steps in the Development of Intermodal Projects

Step	Description
Planning	The lead agency in initiating an intermodal project must typically assess the project's justification, solicit public comment regarding the most appropriate project to select for the area, and get the project included in state transportation plans, if FHWA or FTA funding in involved.[a] In order for the project to be included in state transportation plans, local transportation officials must be able to demonstrate how the project will be funded. This can include securing federal funding grants or loans, getting federal approval to levy certain fees on airport passengers to be used for the project, and securing state and local funds.
Preliminary design and environmental review	The lead agency works with other stakeholders to, among other things, select the "preferred alternative"[b]—after considering estimates of cost, benefits, and impacts (e.g., financial and environmental)—and consult with federal agencies governing environmental and historic preservation issues before advancing to final design.
Final design and right-of-way acquisition	Stakeholders work together to finalize design plans, appraise and acquire needed property, and finalize project cost estimates.
Construction	The lead agency advertises and evaluates bids for construction contracts. Once contracts are awarded, construction begins and the lead agency may manage or oversee construction.

Source: GAO analysis of DOT information.

[a]These plans include the state's 20 year transportation improvement plan and, as the project gets closer to being initiated, the state's short-term transportation plan (at least 3 years).

[b]The preferred alternative is determined by applying National Environmental Policy Act of 1969 requirements and other federal environmental laws and regulations to each alternative considered. The alternative that causes the least amount of damage to and best protects the environment is typically considered preferred.

During our research at 16 airports, we found three common themes regarding the roles of various stakeholders, although the extent of different stakeholders' involvement varied among projects. First, almost all airports are heavily involved with the development of intermodal capabilities on airport property. This is especially true if the project involves construction of a major intermodal facility such as an automated people mover connecting the airport terminals to a transit station. For example, the Port Authority of New York and New Jersey[14] was the lead agency in planning, building, and operating the Air Train system at New York's John F. Kennedy International Airport. The Air Train system is an automated people mover that links the airport's terminals to two transit rail stations, thereby providing passengers a connection from the airport to local transit systems (see fig. 3).

[14]The Port Authority of New York and New Jersey operates three New York area airports including John F. Kennedy International Airport, La Guardia Airport, and Newark's Liberty International Airport.

Figure 3: People Mover Tracks from New York's Kennedy Airport Leading into New York's Jamaica Train Station

Source: The Port Authority of New York and New Jersey.

The second theme we found is that local transit agencies are heavily involved in intermodal connections that are part of a new or existing transit system. Depending on the specific transit system, the involvement of the transit agency could include providing local bus service or shuttle service to the airport or could include building and operating a new heavy or light rail line to the local airport. For instance, Portland, Oregon's local transit agency, Tri-Met, was a major stakeholder in the development of the Metropolitan Area Express light rail line extension to the Portland International Airport. Tri-Met provided about $46 million towards the development of the extension, managed the project during construction, took ownership of most of the extension,[15] and operates the service to the airport.

Finally, we found that other local and state transportation agencies, such as state departments of transportations or local metropolitan planning organizations, can be involved in these projects, including in certain cases

[15]The portion of the light rail extension that is on airport property is owned by the Port of Portland and operated by Tri-Met.

taking the lead in planning and obtaining funding. For example, the Wisconsin Department of Transportation served as the lead agency in planning an Amtrak station at the General Mitchell International Airport in Milwaukee. Fairfax County, Virginia, secured funding to cover part of the cost of a section of a planned local rail line extension to Dulles airport by approving a tax on commercial and industrial properties that was voluntarily proposed by a group of landowners. In some cases, these state or local agencies may take the lead because they have the best access to federal funding.

Federal Government's Role Is Primarily One of Funding and Oversight

The federal government has not established specific goals or funding programs to develop intermodal capabilities at airports. Its role, therefore, is primarily one of funding and oversight of projects through separate transportation programs within DOT agencies. Although there is no federal funding program specifically for intermodal projects, many intermodal projects at airports fit the funding criteria for one or more federal programs focused on surface transportation or aviation. State and local transportation agencies and airports may receive funding from one or several of these federal programs to develop their intermodal capabilities. (See table 2.) Appendix III provides additional information on the financing of intermodal projects at airports.

Table 2: Federal Programs that Can Fund Intermodal Projects at Airports

Program	Description	Example of use at airports
New Starts (FTA)	Selects worthy fixed guideway transit projects for funding by congressional appropriations. Projects can include heavy, light, and commuter rail, and certain bus transit projects (such as bus rapid transit). To be eligible for funding, projects must, among other things, be justified based on a comprehensive review of mobility improvements, environmental benefits, cost effectiveness, and operating efficiencies; and supported by an acceptable degree of local financial commitment. The program funding match is at most 80 percent federal and 20 percent local.[a] In fiscal year 2003, this program was funded at $1.2 billion.	Bay Area Rapid Transit extension south of San Francisco into the San Francisco International Airport and San Mateo county Metro Transit Hiawatha Line service between downtown Minneapolis and the Minneapolis/St. Paul International Airport
Congestion Mitigation and Air Quality (joint FHWA and FTA)	Funds transportation projects and programs in order to reduce transportation-related emissions in areas with poor air quality. To be eligible for funding, projects must be transportation related, in nonattainment or maintenance areas,[b] and reduce transportation-related emissions. The program funding match is 80 percent federal and 20 percent local. In fiscal year 2003, this program was funded at $1.4 billion.	Metro Transit Hiawatha Line service between downtown Minneapolis and the Minneapolis/St. Paul International Airport
Surface Transportation Program (FHWA)	Provides funding to states and localities for projects on any federal-aid highway—including transit capital projects and local and nationwide bus terminals and facilities. The program funding match is 80 percent federal and 20 percent local. In fiscal year 2003, this program was funded at $5.9 billion.	Miami Intermodal Center at the Miami International Airport
Transportation Infrastructure Finance and Innovation Act of 1998 (joint FHWA and FTA)	Provides federal credit assistance for surface transportation projects. Project sponsors may include public, private, state, or local entities. Projects eligible for federal assistance through existing surface transportation programs, including passenger bus and rail facilities, are eligible for credit assistance under this program. The amount of federal credit assistance may not exceed 33 percent of the reasonably anticipated project costs. In fiscal year 2003, this program was funded at $130 million.	Miami Intermodal Center at the Miami International Airport
Airport Improvement Program (FAA)	Provides grants to airports for planning and development projects. The program is funded, in part, by aviation user excise taxes, which are deposited into the Airport and Airway Trust Fund. In terms of promoting intermodal capabilities, these funds may be used for access roads that are on airport property, airport owned, and exclusively serve airport traffic. The program funding match is 75 to 90 percent federal based on the number of enplanements[c] at the airport and the remainder local. In fiscal year 2004, this program was funded at $3.4 billion.	We found no example of its use for intermodal projects
Passenger facility fee (FAA)	Authorizes commercial service airports to charge passengers a boarding fee—commonly called a passenger facility charge—of up to $4.50, after obtaining FAA approval. The fees are used by the airports to fund FAA-approved projects that enhance safety, security, or capacity; reduce noise; or increase air carrier competition. In calendar year 2004, $2.2 billion in fees were collected under this program.	AirTrain automated people mover at New York's John F. Kennedy International Airport and Newark's Liberty International Airport

Source: GAO analysis of DOT information.

[a]When evaluating New Starts proposals, FTA places greater priority on projects that have a greater local matching share. Competitive New Starts proposals often have a less than 60 percent federal match.

[b]Federal air quality standards exist for certain air pollutants (known as criteria pollutants). Geographic areas that have levels of a criteria pollutant above those allowed by the standards are called nonattainment areas. Areas that did not meet the standards for a criteria pollutant in the past but have reached attainment are known as maintenance areas.

[c]An enplanement is defined as a passenger boarding a flight. Enplanements include passengers boarding the first flight of their trip, as well as passengers who board after connecting from another flight.

To carry out its oversight responsibility, the federal government ensures that the design and construction of intermodal facilities complies with federal laws and regulations, including environmental, safety, security, and mobility requirements, such as the Americans with Disabilities Act. For example, the National Environmental Policy Act of 1969 requires, among other things, that the project sponsor prepare an environmental impact statement for projects that receive federal funds. This environmental impact statement must consider alternatives and mitigation measures that would lessen the project's impacts. For intermodal projects, FAA, FTA, or FHWA will typically act as the lead agency, depending on how the project is funded—ensuring that environmental documents are properly prepared and that all environmental concerns are adequately addressed before granting approval for the project's construction. FTA also established a requirement that projects receiving funding through the New Starts program conduct post implementation evaluations, which are subsequently provided to FTA. In addition, FAA ensures that intermodal projects meet airport safety requirements, and the Department of Homeland Security's Transportation Security Administration establishes security requirements that may affect the use of intermodal facilities at airports.

Finally, the federal governmen's role in developing intermodal capabilities at airports includes increasing awareness of intermodalism at airports through workshops and funding research. For example, conferences for FAA regional offices have included topics such as the eligibility of ground access projects at airports for federal funding programs. In addition, FTA has provided funding to the Transit Cooperative Research Program to conduct two studies on improving public transportation access to large airports.[16]

[16]Transit Cooperative Research Program Report 62, *Improving Public Transportation Access to Large Airports* (Washington, D.C.: 2000); and Transit Cooperative Research Program Report 83, *Strategies for Improving Public Transportation Access to Large Airports* (Washington, D.C.: 2002).

Private Sector's Role Includes Funding or Assisting in Developing Intermodal Capabilities

The private sector's role in developing intermodal projects at airports may include funding through lease revenues; contracting to design, build, or operate intermodal capabilities; and participating in the transportation decision-making process through public participation. For example, a private developer will fund through lease revenues about 18 percent of the cost to develop the Metropolitan Area Express light rail extension at the Portland, Oregon, airport. In another example, in 2001, the Florida Department of Transportation awarded contracts to private companies for the design and construction of the rental car facility—one component of Miami airport's planned intermodal bus and rail facility. With respect to contracting arrangements with the private sector, Miami airport is also requesting proposals to design, build, operate, and maintain an automated people mover from the airport terminal to the planned intermodal facility.

Airlines, in particular, can play an important role in the development of intermodal projects at airports. Use and lease agreements between airlines and airports are a major revenue source for most large airports, and because of this financial arrangement, airlines may have influence in or participate in airport decisionmaking.[17] The ability of airlines to participate in decisionmaking depends on the specific airport and the structure of the lease agreement.[18] For example, some airports have lease agreements that can require airports to obtain airline approval before making airport capital expenditure decisions.[19]

[17]Use agreements deal with airside operations, which include landing fees, and lease agreements include terminal and gate rents.

[18]For airports not governed by such agreements, rates are established by ordinance or regulation.

[19]Airline lease agreements can include provisions known as "majority-in-interest" that provide airlines with some control over an airport's long-term financial obligations.

Most Major U.S. Airports Have Direct Connections to Local Transportation Services, but Very Few Have Direct Connections to Nationwide Rail or Bus Systems

Based on our survey of all large and medium and certain small hub U.S. airports,[20] most airports have direct connections[21] to rail or bus systems, with some airports having direct connections to more than one type of ground transportation. The vast majority of these direct connections are to local transportation systems such as local bus or rail service. Direct connections to nationwide ground transportation from airports are limited, with less than one-third of airports reporting direct connections to either nationwide bus or rail stations. While over one-fourth of airports reported proposals and plans to improve their intermodal capabilities, most of these airports plan to develop or enhance direct connections to a local bus or rail system. (See app. IV for complete survey results.)

Many Airports Have More than One Type of Direct Intermodal Connection

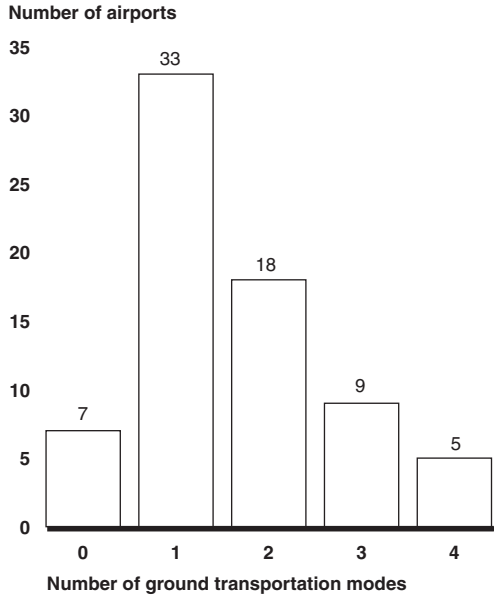
Most airports reported having some direct intermodal connections, with a number of airports responding that they had connections to multiple types of transportation modes. (See fig. 4.) Five airports, located in the New York City area, Miami, Philadelphia, and Palm Beach, reported direct connections to local and nationwide bus and rail systems. In contrast, seven airports[22] reported having no direct connections. Those airports that have no intermodal connections are all medium hub airports with fewer than 5 million enplanements in 2003. Two of these airports have plans to develop intermodal service. Louis Armstrong New Orleans International Airport plans to add stops for local transit buses, and Jacksonville International Airport plans to add connections to the local transit bus and light rail systems. Appendix V provides a complete list of airports with the types of connections and planned connections.

[20]We surveyed all 68 large and medium hub U.S. airports, and those small hub airports (4 in total) that are located in the same metropolitan statistical area as one or more large or medium hub airports.

[21]We considered a transfer point (such as a bus stop or rail station) to be a direct connection to the airport if (1) it was convenient for an average adult with luggage to walk to the transfer point from any of the airport's terminals; (2) the airport had an automated people mover that transports passengers from the transfer point to any of the airport's terminals; or (3) there was regular, fixed-route shuttle service from the transfer point to any of the airport's terminals.

[22]The airports include Albuquerque International Sunport, Omaha's Eppley Airfield, Jacksonville International, Kahului (Hawaii), Kansas City International, Louis Armstrong New Orleans International, and Norfolk International.

Figure 4: The Number of Airports with Direct Connections to Various Numbers of Ground Transportation Modes



Source: GAO summary of data from 72 airports.

Note: The four ground transportation modes included in our survey were local bus, local rail, nationwide bus, and nationwide rail.

Most Airports Have Direct Connections to Local Transportation Systems

Most of the major U.S. airports reported having direct connections to one or more local transportation systems in their area, such as local bus or rail service, with 26 airports reporting having both. The most common type of public transportation system available to and from the airport is local bus service.[23] Sixty-four airports reported having a direct connection to local bus service. However, according to airport officials we interviewed, the level of bus service provided varies. For example, Seattle-Tacoma International Airport has five public bus routes that serve the airport from the surrounding communities, while General Mitchell International Airport in Milwaukee has only one route that serves the airport. The Boston Logan Express bus service offers nonstop airport connections to and from

[23]Local bus service included public transit, rapid transit, and nonstop, dedicated express bus service, such as the Van Nuys FlyAway or Boston Logan Express.

Boston's General Edward Lawrence Logan Airport and four locations, serving over 100 communities.

The level of convenience and access to bus service also varies, as shown in table 3. Airports with direct connections to local bus systems either had connections to buses at the airport terminal(s) or at an intermodal facility or transit center. For example, Denver airport reported that it would be convenient for an average adult with luggage to walk to the local bus stop, which is located at the airport terminal, while passengers at Los Angeles International Airport can take a shuttle to the airport transit center to access buses. However, transportation experts and some airport officials we interviewed stated that ridership on public buses is generally very low for airline passengers but somewhat higher for airport employees. One reason for this situation is the lack of accommodations for luggage on most public buses.

Table 3: Number of Airports with Direct Connections to Local Bus Service

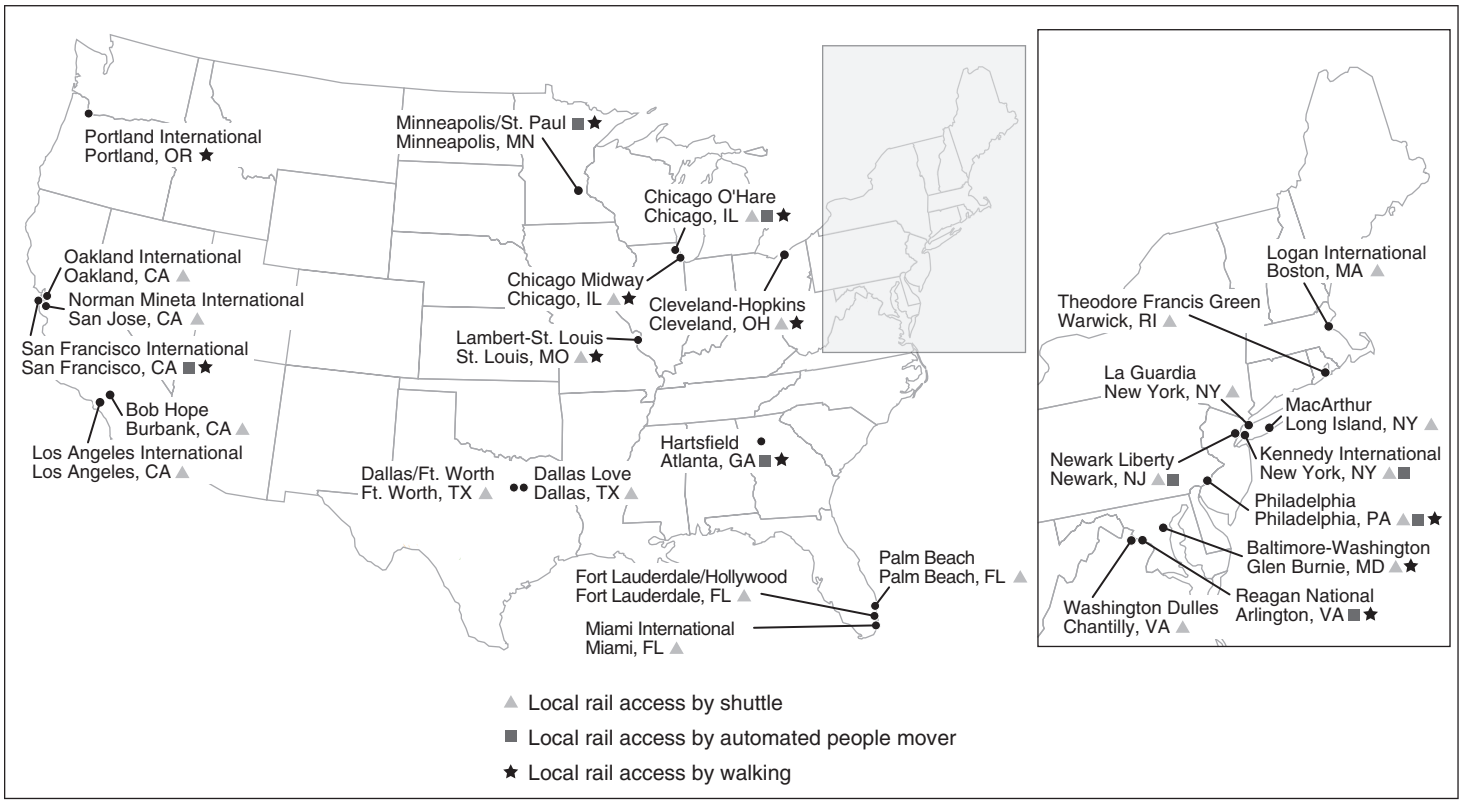
Type of connection to local bus service	Number of airports
Walking (convenient for an average adult with luggage to walk from bus stop to any of the airport's terminals)	56
Automated people mover that transports passengers from the transfer point to any of the airport's terminals	6
Regular, fixed-route shuttle service from the transfer point to any of the airport's terminals.	48

Source: GAO summary of data from 64 airports reporting access to local bus services.

Note: The numbers do not add up to 64 because some airports reported multiple options available to access the bus system, such as by walking or taking an automated people mover.

Twenty-seven airports reported having a direct connection to a local rail system, such as light rail, commuter rail, or subway, as shown in figure 5. These airports reported several options for passengers to access the rail system. Thirteen airports reported that passengers could either walk or take an automated people mover to access the rail station. Twenty-two airports reported that passengers could take a regular, fixed-route shuttle service to a station for a local rail system.

Figure 5: Major U.S. Airports with Direct Connections to Local Rail Systems



Source: GAO summary of data from 72 airports.

Transportation literature has shown that automated people mover technology has been beneficial in linking public transit at airports, and attributed this impact to the exclusive rights-of-way and driverless operation that allows frequent service on an around-the-clock basis. For example, Chicago O'Hare International Airport's automated people mover is a free, fully-automated 24-hour rail system that operates between the three domestic terminals, the international terminal, and a transit rail station. By comparison, the level of convenience of using shuttles varies. For example, a free shuttle from Baltimore-Washington airport to the local rail station runs approximately every 10 to 15 minutes and takes about 5 minutes. On the other hand, a shuttle running from Washington Dulles International Airport to the local transit rail station costs $8.00 one way, runs every 30 minutes, and takes about 25 minutes.

Nationwide Ground Transportation Options from Airports are Limited

While most major U.S. airports are located in metropolitan areas that have stations for nationwide transportation systems such as Greyhound or Amtrak, only 19 airports reported having direct connections to these stations. Twelve of the 19 airports have direct connections to nationwide bus service. In a few cases, the nationwide bus service is easily accessible to passengers—for example, Hartsfield-Jackson Atlanta International Airport reports that Greyhound is accessible by both walking and automated people mover. However, half of these airports report that passengers can access these services without taking a shuttle, as shown in table 4.

Table 4: Number of Airports with Direct Connections to Nationwide Bus Service

Type of connection to nationwide bus service	Number of airports
Walking (convenient for an average adult with luggage to walk from a nationwide bus station to any of the airport's terminals)	5
Automated people mover that transports passengers from the transfer point to any of the airport's terminals	1
Regular, fixed-route shuttle service from the transfer point to any of the airport's terminals	10

Source: GAO summary of data from 12 airports reporting access to nationwide bus service.

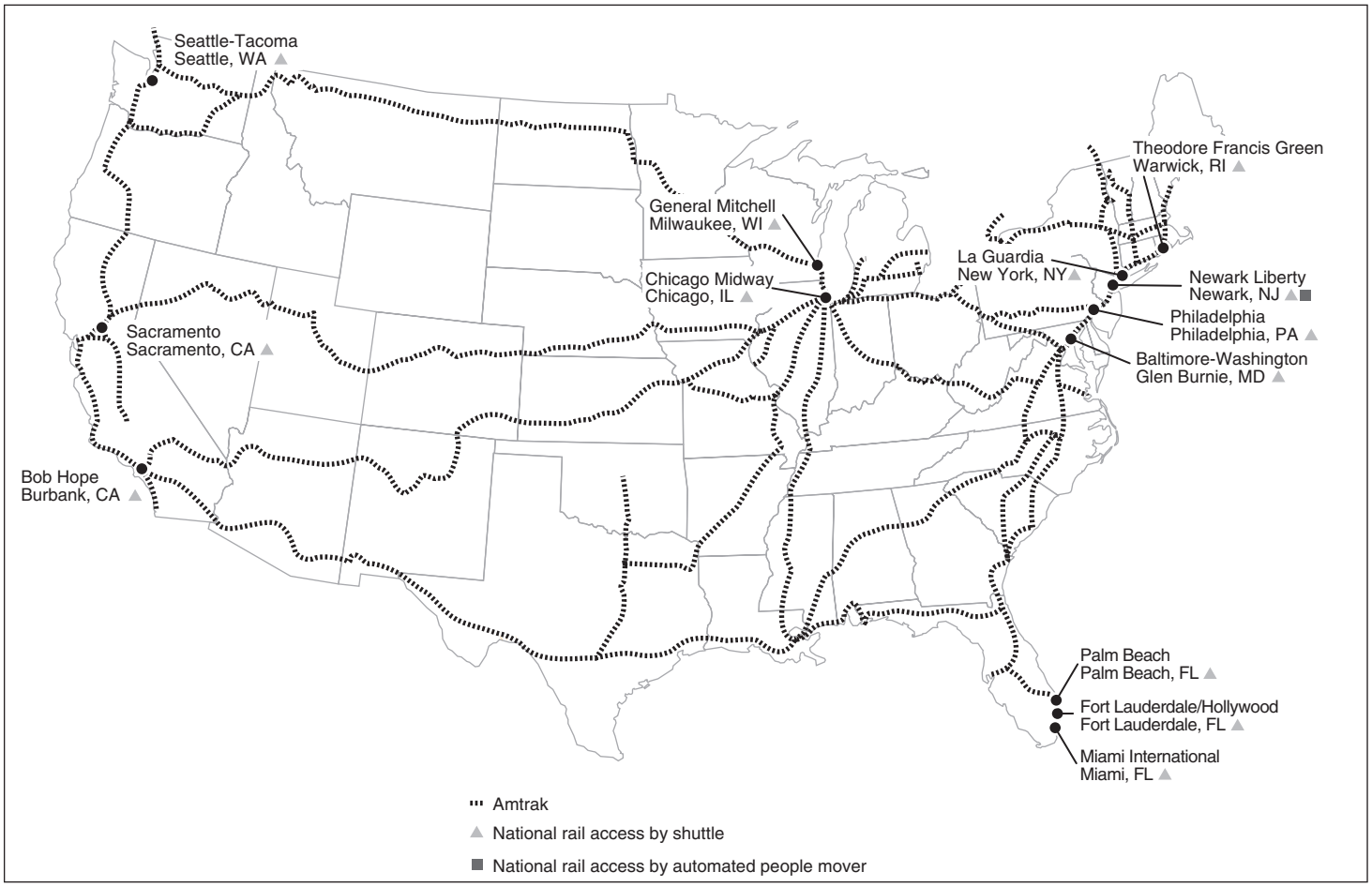
Note: Numbers do not add to 12 because some airports reported multiple options available to access the bus system, such as by walking or taking an automated people mover.

Thirteen airports report having a direct connection to nationwide passenger rail service, Amtrak, as shown in figure 6.[24] All 13 airports provide shuttle service to transport passengers to Amtrak stations that serve the metropolitan area. However, based on information gathered during our research, the type of shuttle service can vary. For example, Bob Hope-Burbank airport reports that a free shuttle service transports passengers to the Amtrak station. On the other hand, at Seattle-Tacoma airport, passengers may use a private shuttle that charges a fee to connect to the Amtrak station. Of these 13 airports, only one—Newark's Liberty International Airport—reported that passengers could also access the Amtrak station by an automated people mover. The accessibility of Amtrak

[24]The survey questionnaire was administered from February 22 through March 31, 2005. Subsequent to the close of the survey, Oakland, California, airport also reported to us that passengers can access Amtrak by shuttle as of June 6, 2005.

to Newark airport has allowed Continental Airlines to establish a code share agreement with Amtrak, whereby passengers can purchase one ticket for a journey that includes travel by both air and rail.[25]

Figure 6: Major U.S. Airports with Direct Connections to Amtrak's Nationwide Route Network



Source: GAO summary of data from 72 airports.

Note: In addition, Oakland (CA) airport reported that passengers can access Amtrak by shuttle as of June 6, 2005.

[25]Code sharing refers to the practice of airlines applying their names and selling tickets to flights or rail service operated by other carriers.

Many Airports Are Planning to Improve Intermodal Connections to Local Rail and Bus Systems

Twenty airports reported that their airport capital improvement plan[26] included proposals to improve intermodal capabilities. At several airports, these proposals are in anticipation of expected growth in enplanements and the need to provide airline passengers and airport employees with alternative transportation modes to access the airports. Most of the airports with plans to improve intermodal services intend to enhance their direct connections to the local transportation system rather than to nationwide systems, as shown in table 5. Only two airports, Baltimore-Washington International and Dallas/Fort Worth International, reported plans to add a direct connection to a nationwide transportation system, both of them to a nationwide bus service.

Table 5: Number of Airports with Capital Improvement Plan Proposals to Improve Passenger Access to Local and Nationwide Transportation Systems

	Local transportation systems		Nationwide transportation systems	
	Bus	Rail	Bus	Rail
Number of airports with plans to improve intermodal connections	12	14	2	0

Source: GAO summary of data from 20 airports.

Note: Numbers do not add to 20 because some airports reported multiple proposals.

In addition to these plans to improve intermodal connections to a particular mode, 19 airports reported proposals to build an automated people mover to connect airport terminal(s) with ground transportation facilities.[27] For example, Denver International Airport intends to build a local rail station adjacent to the airport's main terminal and to connect the terminal to the station by an automated people mover.

[26]The capital improvement plan is a planning document addressing current and future airport capital needs.

[27]Ground transportation facilities include bus and train stations.

Development of Intermodal Capabilities May Provide a Range of Benefits; However, Substantial Costs and Barriers Affect their Development

According to transportation and airport officials we spoke with, intermodal facilities and services at airports provide or are expected to provide a range of benefits—such as alternative transportation options for travelers, reduced road congestion and vehicle emissions, and more efficient use of congested air space. These officials, however, have not evaluated these intermodal capabilities and, therefore, are not able to quantify the benefits. Moreover, costs to develop intermodal projects at airports can be significant. In addition, barriers such as the difficulty of obtaining financing can affect the development of these projects.

Intermodal Capabilities Can Provide Benefits; However, Evaluation of Benefits Can Be Difficult

Based on our interviews with U.S. and European transportation officials and our prior work, we identified a number of benefits that can be derived from the development of intermodal capabilities at airports. These capabilities can benefit not only airline passengers and airports, but also airport and airline employees and society at large. We found that many of the benefits cited mirror those that derive from transit projects in general. However, officials had not evaluated specific airport intermodal projects or measured the benefits that may have actually occurred. Due to the post-implementation evaluation requirements that were established for the New Starts program in 2000, those projects that were subsequently selected under the New Starts program will be evaluated over the coming years.

Intermodality Provides Alternative Transportation Options with the Potential to Reduce Travel Times and Costs

Transportation and airport officials we spoke with said that providing passengers and employees alternative transportation options was a major benefit of developing intermodal capabilities at airports. Our prior research[28] has shown that transit investments can provide direct benefits to travelers by improving travel times for existing transit users, improving travel times for automobiles and trucks on alternative roadways, lowering the use of automobiles and the associated environmental costs by attracting riders out of their vehicles, and providing a back-up or future option for nonusers of transit. In some cases, these alternative transportation options may also provide a benefit of reduced travel times and costs in comparison to traveling in a private vehicle (including shuttle or taxi) on congested highways. Potential savings for passengers could

[28]GAO, *Highway and Transit Investments: Options for Improving Information on Projects' Benefits and Costs and Increasing Accountability for Results*, GAO-05-172 (Washington, D.C.: Jan. 24, 2005).

include the cost of gas, taxi service, or parking. Several local transportation officials told us that the benefits of intermodal capabilities are maximized when the supporting transit system is reliable and is part of a larger transit network. For example, officials from the Port Authority of New York and New Jersey said that the automated people mover that connects a terminal at Newark airport to a new Amtrak and transit rail station was developed to provide access to many destinations in the New York City area and beyond. In fact, Amtrak officials stated that a large number of Amtrak passengers using the Newark airport station are coming from Philadelphia and Washington, D.C.

Figure 7: Train Station and Automated People Mover at Newark's Liberty International Airport

Source: The Port Authority of New York and New Jersey.

Intermodality May Reduce Road Congestion and Vehicle Emissions

Airport officials stated that another benefit of airport intermodal capabilities is the potential to reduce congestion on nearby highways, airport access roads, and the terminal curbside. Transportation and airport officials stated that a byproduct of reduced road congestion is a reduction of vehicle emissions and improved air quality. For example, it was estimated that the extension of the Bay Area Rapid Transit to the San

Francisco airport would reduce road traffic around the airport by 4,530 daily vehicular trips, representing 6 percent of the daily vehicular trips to the airport. While officials believe intermodal projects improve access to airports and reduce vehicle emissions, they also stated that it is difficult to determine how trip reductions affect overall congestion since congestion is affected by many factors, such as land use, traffic patterns, and general economic conditions, that are difficult to isolate.

Intermodality May Allow for the More Efficient Use of Congested Air Space

Transportation industry experts and European transportation officials we interviewed stated that another potential benefit of intermodal capabilities at airports is the more efficient use of air space and existing capacity at congested airports through the replacement of short-haul flights with rail service. The potential reduction of short-haul flights could allow airlines to reallocate airport capacity to long-distance flights, which generally have lower costs per mile. However, our prior work[29] and transportation officials we talked with indicate that for rail transport to capture the market share necessary to affect air travel, the distance between potential nationwide passenger rail destinations must be short enough or trains must travel at high enough speeds to make rail travel times competitive with air travel times.[30] Transportation officials we talked with also stated that the realization of these benefits depends on a reliable and extensive rail network that would provide competitive service to air travel about travel time, frequency of service, and passenger convenience. This situation has occurred in several cases in Europe, where some national governments have established policies to reduce the number of short-haul flights at their major airports and have supported these policies by funding high-speed rail infrastructure. For example, there has been a reduction of air service between Paris, France and Brussels, Belgium—a popular short distance city pair for travelers—due, in part, to the high-speed train service linking Paris Charles de Gaulle airport and downtown Paris with Brussels (see fig. 8). Air France has replaced five Paris-to-Brussels flights with Thalys high-speed rail service.

[29]GAO, *Intercity Passenger Rail: Issues for Consideration in Developing an Intercity Passenger Rail Policy*, GAO-03-712T (Washington, D.C.: April 30, 2003).

[30]Our prior work examined intercity rail service in general. It did not specifically state that these benefits would come from rail service at airports. Therefore, the same benefit could be obtained from rail service between stations not located at airports.

Figure 8: Thalys High-Speed Train at the Paris Charles de Gaulle Airport

Source: © 2004 International Air Rail Organization.

As another example, Lufthansa established a code-share agreement with Deutsche Bahn (the German national train company) between Frankfurt and Stuttgart and between Frankfurt and Cologne. This code-share agreement allows Lufthansa passengers arriving or departing at Frankfurt to transfer onto trains for the first or final portion of their journey to either Stuttgart or Cologne. It also allows passengers to check in for flights or pick up their luggage at the main train stations in Stuttgart and Cologne. Lufthansa officials stated that this service has allowed them to reduce their flights between Frankfurt and Cologne and reallocate resources to other markets.[31]

[31]Lufthansa officials stated that for this service to be competitive there has to be a 45-minute maximum transfer time between the flight arrival and the train's departure at Frankfurt. This requires a high frequency of service and officials stated that it would require at least one train every hour.

In the United States, efforts have also been made to use rail service to complement air service. For example, in March 2002, Continental Airlines established a code-share agreement with Amtrak in order to expand options and destinations for travelers using Amtrak and Continental. Under this agreement, passengers arriving at Newark airport can complete their journey on Amtrak to destinations such as Philadelphia, Pennsylvania. With this code-sharing agreement, Continental initially eliminated short-haul flights between Newark and Philadelphia and provided connecting rail service into some markets that were not served by Continental, such as Wilmington, Delaware, and Stamford, Connecticut. However, Continental officials stated that in April 2003, they reinstated limited air service between Newark and Philadelphia because of market demand. As another example, Midwest Airline officials said that the new Amtrak station at Milwaukee airport, which opened in January 2005, will allow the airline to better market its services to passengers from northern Illinois. This airline is also discussing a potential code-sharing agreement with Amtrak.

Specific Benefits Can Be Difficult to Evaluate

Measuring and forecasting the benefits of individual intermodal projects can be challenging in part due to data quality limitations. In our prior work,[32] we identified data quality as a pivotal concern in measuring and forecasting traffic flow, such as the number of passengers using public transportation to get to the airport compared to the number of passengers using private vehicles, as reliable and complete data are not always available. This information is generally collected through surveys of passengers at airports. However, since these surveys can be very expensive to conduct, only airports with significant financial resources conduct these surveys, and then only every few years. Moreover, such surveys tend to result in low response rates, which are often associated with biased estimates due to differences between passengers who agree to participate and those who do not participate in the survey.

Transportation officials at our 16 case study locations told us that their intermodal capabilities have not been evaluated, and therefore they are not able to quantify their benefits. This situation should change for future intermodal projects that receive funds through the New Starts program. FTA's Major Capital Investment rule, that went into effect in April 2001, requires that New Starts grantees conduct "before and after studies" on approved projects. Project sponsors will need to present a complete plan for collection and analysis of information to identify the impacts of the

[32] See GAO-05-172.

New Starts project and the accuracy of the forecasts. As of June 2005, FTA has awarded nine full funding agreements that will require these before and after studies. Those intermodal projects at airports that use New Starts funding will have to incorporate post-implementation evaluation into the project and face these data quality challenges.

Intermodal Costs Vary Depending on Project Complexity and Scope

Based on our interviews with federal and local transportation officials, we found that intermodal project costs can vary significantly, depending in part on the complexity and scope of the project. We found that these projects may be as simple as placing a bus stop at the terminal or as complex as developing a new rail transit system with an airport station. In general, bus projects cost significantly less than rail projects. For example, we previously reported[33] that the costs of bus-related projects on separate dedicated busways average about $13.5 million per mile in contrast to rail projects, which average about $34.8 million per mile. The higher cost per mile for rail projects compared to bus-related projects arises, in part, from the costs for rail projects associated with constructing stations, structures, signal systems, power systems, and maintenance facilities; relocating utilities; obtaining rights-of-way; and purchasing vehicles. Local transportation officials agreed that the costs of rail projects also vary depending on local circumstances such as whether the project alignments will affect local land-use restrictions or environmentally protected land and the extent to which the project will be affected by airport security measures.

Table 6 provides examples of recently developed and planned rail intermodal projects, their approximate costs, and funding sources. See appendix VI for additional information on these projects.

[33]GAO, *Mass Transit: Bus Rapid Transit Shows Promise*, GAO-01-165 (Washington, D.C.: Sept. 17, 2001).

Table 6: Examples of Intermodal Project Costs and Funding Sources

(Dollars in millions)

Project description	Capital cost [a]	Funding sources
Connection to existing system		
Construction of a new Amtrak rail station adjacent to and serving Milwaukee's General Mitchell International Airport, and improvements to the existing rail line, which already provided service between Milwaukee and Chicago	$6.8[b]	• Two separate annual federal appropriations • Wisconsin Department of Transportation
Construction of a new centralized parking and bus facility at Harrisburg International Airport with planned Amtrak Service	$8.0[c]	• Planned funding includes federal and state sources
Extension of an existing system		
8.7-mile heavy rail line (Bay Area Rapid Transit) extension south of San Francisco that includes a new station at San Francisco International Airport	$1,552[d]	• FTA • Bay Area Rapid Transit • San Francisco International Airport • San Mateo County Transit Authority
5.5-mile light rail line (Metropolitan Area Express) extension to existing rail line to provide service between city center and Portland (Oregon) International Airport	$154[e]	• Tri-Met (local transit agency) • Airport passenger facility charges • City of Portland • Cascades Development Corporation (a private land development corporation)
Development of a new system		
New light rail system (Hiawatha Light Rail) providing service between downtown Minneapolis and the Mall of America, with 2 stations located at Minneapolis/St. Paul airport	$715.3[f]	• FTA • Congestion Mitigation and Air Quality grant • State of Minnesota • Hennepin County Regional Rail Authority • Metropolitan Airports Commission
Proposed California high-speed rail corridor with potential connections at San Francisco, Los Angeles and Ontario, California airports, by means of a people mover system, and a station at Palmdale airport	$33,000 – 37,000[g]	• Planned funding includes federal and state sources, with state funding through a bond measure

Source: GAO analysis of interviews conducted with, and documents provided by, airport and transportation officials.

[a]Capital costs are approximations as reported by airport or local transportation officials.

[b]Amount is expressed in 2005 dollars and includes the construction of a new building, boarding platform, canopy, parking facility, and several miles of rail improvements, including upgraded rail technology.

[c]Amount is expressed in 2004 dollars and includes the design, engineering, and general construction of a four-level structure and pedestrian bridges to the airport terminal and planned rail station.

[d]Amount is expressed in 2003 dollars and includes engineering, design, right-of-way acquisition, utility relocation, facilities (four stations) construction and system installation, vehicle acquisition, and expansion and improvement of several existing maintenance and storage yards.

[e]Amount is expressed in 2001 dollars and includes engineering, design, vehicle acquisition, and construction and system installation.

[f]Amount is expressed in nominal dollars (1999-2004) and includes costs for the engineering, design, acquisition of 24 vehicles, construction and 12-mile system installation, 17 stations, and tunnel construction to access the 2 airport stations.

[g]Amount is expressed in 2003 dollars. Project costs include right-of-way, track and signals, grade crossing and separations, structures, tunnels, electrification, stations, parking and other costs for all state rail corridors combined.

Barriers Impede the Development and Use of Intermodal Capabilities

A significant barrier to the development of intermodal capabilities is the lack of specific national goals or funding programs to develop intermodal capabilities at airports, as mentioned earlier in this report. A number of other barriers also impede the development of intermodal capabilities at airports, including the difficulty of securing funding, disincentives for airport support, and geographical and physical land constraints at airports. In addition, the use of intermodal connections can be limited by the inability of the ground connections to meet the preferences of airline passengers, many of whom prefer to use private vehicles for trips to airports.

Difficulty of Securing Funding

Almost all local transportation officials we interviewed agreed that a barrier to developing intermodal capabilities using rail transit is the difficulty of securing funding, which usually includes both federal and local funds. Because this type of intermodal capability requires a large supporting network, such as a light rail system, federal support is often an important part of the funding package. We found that FTA's New Starts program is a significant source of funding for intermodal capabilities at airports that are part of a rail transit system. Under this program, intermodal projects must compete with other transit projects for funds, and grantees are selected through an evaluation process that can take several years to complete prior to obtaining final funding approval. Local transportation officials agreed that this process can make it difficult to secure this part of the funding package. An FTA official added that New Starts' rigorous rating process and the increasing demand for its limited funds makes the process time-intensive and competitive in nature.

Local transportation officials described other difficulties in securing the use of passenger facility fees, commonly referred to as PFCs.[34] In particular, several local transportation officials mentioned that the requirement that PFC funds be used for projects on airport property,

[34]PFCs are fees up to $4.50 paid by airport passengers, which are used to finance airport capital improvements.

among other criteria, limits their use for intermodal projects. However, even with this restriction, we found that four airport authorities used PFC funds to develop or contribute to intermodal projects at airports, as shown in table 7.

Table 7: Selected Examples of Intermodal Rail Projects Funded by PFC Funds

Dollars in millions[a]

Location	Project description	Funding amount
Portland, OR	Light rail extension and new station at Portland International Airport	$43
Newark, NJ	People mover system 1-mile connection from Newark Liberty International Airport to new Northeast Corridor rail station	$357
New York, NY	People mover system 3-mile connection from John F. Kennedy International Airport to two transit rail stations	$1,326
St. Louis, MO	On-airport transit station at St. Louis Lambert Field International Airport	$4

Source: GAO analysis of FAA data.

Note: These projects have been approved by FAA and airports have begun collecting PFC funds. FAA has approved the use of PFC funds for additional projects for which airports have not yet started collecting PFC funds.

[a]Funding amounts are rounded to the nearest million.

Airlines, moreover, support these restrictions on the use of PFC funds. Several airlines told us that the primary objective of PFCs is to fund on-airport development and capacity improvements, and not ground-access projects, which airlines believe should be funded through local and state governments. In fact, airline officials stated that when PFCs are used for intermodal projects, airport funding is depleted and less will be available for other infrastructure projects that directly benefit aviation operations, such as runway renovations.

Local transportation officials said it can also be difficult to secure the local funds needed to develop an intermodal airport project. These officials agreed that local funding typically comes from several agencies, such as metropolitan transportation authorities, transit agencies, and airport authorities—all with potentially different project funding priorities. Local transportation officials agreed that these differing priorities can make it difficult to build the unified local support necessary to secure funding,

especially when intermodal projects are competing with other transportation or transit projects for limited funds.

Disincentives for Airport Support

In some cases, airports may have economic disincentives to commit to the development of intermodal projects. For example, those airports that derive a large portion of revenues from parking may view intermodal projects—and the potential that passengers will access the airport by transit rather than private automobile—as a potential threat to that revenue. According to a 2003 airport association survey, parking revenues make up between 17 and 29 percent of airports' nonaviation operating revenues.[35]

Geographical and Physical Land Constraints

Geographical constraints, including physical and environmental issues, can also add to the difficulty of developing intermodal projects at airports. On the one hand, our prior work has found and local transportation officials stated that densely populated urban areas offer few alternatives for expansion or new project development.[36] On the other hand, it is these same densely populated urban areas where rail connections to airports are more likely to generate benefits that will justify the costs, as these areas may have high levels of congestion and larger numbers of people willing to use public transportation to access airports as a result.

Transportation planning officials in California stated that geographic constraints were a barrier to developing route alternatives for the state's proposed high-speed rail system. While one of their objectives is to connect the system to the airports as directly as possible, they realize that it may not be possible because some California airports are located in areas that are difficult to access without requiring significant disruptions that may include dislocation of established commercial and residential sites.

As another example, BART officials said that because federally protected wetlands are located adjacent to the San Francisco airport, officials had to modify the transit route into the airport to ensure there would be minimum impact on the wetlands. Since the proposed light rail line into the Minneapolis/St. Paul airport crossed land owned by various federal

[35]Airports Council International-North America, *The 2003 General Information Survey* (Washington, D.C.: 2003).

[36]GAO, *Freight Transportation: Strategies Needed to Address Planning and Financing Limitations*, GAO-04-165 (Washington, D.C.: Dec. 19, 2003).

agencies, the process to gain the needed right-of-way was a multi-agency effort that required significant coordination, adding somewhat to the project planning time and costs.

Limitations of Existing Rail Network

Unlike the rail network in some European countries, Amtrak's passenger rail network is not extensive enough to provide convenient service to many airports. For example, we noted previously in this report that although 13 airports reported having a direct connection to Amtrak's passenger rail service, only 1 reported that passengers could access the station by automated people mover. In addition, even when rail lines are accessible to the airport, the frequency of passenger trains may be insufficient to draw airport passenger travel. Both airline and rail officials indicated that for code-share agreements, airlines require a maximum passenger transfer time between airplane and train of less than 1 hour. This requirement translates to one train per hour within the specific market, and Amtrak officials stated that they provide that level of service in very few markets—many of which are located on Amtrak's corridors serving highly populated metropolitan areas. For example, although Amtrak track lines are adjacent to the airport in Cleveland, Ohio, Amtrak officials stated that Amtrak trains run only twice a day along this line, which is not frequent enough to establish a code-share agreement with an airline. In contrast, in Europe, train companies provide high-speed rail service between the Frankfurt airport and Cologne every half hour, between the Frankfurt airport and Dortmund every hour, and between Paris and Amsterdam Schiphol airport approximately every hour.[37]

Difficulty of Coordinating Along Longer Transportation Corridors

In our prior work, we stated that transportation corridors that extend across multiple state and local boundaries pose challenges for intermodal transportation decision making due to coordination and cross-jurisdictional issues.[38] Getting the cooperation of and coordination between these different officials can make the planning and implementation of multistate and multiregion projects difficult. During our interviews, we found that many intermodal projects included multiple agencies, communities, and transportation modes—each with its own priorities. For example, during the planning of the Seattle light rail, Sound

[37]Service between Paris and Amsterdam Schiphol airport is provided from 6:55 a.m. to 6:55 p.m. every day.

[38]GAO, *Surface Transportation: Many Factors Affect Investment Decisions*, GAO-04-744 (Washington, D.C.: June 30, 2004).

Transit officials noted that the alignment from downtown Seattle to the Seattle airport ran through a number of surrounding cities. This required three local cities to approve permits for the construction of the project.

Inability of Ground Connections to Meet Airline Passenger Preferences

The development and use of intermodal connections at airports can be limited by the inability of the ground connections to meet the preferences of airline passengers. According to transportation research[39] and local transportation officials, intermodal capabilities are difficult to develop unless a demand for the service exists. Demand for public transportation options to airports is limited, as the vast majority of passengers still use private vehicles to access the airport. For example, one study said that the ceiling on public transportation use to access airports appeared to be about 10 to 15 percent, even at airports that had rail connections.[40] Transportation and airport officials told us that consumers' preferences can affect the demand for intermodal options at airports, such as the preference for seamless transitions from one mode to another, a simplified process to handle baggage, transit schedules that meet consumer demands, and clear, easy-to-follow information on accessing transportation options—including signage at airports and information at hotels on accessing transit to airports (see fig. 9 for an example of signage).[41] In addition, these officials stated that passengers, particularly those traveling with large amounts of luggage and children, may not consider using transit or rail systems to complete their travel plans due to inconvenience.

[39]Transit Cooperative Research Program Report 62, *Improving Public Transportation Access to Large Airports* (Washington, D.C.: 2001); and Transit Cooperative Research Program Report 83, *Strategies for Improving Public Transportation Access to Large Airports* (Washington, D.C.: 2002).

[40]Transportation Research Board Paper No. 00-0577, *Use of Public Transportation by Airport Passengers* (Washington, D.C.: 1998).

[41]Other factors that might influence consumers' preference include the travel times and out-of-pocket costs of different modes.

Figure 9: Airport Sign Showing the Direction to the Amtrak Train Station at Milwaukee's General Mitchell International Airport

Source: GAO.

Two Key Strategies Could Help Address Intermodal Transportation Planning and Financing Limitations

Using our past work and our analysis of information obtained from government and transportation officials in the United States and Europe, we identified two strategies that could help public decision makers improve intermodal options at airports, particularly direct connections to local and nationwide rail systems.[42] A framework with key elements could assist in the consideration and implementation of either strategy. The first strategy would be to increase the funding flexibility of federal, state, and local transportation agencies under U.S. transportation policy's focus on local decisionmaking in order to encourage a more systemwide approach to transportation planning and development. This strategy could help

[42]While there is a potential for increasing intermodal options at airports through expanding private bus services, the strategies discussed focus on rail systems rather than the private bus industry as the private bus industry uses existing road infrastructure, while rail systems typically require the development of new rail infrastructure. Many of the issues that limit expanded bus service at airports are related to market demand, airport access points, and parking capacity for buses, which are primarily local and airport issues.

overcome the difficulty of securing funding for intermodal projects at airports, which local transportation officials identified most often as a barrier to improving such capabilities. It would most likely lead to a continued focus on the development of local intermodal connections rather than a fully integrated nationwide system. The second strategy would involve a fundamental shift in federal transportation policy's long-time focus on state and local decisionmaking by increasing the role of the federal government in planning and funding intermodal projects in order to develop more integrated air and rail networks, either nationwide or along particularly congested corridors. This strategy would be closer to the intermodal development strategy followed by the European Union and several European countries, or to the strategy the federal government used to develop the interstate highway system. Such a strategy could increase intermodal options and American mobility through broad policy and funding changes, but the high cost of rail investments and the resulting high costs of this strategy would make it difficult to justify on a nationwide scale.

Key Components of a Framework Would Help Guide Either Strategy

Building on the perspectives gained from our past work[43] in federal investment strategies and the work of transportation experts, we developed a framework to help guide consideration of the two strategies. This framework has three components:

- Set national goals for the system. These goals, which would establish what federal participation in the system is designed to accomplish, should be specific and measurable.
- Clearly define the federal role relative to state and local transportation roles. The federal government is one of many stakeholders involved in the development of intermodal capabilities at airports. This component is important to help ensure that the federal role supplements and enhances the participation of other stakeholders.
- Determine which funding approaches, such as alternatives to investment in new infrastructure, will maximize the impact of any federal investment. This component can help expand the ability to leverage funding resources and promote shared responsibilities. Given

[43]GAO, *Marine Transportation: Federal Financing and a Framework for Infrastructure Investments*, GAO-02-1033 (Washington, D.C.: Sept. 9, 2002).

the current budgetary environment, and the long-range fiscal challenges confronting the country, substantial increases in funding for transportation projects will require a high level of justification.

In addition, either strategy would benefit from a process for evaluating performance periodically to determine if the anticipated benefits are accruing. Evaluations also provide a means to periodically examine established goals, roles, and approaches, and a basis to modify them, as necessary. Leading organizations have stressed the importance of developing performance measures and linking investment decisions and their expected outcomes to overall strategic goals and objectives.[44] While highway and transit projects can be major components of intermodal projects at airports, in our prior work, we found that there are no requirements for evaluations of highway and transit projects receiving federal funds other than those receiving funds through the New Starts program.[45]

First Strategy: Providing Federal and State Transportation Agencies Flexibility in Developing Intermodal Transportation

In the first strategy, Congress could encourage the development of intermodal capabilities at airports while continuing U.S. transportation policy's focus on local decisionmaking by providing federal, state, and local transportation agencies with additional flexibility within current federal transportation programs that are administered by FTA, FAA, and FHWA.

Establishing National Transportation Goals that Integrate Airports

National transportation goals could be established to encourage the development of airport intermodal transportation options. In doing so, Congress can help chart a clear direction, establish priorities among competing projects, and specify the desired results. At the federal level, surface transportation goals are geared toward providing and enhancing the mobility of the American public with a focus primarily on roads, mass transit systems, and railroads. For example, under ISTEA and TEA-21, Congress established goals to develop a national intermodal ground transportation system that will move people and goods in an efficient manner, but the goals did not explicitly include connecting aviation to the ground transportation systems. Futhermore, the national policy concerning

[44]GAO, *Executive Guide: Leading Practices in Capital Decision-Making*, GAO/AIMD-99-32 (Washington, D.C.: December 1998).

[45]See GAO-05-172.

intermodal planning of connections between airports and ground transportation systems focuses on coordination and does not set priorities or desired results for these types of intermodal connections.[46] A truly intermodal transportation system would connect ground systems, aviation, and waterways. For example, both the European Union and some individual European Union member nation's transportation plans highlight the goal of developing better connections between different transportation systems, including air and rail services.

Defining the Appropriate Federal Role

Since following this strategy would not involve a major shift in transportation policy, it would most likely not involve a major shift in the federal role in developing intermodal capabilities at airports. The federal role would continue to be focused on funding and oversight of locally determined and developed transportation projects. However, since this strategy would include the goal of establishing a more systemwide approach to transportation planning, the federal government would need to determine the scope of its involvement in encouraging such an approach.

Establishing a Systemwide Approach to Intermodal Funding

Federal transportation funding, which is focused on individual transportation modes, could be shifted to a more systemwide approach across all modes and types of travel. Under the federal transportation planning and funding structure, local transportation agencies tap into federal funds for transportation projects through different federal programs and agencies, based on the relevant mode. Each federal program has specific requirements and criteria, which can limit how local transportation can access and use funds from these programs. In addition, intermodal projects at airports can involve multi-jurisdictions, which can present challenges under the current structure. For example, for passengers or airports to obtain the full benefits of providing alternative transportation options, intermodal capabilities need to be connected to large local transit or national rail systems. Such systems often provide service to multi-jurisdictions and, therefore, their planning and development require cooperation among multiple transportation providers and planners, such as state departments of transportation, local transit agencies, metropolitan planning organizations, and city and county governments.

[46] 49 U.S.C. § 47101.

To break down the current funding stovepipes and promote intermodal development, the federal government could consider several alternatives for transportation planning and funding that might better focus on these outcomes and promote better coordination between jurisdictions. These alternatives include:

- Increasing the flexibility of current programs. The current system of financing surface and aviation transportation projects limits options for addressing intermodal capabilities. During our interviews, officials highlighted that because federal, state, and local funding comes from different sources such as the New Starts program and PFCs, it is difficult to consider efficient and effective ways to enhance intermodal capabilities at airports. Providing more flexibility in funding across modes could help address this barrier.

- Applying different federal matching criteria for different types of expenditures in order to provide a higher level of federal match for projects that reflect federal priorities.

- Establishing a performance-oriented funding or reward-based system. Federal funds would favor those entities that address national interests and meet established intermodal goals. Federal support would reward those states or localities that apply federal money to gain efficiencies in their transportation systems, or develop intermodal capabilities at local airports.

- Expanding support for alternative financing mechanisms. The public sector could also expand its financial support for alternative financing mechanisms to access new sources of capital and stimulate additional investment in intermodal capabilities. These mechanisms include both newly emerging and existing financing techniques such as providing credit assistance to state and local governments for capital projects and using tax policy to provide incentives to the private sector for investing in intermodal capabilities. In some cases, when use and benefits are predicted to be high, private sector revenues may be an option.

- Aligning incentives for planning agencies to adopt best practices and to achieve expectations. Aligning incentives for existing and new programs or approaches to facilitate the use of better intermodal transportation project planning and funding options could improve the efficiency of federal transportation programs in enhancing intermodal connections between surface and air transportation, especially in multistate

transportation corridors, where many planning agencies have to cooperate in establishing priorities.

Benefits Likely to Be Focused on Local, Not Nationwide Travel

While this strategy of encouraging a more systemwide approach to transportation planning and development could address a number of barriers to developing intermodal services at airports, it would likely support the development of connections to local transit networks instead of to a nationwide rail network. This strategy is based on breaking down barriers with the current transportation planning structure, which is geared toward local involvement. Local transportation officials we interviewed stated that the focus of developing intermodal capabilities at their local airports was to provide greater access for the local community, instead of providing links to nationwide networks. Therefore, since this strategy provides local transportation agencies additional flexibility, we believe that their emphasis will be on developing intermodal capabilities for local access networks.

Second Strategy: Increasing the Involvement of the Federal Government in Developing a Nationwide Intermodal Transportation System

If Congress decides that a more aggressive intermodal development strategy is required, it could increase the federal government's involvement in developing a nationwide intermodal transportation system, similar to efforts in the 1950s to develop the interstate highway system. Such a strategy would involve a fundamental shift in federal transportation policy's focus on state and local decisionmaking for transportation projects and would be closer to the intermodal development strategy followed by the European Union (and several European countries) with the goal of promoting rail as a complement to air transportation. For example, the European Union and individual European nations are currently supporting the development of air-rail networks through government funding of high-speed rail infrastructure. In line with this focus, Germany and France have built new dedicated high-speed rail lines that are used only for passenger service and some of which include train stations at their largest airports. While Europe provides examples of how to develop intermodal capabilities at airports, significant differences in population density, geography, and private vehicle costs between the United States and Europe would limit the use of the European model in the United States. (See app. II for more information on the development of air-rail connections in Europe.)

Establishing National Transportation Goals to Develop Intermodal Capabilities

Congress could establish national goals for the development of intermodal capacities at U.S. airports that would increase the federal government's role in developing a nationwide intermodal transportation system that

focuses on connecting air and ground transportation. Congress has set a precedent for establishing national policy for large nationwide transportation infrastructure with the development of the interstate highway system. This system was primarily developed to address (1) the public's demand for efficient long-distance travel, (2) the needs of the military, and (3) national economic development through the connection of metropolitan and industrial areas. While the interstate highway system was focused on a single mode, the national intermodal transportation goals could focus on all modes and the connections between them. Therefore, the goals could include not only the development of facilities and connections on airport property, but also the development of a supporting transportation network to provide air passengers the ability to reach their final destination.

Many European governments have emphasized intermodal connections between air and rail within their national transportation policies, with the goal of addressing limited airport capacity and environmental issues. For example, the European Union's transport policy states that improving the intermodal connections between European airports and the high-speed rail network is a top priority. (See app. II for additional information of trans-European transport network.)

Define the Federal Role in Planning Intermodal Capabilities

The federal government could take a more active role—versus state and local transportation agencies—in the planning of intermodal connections between airports and other transportation modes. In terms of planning, the interstate highway system provides an example of how active involvement by the federal government could lead to the development of a nationwide intermodal system. In that case, the federal government provided project-specific oversight, laid out the routes, oversaw construction, and ensured that the system was adequately maintained. To develop a nationwide intermodal system that focuses on connecting airports to a rail network of sufficient quality to attract significant number of riders, the federal government could potentially take on similar roles. The European high-speed rail network is another example of governments taking an active role in developing larger transportation networks that connect to airports. For example, the French government plays a major role in developing its high-speed rail system—Train à Grande Vitesse. There are four main participants in the nation's rail network, including the central government,

regional governments, Réseau Ferré de France,[47] and the Société Nationale des Chemins de fer Français.[48] While the ownership, management, and operation of the rail system is carried out by the Réseau Ferré de France and Société Nationale des Chemins de fer Français, the central government still defines the extent of the network, gives its approval to major projects, participates in funding, and has oversight authority for the construction and safety of these projects. In addition, while no specific department deals with intermodal capabilities at French airports, the French government set up a working group in 2002 to look at developing more integration between the two transportation modes.

Determining the Appropriate Federal Funding Sources

For the federal government to take a more active role in developing airport intermodal capabilities, it might also need to take on additional federal funding responsibilities. This would be especially true if the federal policy was to develop a system that promoted connections between airport and high-speed rail networks, similar to the systems that have been developed in Europe. To fully develop an intermodal system that provides airline passengers with nationwide rail options that are comparable to European systems and that could potentially compete with air service, would require expanding and improving the existing U.S. rail network and rail service. Except in limited highly traveled corridors, Amtrak cannot provide the level of service that airlines require, in part, because much of the U.S. rail infrastructure is privately owned by freight companies and passenger trains do not receive priority in scheduling. To accomplish improved air-rail connections, the federal government would have to increase its funding role due to the high cost of enhancing or expanding rail service or developing high-speed rail corridors.

Congress has in the past provided significant funding for large transportation projects that were deemed to be in the national interest and were geared toward reaching national goals. For example, between 1954 and 2001, Congress apportioned over $370 billion for the construction and preservation of the interstate highway system. Increased federal involvement in the development of nationwide intermodal capabilities at U.S. airports would be costly and could require the implementation of a

[47]The Réseau Ferré de France is a public company, owned by the French government, that owns and manages the French rail network.

[48]Société Nationale des Chemins de fer Français operates the trains on behalf of Réseau Ferré de France.

dedicated funding source. The full costs of any intermodal capability would be dependent on how integrated and expansive this network would be and whether it included additional high-speed rail or focused on conventional passenger rail service. Our prior work has shown that both choices are costly. In the past, we have reported on Amtrak's precarious financial situation, for which Congress has periodically provided large-scale infusions of federal funds for capital expenses.[49] Additional federal funds have been spent to develop high-speed train service between Boston and Washington, D.C. We found that through March 2003, a total of about $3.2 billion had been provided—about $2.6 billion by the federal government and an additional $625 million by commuter rail agencies and state governments.[50]

Unlike the capital investment in infrastructure for airports, highways, and transit, which receive significant federal money from dedicated funding sources, the national rail system's infrastructure is funded by annual appropriations and must compete with other federal programs for funds on an annual basis. Therefore, to establish any long-term strategy to fund improvements between the national rail system and airports could require the establishment of a dedicated funding source. For example, in the past, it has been suggested that Amtrak could be funded through a dedicated funding source, such as one of the federal transportation trust funds. Even if a revenue source is established, this new funding would face many of the same revenue challenges that other transportation systems, such as highways, are facing as revenue sources are eroded.

Both the European Union and European governments have invested significant funds in the development of high-speed rail networks that provide passengers the option of fast intercity travel. For example, the European Union estimated in 2003 that the total cost of completing the trans-European transport rail network would be around 350 billion euros.

[49]From fiscal years 1976 through 2003, the federal government provided Amtrak with over $26 billion (nominal dollars) in operating and capital subsidies. This is equivalent to about $41.7 billion in 2002 dollars. See GAO, *Intercity Passenger Rail: Issues for Consideration in Developing an Intercity Passenger Rail Policy*, GAO-03-712T (Washington, D.C.: April 30, 2003).

[50]In 2003, we reported that Amtrak had estimated it would require up to $70 billion over 20 years to enhance or expand service or develop high-speed rail corridors. See GAO-03-712T.

In addition, some European governments provide a significant portion of funding for all new rail infrastructure. For example, the Swiss government has established a vehicle tax on all Swiss and foreign freight trucks using Swiss roads to help fund its rail network, among other things. Two-thirds of the revenue collected from this tax is allocated to improving the Swiss rail infrastructure. Germany has also enacted a specific toll on freight vehicles based on a user charge for actual mileage driven. The revenue collected from this toll will be used to finance the Anti-Congestion Scheme for Federal Railway Infrastructure program, among other programs.[51]

Anticipated Benefits May Not Justify High Costs

Given the high costs of this strategy, benefits high enough to justify investment in intermodal facilities would likely be anticipated in a limited number of places, at most. Both private and public benefits could result from this investment. Users of the investment would receive private benefits in the form of transportation services and would be expected to pay some form of fee or user charge. How much users would be willing to pay would depend on the value of the services that they would receive from the intermodal facility, compared with the benefits from alternative modes that they could also use for the same trip and the prices they would have to pay for the alternatives. In locations where there is highway congestion, a rail link to the airport might be valuable to many travelers because it could offer a travel option that might reduce travel time or make the travel time more reliable. Similarly, if airport parking is expensive, an intermodal link might have considerable value to travelers. However, such a link might be of less value where there is little congestion and parking is inexpensive; in such situations, we would not anticipate that many travelers would be willing to pay much to use a new facility.

In addition to these private benefits, there may be public benefits that users would not take into account in deciding how often to use the facility and how much they would be willing to pay. The public benefits could include reduced highway and air congestion, pollution, and energy dependence. For example, if air passengers can access a nationwide rail network directly at an airport, some passengers might travel to that airport from other cities by train rather than on highways or short-haul flights, which might reduce highway or airport and airway congestion. However, the demand for such service is likely to be low except in a few highly congested travel corridors where the distances are short enough to make rail travel

[51]The goal of this program is to increase the effectiveness of the railway system and shift traffic from the nation's roadway system to the railway system.

times competitive with air travel times. Morever, congestion-relief benefits would only be realized at airports where either highways or airports are already at or near capacity, because only at those airports would additional users have a disproportionate, detrimental effect on the flow of automobile or aircraft traffic. At airports that do not have substantial highway or airport congestion, such benefits would not be realized. There might still be some pollution and energy dependency benefits, but since the number of travelers likely to use these facilities at such airports is limited, these benefits will be limited as well. Public benefits could also include "option value," the value that people place on having the option to use something even though they are not currently using it. By providing an alternative that would be available to travelers as an option if their circumstances change, such as bad weather, investment in intermodal facilities creates value that could also justify public subsidy. The greater the number of potential users, and the greater the likelihood that travelers might switch to the new facility, the greater the option value.

The existence of public benefits, or externalities, is often cited as a justification for public subsidies that would induce more people to use a facility than if they had to pay the full cost. When the price can be reduced to users due to subsidies, some additional travelers for whom the private benefits would not be sufficient to justify paying an unsubsidized price would also choose to use the facility. However, only where both the private and the public benefits are large would the appropriate subsidy be sufficient to cover the difference between what users would be willing to pay and the substantial cost of the facility. Given the high investment costs, these locations are likely to be limited to airports where there is substantial ground and air congestion and to a few highly congested travel corridors where the distances are short enough to make rail travel times competitive with air travel times.

Concluding Observations

The limited nature of intermodal connections at major U.S. airports is most likely the result of many factors. One underlying factor is a lack of demand. Due to the inconvenience of transferring from airplane to train or bus, potentially higher travel times, and out-of-pocket costs, many American travelers in many parts of the country are likely to continue to prefer car travel over transit to access the airport and short-haul flights over connections to a nationwide rail system to complete an overall journey. There is likely to be a greater demand for such connections in a few highly traveled corridors where higher private benefits to individual travelers and public benefits such as reduced congestion on roadways would be more

likely to result. Moreover, in the context of federal transportation policy's emphasis on local decision making, local officials in communities with strong local bus and rail transit systems have worked to connect airports to these systems. A federal strategy of encouraging a more systematic approach to transportation planning—including alternative funding mechanisms—could encourage state and local governments to consider the development of additional intermodal connections at airports in the context of other transportation investment decisions. At the same time, it is clear that more quantitative evaluations of the benefits of intermodal capabilities at airports could help to better inform state and local as well as federal decision makers as they attempt to determine which projects to develop with limited resources. The before and after evaluation requirement for projects that receive funding through the New Starts program is a positive step in this direction and could potentially be more widely applied.

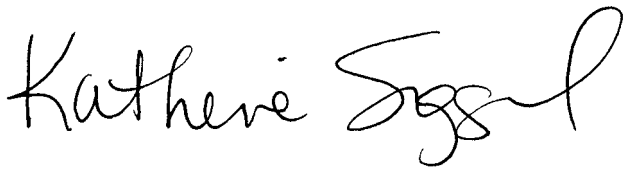
Agency Comments

We provided drafts of this report to DOT and Amtrak for their review and comment. DOT provided technical comments from FAA's Director of Airport Planning and Programming, which we have incorporated in this report as appropriate. Overall, DOT generally concurred with this report. Amtrak had no comments on this report.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 10 days from the report date. At that time, we will send copies of this report to interested congressional committees, the Secretary of Transportation, the Administrators of FAA and FTA, and the President of Amtrak. 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 have any questions about this report, please contact me at (202) 512-2834 or siggerudk@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix VII.

Sincerely yours,



Katherine Siggerud
Director, Physical Infrastructure

Objectives, Scope, and Methodology

This report addressed the following questions: (1) What roles do federal, state, and local governments and the private sector play in developing intermodal capabilities at U.S. airports? (2) To what extent have intermodal services and facilities been developed at selected U.S. airports? (3) What benefits, costs, and barriers exist for developing additional intermodal capabilities at U.S. airports? (4) What transportation strategies, including lessons learned from the European experience, may help public decision-makers improve intermodal capabilities at U.S. airports?

To address these questions, we used a variety of methods and sources of information. To determine the roles that federal, state, and local governments and the private sector play in developing intermodal capabilities at U.S. airports, we interviewed transportation officials from the following Department of Transportation (DOT) offices: Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and the Office of Intermodalism. We also interviewed officials from the American Bus Association, Association of American Railroads, Association of Metropolitan Planning Organizations, Airports Council International-North American, American Public Transportation Association, International Air Rail Organization, Amtrak, American Airlines, Continental Airlines, Midwest Airlines, and Northwest Airlines. In addition, we interviewed officials from state and local transportation offices, metropolitan planning organizations, transit authorities, and airport authorities representing selected airports, which are identified later in this appendix.

To determine the extent to which intermodal services and facilities have been developed at major U.S. airports, we selected and administered a Web-based survey to 72 airports from FAA's 2003 Air Carrier Activity Information System[1] database. These airports accounted for approximately 90 percent of the enplanements for calendar year 2003, and consist of all 33 large hub, all 35 medium hub, and the 4 small hub airports that are located

[1]The FAA Air Carrier Activity Information System database categorizes airports by the number of annual enplanements.

in the same metropolitan area as a large or medium hub airport.[2] Appendix V provides the complete list of airports surveyed. We asked airport officials about the local and nationwide bus and rail systems that are accessible to their airports by regular, fixed-route shuttle service, an automated people mover or walking. We also asked the airports if their capital improvement plan included proposals to enhance the airport's connections to local and nationwide transportation systems. Since responses to surveys are often subject to nonsampling errors, we attempted to minimize these errors by taking several precautions during the questionnaire design and pretested the instrument with 8 medium and large hub airports. We made changes to the content and format of the final questionnaire as a result of these pretests. The questionnaire was administered on the Internet from February 22 to March 31, 2005, with two intervening e-mail messages and follow-up telephone contacts. We received responses from all 72 airports,[3] resulting in a 100 percent response rate. To ensure the accuracy of information presented by the airport officials, we relied on Salk International's *Airport Transit Guide* and follow-up questions at selected airports. We are not reporting responses for two questions on the survey because we determined that these responses were unreliable. During our pretests of the survey questionnaire, some respondents gave incorrect answers to questions about the existence of stations for either Amtrak or a nationwide bus system within their metropolitan area (questions 5 and 13). Based on follow-up questions, we discovered that some pretest respondents were unaware of some stations located within their metropolitan area, especially in instances where there was no direct access between the airport and these stations. In addition, some respondents were unaware of the exact boundaries of their metropolitan area. Despite these difficulties, we elected to leave these questions in the survey because of their role in screening respondents and setting the context for subsequent questions. The nature of the errors were such that false negative responses would be unlikely to lead to errors in subsequent questions. That is, it is unlikely that an airport that actually had direct connections to a nationwide bus or rail system would state that there was not a station for such a system

[2]FAA categorizes the nation's commercial airports into four main groups based on the number of passenger enplanements—large hubs, medium hubs, small hubs, and nonhubs. The categories are based on the number of passengers boarding an aircraft (enplaned) for all operations of U.S. carriers in the United States. A large hub enplanes at least 1 percent of all passengers, a medium hub 0.25 to 0.99 percent, a small hub 0.05 to 0.249 percent, and a nonhub less than 0.05 percent.

[3]We received one airport's response by fax.

in their metropolitan area. We conclude that responses to the remaining questions are sufficiently reliable for the purposes of this report. Appendix IV provides the survey results. The survey results (GAO-05-738SP) are also available on the GAO Web site at http://newwww.gao.gov/special.pubs/gao-05-738SP/index.html.

To obtain information on the benefits, costs, and barriers in developing intermodal capabilities at selected U.S. airports, we conducted case study analysis of 16 selected airports. Airports for our case studies were chosen based on airport size, planned or existing types of intermodal service,[4] and geographic location. We adopted a case study methodology because, while the results cannot be projected to the universe of airports, case studies are useful in illustrating the range and complexity of intermodal capabilities the airports implemented. We interviewed local and state transportation officials, metropolitan planning organizations, transit authorities, airport authorities, airlines and other key stakeholders at each of the 16 airports. The cities and airports where we conducted our case studies are shown in table 8.

Table 8: Airports Selected for GAO Case Studies

Airport	Geographic location	Airport size
Baltimore-Washington International	Baltimore, MD	Large
General Mitchell International	Milwaukee, WI	Medium
John F. Kennedy International	New York City, NY	Large
La Guardia	New York City, NY	Large
Los Angeles International	Los Angeles, CA	Large
Metropolitan Oakland International	Oakland, CA	Large
Miami International	Miami, FL	Large
Minneapolis/St. Paul International	Minneapolis, MN	Large
Newark Liberty International	Newark, NJ	Large
Norman Y. Mineta San Jose International	San Jose, CA	Medium
Ontario International	Ontario, CA	Medium
Portland International	Portland, OR	Medium
Ronald Reagan Washington National	Arlington, VA	Large

[4]Planned or existing types of intermodal service include rail, bus, and high-speed rail.

(Continued From Previous Page)

Airport	Geographic location	Airport size
San Francisco International	San Francisco, CA	Large
Seattle-Tacoma International	Sea-Tac, WA	Large
Washington Dulles International	Chantilly, VA	Large

Source: GAO.

To determine what transportation strategies may help public decision makers improve intermodal capabilities at U.S. airports, we interviewed government, airline, rail, and airport officials from the European Union, France, Germany, Switzerland, and the Netherlands to obtain descriptive information on their airport-rail connections. These nations were selected based on research publications, which identified airports within these countries as having best practices on intermodal airport connections. We also reviewed and used information from our past reports on areas including the interstate highway system, the nationwide rail system, and transportation investment strategies. In order to determine basic differences between the United States and Europe that could affect the relevance of the European experience in the United States, we gathered and analyzed information from intermodal transportation experts and literature.

In addition, we obtained and analyzed information and documents from DOT, the European Union, the National Research Council's Transportation Research Board, the Transit Cooperative Research Program, and others. We conducted our work between July 2004 and July 2005 in accordance with generally accepted government auditing standards.

Intermodal Connections at Airports in Europe

While the European Union has developed a common transportation policy, the actual implementation and development of transportation infrastructure, including intermodal capabilities at European airports, remains the responsibility of individual member nations. Their experiences may provide examples of how intermodal connectivity could be improved in the United States. However, significant differences between the United States and Europe should be considered.

Role of the European Union in Developing Air-Rail Connections

In 1992, the European Union established a transportation policy with the guiding principle to open up the transportation market between member countries. This policy included increasing competition within the aviation industry, striking a balance between growth in air transportation and the environment, and building new transportation infrastructure. The European Commission's Directorate-General for Transport and Energy is the transportation agency for the European Union and is responsible for developing and implementing transportation policy. This office carries out these tasks using legislative proposals—which establish specific requirements or regulations that member countries must implement—and program management including the financing of certain transportation projects. While the European Union has established a European Union-wide policy, individual member nations are responsible for planning and funding not only European Union-designated priority projects, but also their own individual transportation priorities.

In July 1996, the European Union established guidelines for developing a trans-European transportation network that comprises roads, railways, airports, seaports, inland ports and traffic management systems that serve the entire European Union. The guidelines included a list of priority projects that can receive funding from the European Union. For those priority projects, the European Union generally funded up to 50 percent of the project study costs and up to 10 percent of project development costs.[1] Member nations are primarily responsible for planning, designing, funding, and building these projects.

[1]The European Union's 10 percent funding of project development costs is for sections of the projects that are linked to the trans-European network objectives.

Role of Member Nations and Local Entities in Developing Air-Rail Connections

During our interviews with transportation officials in four European countries, we found that national governments, local governments, and private transportation companies—such as airport and rail companies—all take part in the development of intermodal capabilities at airports.[2] At the European locations we visited, airports, many of which are owned or operated by private airport management companies, have taken the lead in planning and funding major intermodal facilities on airport property. For example, Fraport, a private company that manages Frankfurt's airport, and Deutsche Bahn, the German rail company, invested over 300 million euros in building a station for long-distance and high-speed trains at the Frankfurt airport.[3] Additionally, some European rail systems are also privately operated. For example, both Germany and France have established private companies to operate their nations' rail systems. However, the national government still takes the lead in planning and funding the building of the overall rail infrastructure, such as dedicated high-speed rail tracks. Once this infrastructure is built, it is then turned over to these private companies that operate and manage this infrastructure. At the Frankfurt airport, Deutsche Bahn and Fraport funded the construction of the long-distance train station, but all the track infrastructure was funded by the German national government. We found that local governments also are involved in providing intermodal transportation services to airports, with local government-owned transit agencies providing either rail or local bus service to the airport. For example, the Rhein-Main Verkehrsverbund regional transit system provides 230 daily connections and service to about 4,000 passengers per day from the Frankfurt airport.

Differences between the United States and Europe Limit Usefulness of "European Model"

Examining international models can provide examples of how a more active federal role can help in developing a nationwide rail network, including intermodal capabilities at airports. However, significant differences between the United States and other nations would limit the use of these international models. Based on information we gathered from intermodal transportation experts and research we reviewed, we identified

[2]Many European airports are either owned by private-for-profit companies or are owned by regional or local governments and managed by private-for-profit companies.

[3]The Frankfurt International Airport is owned and managed by Fraport, a private airport management company. The state of Hesse, city of Frankfurt, and German federal government own over 70 percent of Fraport's shares.

three basic differences between the United States and Europe that affect the ability to use the European model in the United States.

- **Population density**. Experts and prior research highlight the greater population density of European cities and that downtowns are major destination points for passengers as key differences that affect the use of intermodal systems. While some U.S. cities have population densities comparable to European cities, in general, U.S. cities are more decentralized. In addition, prior research has shown that European cities generally have a greater downtown orientation for passengers as compared to U.S. cities, and so intermodal systems providing direct access to downtown will have a greater ability to draw passengers.[4]

- **Geographic differences**. Generally, distances between many major cities in the United States are greater than in Europe. These greater distances can affect intermodal transportation because many experts believe that for intercity rail to be competitive with air travel, the distance between cities needs to be within 2-3 hours total travel time or 100-500 miles, depending on the speed of the train. One expert stated that there are some areas in the United States—California, the Northeast, and the Great Lakes—where it is possible that rail transportation could provide competitive service within these areas.

- **Lower vehicle use costs**. In the United States, gasoline prices are much lower than in Europe because of substantially lower taxes. In addition, the rate of car ownership is generally higher. For both reasons, people traveling to airports in the United States are more likely to drive and leave their cars at the airports until they return than in Europe, which could reduce the demand for (and therefore the benefits of) more extensive intermodal capabilities at U.S. airports.

[4]Transit Cooperative Research Program Report 62, *Improving Public Transportation Access to Large Airports* (Washington, D.C.: 2000).

Financing Intermodal Projects at Airports

Intermodal projects are large capital projects that generally require pooling money from different sources and different transportation modes. The federal government can help finance local transportation projects through federal transportation programs such as the New Starts program and federal credit assistance programs such as the Department of Transportation's (DOT) Transportation Infrastructure Finance and Innovation Act. State and locally generated money such as state transportation trust funds, dedicated sales taxes, and highway tolls have been used to match federal funds. In addition, airports have used passenger facility charges (PFC) and airport revenue to fund rail access at airports and public-private partnerships have been used to attract private investment.

Federal Funding

The New Starts program is used to select for federal funding new rail transit projects, including those that connect to airports. New Starts is the Federal Transit Administration's (FTA) capital investment program for fixed guideway systems and extensions. For selected projects, a maximum of 80 percent federal contribution to total project costs can be funded, but projects that request a maximum federal share of 60 percent of the project's total cost receive higher priority. For example, parts of the BART extension to the San Francisco International Airport and the Hiawatha Light Rail Line to the Minneapolis/St. Paul International Airport were funded through the New Starts program. Other federal programs provide support for highway and transit systems that may be connected to airports. For example, federal highway fuel taxes are deposited into the Highway Trust Fund and distributed by the Federal Highway Administration (FHWA) and FTA to state transportation departments and local transit operators. While most federal funding sources and programs are linked to highway or transit uses, some funding flexibility between highway and transit is allowed under programs such as the Surface Transportation Program and the Congestion Mitigation and Air Quality Improvement Program, both of which have been used to fund intermodal projects.

In addition, the Federal Aviation Administration's (FAA) Airport Improvement Program (AIP) provides grants to airports for planning and development projects. The program is funded in part by aviation user taxes, which are deposited into the Airport and Airway Trust Fund. Funds are allocated to airports with scheduled commercial service and at least 10,000 enplanements each year.[1] In terms of promoting intermodal capabilities, AIP funds are generally used for access roads to airports that are airport owned, on airport property, and exclusively serve airport traffic.[2]

Furthermore, DOT provides credit assistance for highway, transit, passenger rail, and intermodal projects under the Transportation Infrastructure Finance and Innovation Act. Credit assistance includes direct loans, loan guarantees, and lines of credit. Project financing must be repayable in part or in whole from tolls, user fees, or other dedicated revenue sources.

Finally, Congress designates specific transportation programs and projects for funding. For example, federal funds to Amtrak support nationwide passenger rail service for operating and capital expenses. Congress also designated funds for the construction of the Amtrak station at the Milwaukee General Mitchell International Airport.

State and Local Funding

State and local funding for intermodal capabilities can provide matching funds for federal programs such as New Starts and can derive from several sources. These sources have included state and local apportionments of the Highway Trust Fund, state and local gas taxes, and motor vehicle taxes and registration fees. In addition, some states have dedicated a percentage of the general sales tax to fund rail transit projects.[3] Some local governments and transit agencies have also dedicated a portion of property

[1]Funds are allocated to smaller airports at a fixed amount each year based on their FAA-identified capital needs and to airports with significant all-cargo operations based on the airport's cargo tonnage. FAA also distributes a portion of AIP funds each year based on discretionary considerations.

[2]The facility must be owned by the airport but can be leased to a transit authority for operations and maintenance. In addition, the facility must be located on property that is either owned by the airport or included in an airport lease or easement agreement.

[3]In the case studies that we examined, the respective counties that include the cities of Seattle, San Francisco, and Miami passed ballot measures dedicating a portion of the sales tax for rail transit projects.

tax or payroll tax for rail projects to airports. Also, bridge, tunnel, and highway tolls have in part funded automated people mover systems at John F. Kennedy International Airport in New York and Newark Liberty Airport in New Jersey. In addition, cities and counties can provide capital and operating costs for rail projects. Further, local governments have established special tax districts such as "transportation improvement districts" that can tax businesses in order to capture the value added to a business or property with close access to a rail project. In this way, those who receive the benefits of increased economic activity or increased property value contribute to project costs. For example, a transportation improvement district was established to help fund the proposed rail extension to the Washington Dulles International Airport in Virginia.

Like the federal government, states have their own credit assistance programs. The National Highway System Designation Act of 1995 allows up to 10 states to capitalize transportation credit assistance banks to provide loans and credit enhancement to eligible surface transportation projects. For example, under this program, Florida used funds authorized under the Transportation Equity Act for the 21st Century to capitalize its credit assistance bank, which funded in part the development of the Miami Intermodal Center at Miami International Airport.

PFCs and airport revenue are the primary sources of local airport contributions to funding projects that provide rail access to airports. For a project to be eligible to use PFCs, it must be airport owned, on airport property, and be exclusively for the use of airport passengers and employees.[4] Airports apply to FAA for approval of both the collection of the fees and the use of the fee revenue for specific projects. FAA will generally approve an airport's proposal for the collection or use of PFC funds as long as the project is eligible, meets a program objective, and is adequately justified. Airport revenue includes receipts from customer facility charges,[5] parking, terminal concessions, and airline landing fees and rentals. For example, the Miami Intermodal Center will levy a customer facility charge on car rentals to pay for its consolidated rental car facility. The eligibility

[4]As with AIP grants, the facility must be owned by the airport but can be leased to a transit authority for operations and maintenance. In addition, the facility must be located on property that is either owned by the airport or included in an airport lease or easement agreement.

[5]Customer facility charges are surcharges on car rentals that can pay for the capital and operating costs of a transit system from a consolidated rental car facility.

criteria for the use of airport revenue are similar to PFCs, but projects must only be directly or substantially related to the air transportation of passengers and property rather than for exclusive use. FAA does not approve the use of airport revenue for a particular project, unless an airport or airport user complains that funds are being inappropriately used.

State and local governments have used federal funding, PFCs, and airport revenue to back tax-exempt bonds. Also, Grant Anticipation Notes backed by New Starts Full Funding Grant Agreements[6] were used for the BART extension to the San Francisco airport. For on-airport projects, General Airport Revenue Bonds have been issued by airports backed solely by, or in combination with, PFCs and airport revenue.

Private Sector Investment

Private investment in intermodal capabilities has occurred through public-private partnerships. For example, Portland International Airport entered into a public-private partnership with the builder of its light rail extension to the airport. In return, the builder has a 85-year lease on the property to develop retail or office space.

[6]A New Starts Full Funding Grant Agreement defines the project including cost, scope, and schedule and commits a maximum level of federal financial assistance subject to appropriation.

Survey Results

Questions	Number of airports responding			
	Yes	No	Not applicable	Don't know
Local rail systems				
1. Is there at least one rail system designed for local transportation within the metropolitan area where ( ) Airport is located? Please consider local rail systems to include light rail, commuter rail, and subways, but not to include nationwide rail networks, such as Amtrak.	43	29	0	0
2. For this local rail system (or systems), please consider the stations that are most accessible to the airport. Is there regular, fixed-route shuttle service from any of these local rail stations to any of the airport's terminals?	22	18	3	0
3. Does the airport have a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from any of these local rail stations to any of the airport's terminals?	8	34	1	0
4. Would it be convenient for an average adult with luggage to walk from any of these local rail stations to any of the airport's terminals?	11	31	0	1
Nationwide rail network				
5. Is there at least one Amtrak station in the metropolitan area where ( ) Airport is located?[a]	56	16	0	0
6. Please consider the Amtrak station (or stations) most accessible to the airport. Is there regular, fixed-route shuttle service from any of these Amtrak stations to any of the airport's terminals?	13	42	0	1
7. Does the airport have a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from any of these Amtrak stations to any of the airport's terminals?	1	53	2	0
8. Would it be convenient for an average adult with luggage to walk from any of these Amtrak stations to any of the airport's terminals?	0	56	0	0
Local bus systems				
9. Is there at least one system of scheduled, fixed-route buses designed for local transportation within the metropolitan area where ( ) Airport is located? Please consider local bus systems to include public transit buses, express buses, and bus rapid transit. Do not consider either nationwide bus systems, such as Greyhound, or on-demand transportation, such as taxi vans, hotel shuttles, or charter buses as local bus systems.	70	2	0	0
10. For this local bus system (or systems), please consider the bus stops that are most accessible to the airport. Is there regular, fixed-route shuttle service from any of these bus stops to any of the airport's terminals?	48	19	3	0
11. Does the airport have a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from any of these bus stops to any of the airport's terminals?	6	58	6	0
12. Would it be convenient for an average adult with luggage to walk from any of these bus stops to any of the airport's terminals?	56	14	0	0

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Questions	Number of airports responding: Yes	No	Not applicable	Don't know
Nationwide bus systems				
13. Is there at least one station for a nationwide bus system, such as Greyhound, within the metropolitan area where ( ) Airport is located? Please do not consider local transit buses, charter buses, or shuttle buses to be a nationwide bus system.[a]	58	14	0	0
14. Please consider the nationwide bus station (or stations) most accessible to the airport. Is there regular, fixed-route shuttle service from any of these nationwide bus stations to any of the airport's terminals?	10	46	0	2
15. Does the airport have a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from any of these nationwide bus stations to any of the airport's terminals?	1	55	2	0
16. Would it be convenient for an average adult with luggage to walk from any of these nationwide bus stations to any of the airport's terminals?	5	53	0	0
Plans to build ground transportation facilities				
17. Does ( ) Airport have a Capital Improvement Plan?	72	0	0	0
18. Does the airport's Capital Improvement Plan include a proposal to build a train station for a local rail system? Please consider local rail systems to include light rail, commuter rail, and subways, but not to include nationwide rail networks, such as Amtrak.	14	55	3	0
19. Does the airport's Capital Improvement Plan include a proposal to build a train station for a nationwide train system, such as Amtrak?	0	72	0	0
20. Does the airport's Capital Improvement Plan include a proposal to add stops for local transit buses? Please consider local bus systems to include public transit buses, express buses, and bus rapid transit. Do not consider either nationwide bus systems, such as Greyhound, or on-demand transportation, such as taxi vans, hotel shuttles, or charter buses as local bus systems.	12	56	4	0
21. Does the airport's Capital Improvement Plan include a proposal to build a station for a nationwide bus system, such as Greyhound? Please do not consider local transit buses, charter buses, or shuttle buses to be a nationwide bus system.	2	69	1	0
22. Does the airport's Capital Improvement Plan include a proposal to build a people mover (that is, an automated guideway car or a moving sidewalk) to connect any of the airport's terminals with ground transportation facilities, such as bus stations or train stations?	19	50	2	0
23. Does the airport's Capital Improvement Plan have any other proposals to improve passengers' access to trains and buses?	13	53	3	2

Source: GAO.

[a]The answers to these questions are unreliable. See appendix I for more details.

Survey Results on Existing and Planned Bus and Rail Connections

The 72 airports we surveyed reported different levels of connections to air and rail systems. As shown in table 9, most airports had direct connections to local bus or rail systems, while fewer had connections to nationwide transportation systems. Twenty airports reported plans to develop connections to local transportation systems, while only 2 reported plans to develop connections to a nationwide transportation system.

Table 9: Existing and Planned Bus and Rail Connections at 72 Airports

Airport (n=72)	Local bus (n=64)	Local rail (n=27)	Nationwide bus (n=12)	Nationwide rail (n=13)	Planned local bus (n=12)	Planned local rail (n=14)	Planned nationwide bus (n=2)	Planned nationwide rail (n=0)
Albuquerque International Sunport								
Austin-Bergstrom International	x							
Baltimore-Washington International	x	x		x	x	x	x	
Bob Hope	x	x		x				
Bradley International	x							
Buffalo Niagara International	x							
Charlotte/Douglas International	x							
Chicago Midway International	x	x		x				
Chicago O'Hare International	x	x			x	x		
Cincinnati/Northern Kentucky International	x					x		
Cleveland-Hopkins International	x	x						
Dallas Love Field	x	x						
Dallas/Fort Worth International	x	x			x	x	x	
Denver International	x					x		
Detroit Metropolitan Wayne County	x							
Eppley Airfield								
Fort Lauderdale/Hollywood International	x	x		x				
General Edward Lawrence Logan International	x	x						
General Mitchell International	x		x	x				
George Bush Intercontinental	x					x		
Hartsfield-Jackson Atlanta International	x	x	x					
Honolulu International	x							
Indianapolis International	x				x			
Jacksonville International					x	x		
John F. Kennedy International	x	x						

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Airport (n=72)	Local bus (n=64)	Local rail (n=27)	Nationwide bus (n=12)	Nationwide rail (n=13)	Planned local bus (n=12)	Planned local rail (n=14)	Planned nationwide bus (n=2)	Planned nationwide rail (n=0)
John Wayne Airport-Orange County	x							
Kahului								
Kansas City International								
La Guardia	x	x	x	x				
Lambert-St Louis International	x	x	x					
Long Beach/Daugherty Field	x							
Long Island MacArthur	x	x						
Los Angeles International	x	x			x			
Louis Armstrong New Orleans International					x			
Louisville International-Standiford Field	x							
Luis Munoz Marin International	x							
Manchester	x							
McCarran International	x							
Memphis International	x		x		x	x		
Metropolitan Oakland International	x	x						
Miami International	x	x	x	x				
Minneapolis/St. Paul International	x	x						
Nashville International	x							
Newark Liberty International	x	x	x	x				
Norfolk International								
Norman Y. Mineta San Jose International	x	x						
Ontario International	x							
Orlando International	x				x			
Orlando Sanford	x				x			
Palm Beach International	x	x	x	x				
Philadelphia International	x	x	x	x				
Phoenix Sky Harbor International	x		x			x		
Pittsburgh International	x							
Port Columbus International	x							
Portland International		x						
Raleigh-Durham International	x				x			
Reno/Tahoe International	x		x					
Ronald Reagan Washington National	x	x						
Sacramento International	x			x				
Salt Lake City International	x					x		

(Continued From Previous Page)

Airport (n=72)	Local bus (n=64)	Local rail (n=27)	Nationwide bus (n=12)	Nationwide rail (n=13)	Planned local bus (n=12)	Planned local rail (n=14)	Planned nationwide bus (n=2)	Planned nationwide rail (n=0)
San Antonio International	x							
San Diego International	x							
San Francisco International	x	x						
Seattle-Tacoma International	x			x		x		
Southwest Florida International	x							
Tampa International	x				x	x		
Ted Stevens Anchorage International	x							
Theodore Francis Green State	x	x		x				
Tucson International	x							
Washington Dulles International	x	x	x			x		
Westchester County	x							
William P. Hobby	x					x		

Source: GAO.

Note: For existing connections, we considered a transfer point (such as a bus stop or rail station) to be a direct connection to the airport if: it was convenient for an average adult with luggage to walk to the transfer point from any of the airport's terminals; the airport had a people mover (that is, an automated guideway car or a moving sidewalk) that transports passengers from the transfer point to any of the airport's terminals; or there was regular fixed-route shuttle service from the transfer point to any of the airport's terminals.

Selected Airport Case Studies

Airport and local transportation officials at each of our case studies reported a number of primary benefits and primary barriers associated with the development of intermodal facilities at the airport. As shown in figure 10, the most commonly cited primary benefit for intermodal facilities at the airport was providing alternative transportation options for passengers, while the most commonly cited primary barrier to developing such facilities was restrictions on the use of FAA funds. A brief description of the intermodal facilities, plans for additional facilities, and local stakeholders at each of the airports is presented in this appendix.

Figure 10: Primary Benefits and Barriers Associated With Developing Intermodal Facilities at Airports, According to Airport and Local Transportation Officials

	Baltimore–Washington	Los Angeles	Miami	Milwaukee	Minneapolis/St. Paul	Newark	New York Kennedy	Oakland	Portland	San Francisco	San Jose	Seattle-Tacoma	Washington National	Washington Dulles
Primary benefits														
Provides alternative transportation options for passengers	●	●		●	●	●	●	●	●	●	●	●	●	●
Provides alternative transportation options for employees	●	●	●		●	●	●		●	●	●	●	●	●
Expands potential employee or customer base	●			●	●	●				●	●		●	●
Makes efficient use of limited airport property	●	●			●				●	●		●	●	
Reduces traffic congestion at airports	●	●	●		●		●	●	●	●	●	●	●	
Provides economic benefits		●			●	●			●			●	●	●
Alleviates parking and terminal curbside congestion		●			●	●	●			●			●	
Provides non-residents with transit to downtown				●	●			●	●	●		●	●	●
Primary barriers														
Restrictions on use of FAA funds	●	●	●		●		●			●	●	●		
Reductions in parking revenue	●							●			●			
Limited local community support	●	●					●							
Geographic and physical barriers and airports right-of-way issues		●			●				●		●	●	●	
Lack of convenience for air passengers						●					●		●	●
Lack of funds		●		●				●			●			●
Lack of support from key airport stakeholders				●	●		●			●				
Availability of inexpensive employee parking								●						
Insufficient transit and rail service				●										
Higher costs due to federal regulatory requirements					●					●				
Insufficient population density											●			

Source: GAO analysis of information from airports and other transportation officials.

Baltimore-Washington International Airport

Intermodal Facilities – Baltimore-Washington International Airport has the following intermodal connections (see fig. 11).

- Local bus: Passengers can access local bus service at the airport's terminal.

- Local rail: Passengers can access three different local rail transit systems. A station for Baltimore's local rail transit system is located at the north end of the airport's terminal. A local commuter rail stops at an Amtrak station that is located within two miles of the terminal and can be accessed by a free shuttle bus from airport terminals. In addition, a station for Washington, D.C.'s local rail transit system can be accessed by an express bus from the airport's terminal.

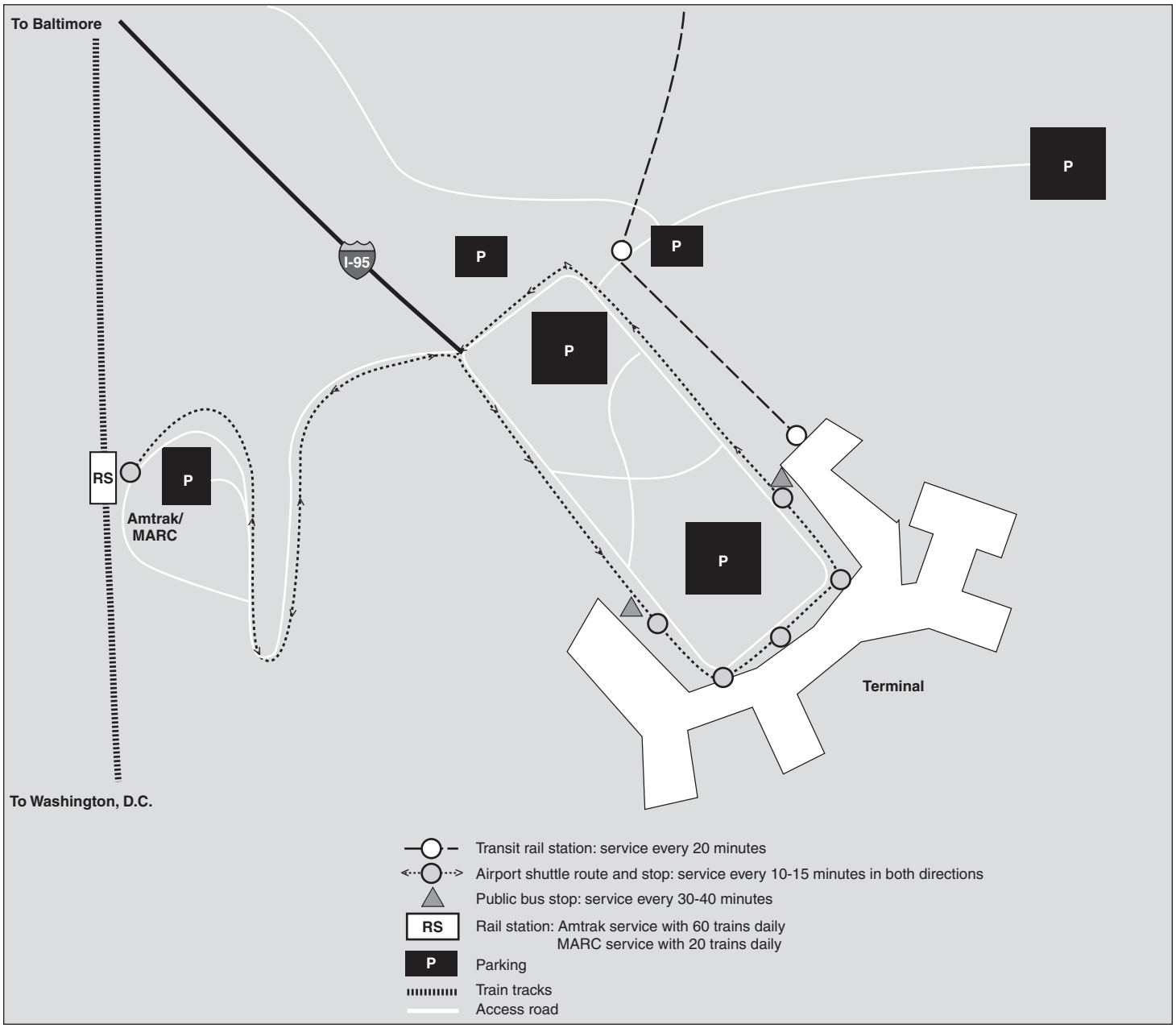
- Nationwide bus or rail: Passengers can access Amtrak at a station located within two miles of the airport and connected to the terminal by a free shuttle.

- Plans for additional facilities: The airport is evaluating the need for and feasibility of developing a regional intermodal transportation center and an automated people mover system that would connect the airport to the Amtrak rail station, satellite parking lots, and a consolidated rental car facility.

Key Local Stakeholders – The Baltimore-Washington airport is owned and operated by the Maryland Aviation Administration, which is part of the Maryland Department of Transportation. At the state level, the department of transportation leads intermodal planning and coordination between state transportation agencies through the airport's Access Coordination Group. This group is comprised of various state and local government agencies that coordinate project information and resolve any problems or issues. The aviation administration is the lead agency in planning and coordinating intermodal facilities at the airport with federal agencies (such as the Federal Aviation Administration (FAA), state agencies, local governments, private sector organizations, and public stakeholders. Other key organizations include the Baltimore Metropolitan Council, the metropolitan planning organization for the Baltimore region, and Anne Arundel County, which regulates land development on nonstate and federal property. The Maryland Transit Administration provides local bus and rail transit service, and Howard County Transit and Annapolis Transit provide local bus service. The Washington Metropolitan Area Transit Authority

provides express bus service to the Greenbelt station of Washington, D.C.'s local rail transit system, Metro.

Figure 11: Intermodal Connections at Baltimore-Washington International Airport



Source: GAO.

Note: Map is not to scale.

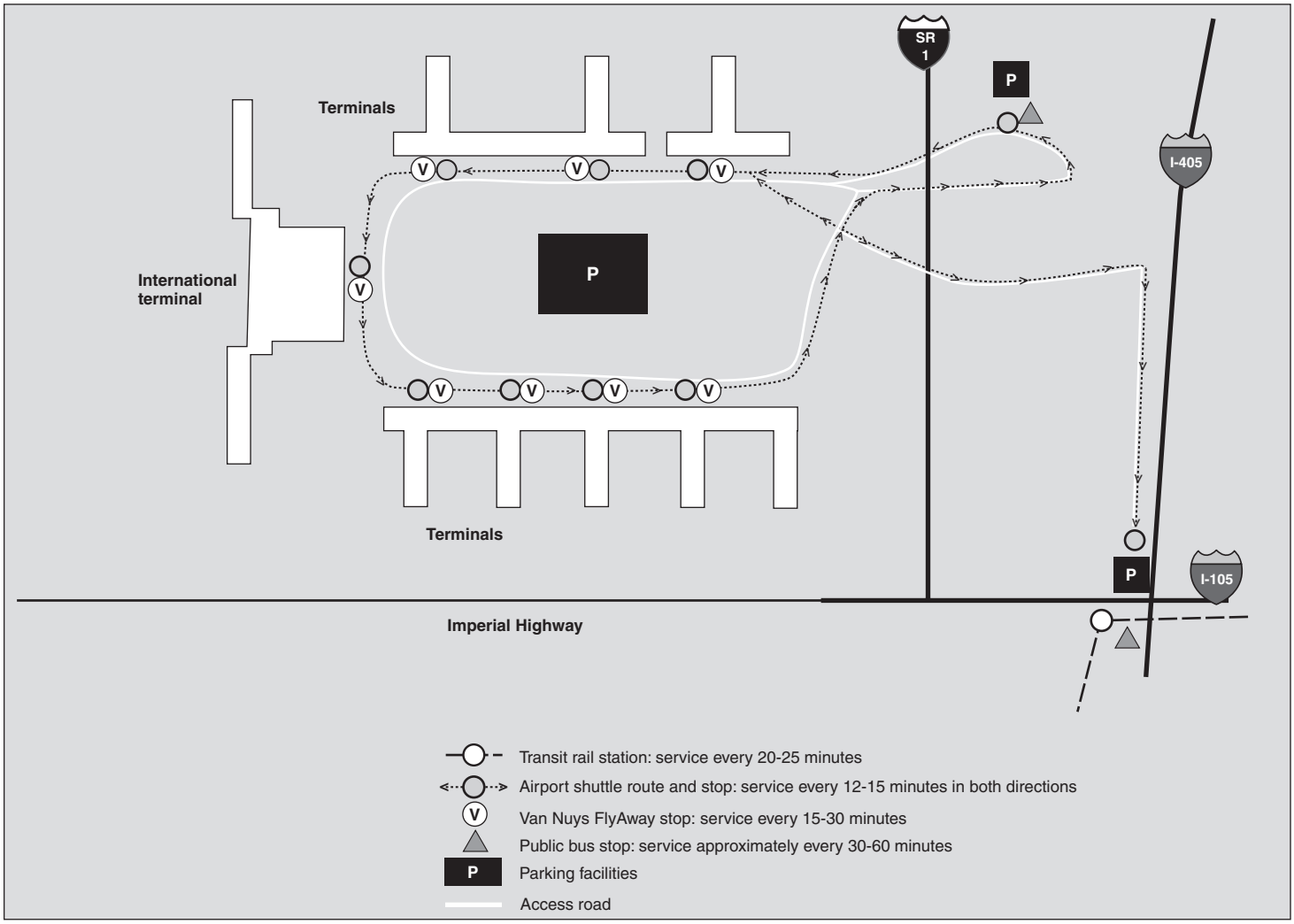
Los Angeles International Airport

Intermodal Facilities – The Los Angeles International Airport has the following intermodal connections (see fig. 12).

- Local bus: Passengers can access local bus service at the Intermodal Transit Center, which is connected to airport terminals by a free shuttle.
- Local rail: Passengers can access the local rail transit system at a station connected to airport terminals by a free shuttle.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: The Los Angeles airport master plan includes the development of an intermodal transportation center with a direct connection to the local rail transit system. The plan also includes the construction of automated people movers to connect the intermodal transportation center to airport terminals.

Key Local Stakeholders – Los Angeles airport is owned and operated by Los Angeles World Airports—a department of the City of Los Angeles—and governed by the seven-member Board of Airport Commissioners. A number of transit agencies—Los Angeles County Metropolitan Transportation Authority, Culver City Transit, Santa Monica Transit, and Torrance Transit—provide local bus service from the airport to various locations within the Los Angeles area. In addition, the airport also operates a dedicated express bus service, Van Nuys FlyAway, which transports passengers to and from the San Fernando Valley. The airport is taking the lead to develop the intermodal transportation center with a connection to the local rail transit system. Other state and local transportation agencies, such as the Southern California Association of Governments (a metropolitan planning organization) and the California Department of Transportation, have played a limited role in planning ground access to the airport.

Figure 12: Intermodal Connections at Los Angeles International Airport



Source: GAO.

Note: Map is not to scale.

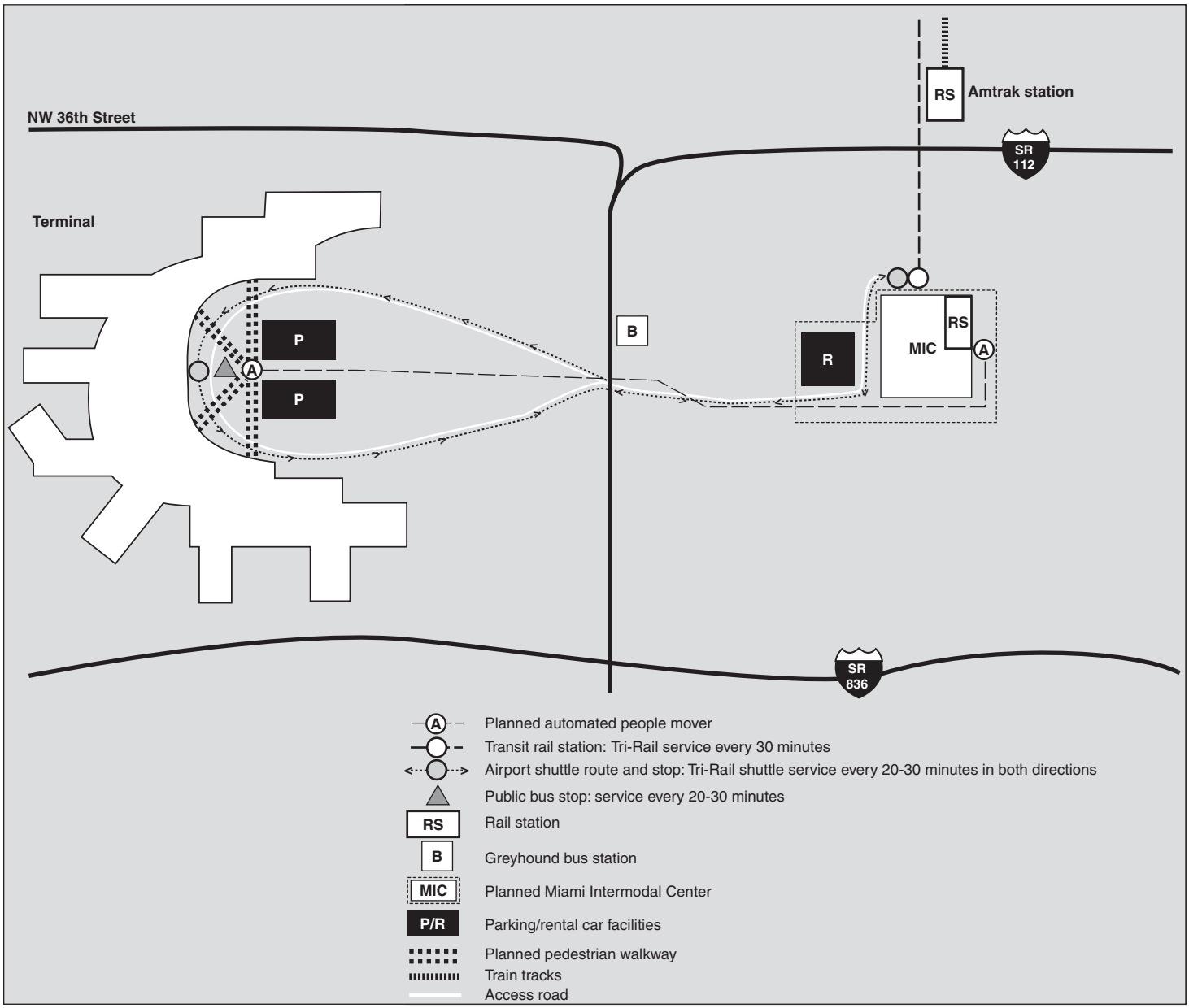
Miami International Airport

Intermodal Facilities – Miami International Airport has the following intermodal connections (see fig. 13).

- Local bus: Passengers can access local bus service at the airport's passenger terminal.
- Local rail: No connections.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: Construction has started on the Miami Intermodal Center, located east of the airport's main terminal. The first phase of the center will include the construction of a consolidated rental car facility, a central bus and rail station, and an automated people mover that will connect the center with the airport. The entire first phase is scheduled to be under construction or completed by late 2008. The second phase consists of the construction of additional rail platforms for Amtrak and local rail. Both phases are expected to be completed over a 20-year period.

Key Local Stakeholders – Miami airport is owned and operated by the Miami-Dade Aviation Department, a county transportation agency. The Florida Department of Transportation is the lead agency in the development of the intermodal center. As the lead agency, the department of transportation coordinates with other stakeholders—including Miami-Dade Transit, which provides the county's bus, rail, and other transit services; Miami-Dade Expressway Authority, which oversees the operation and maintenance of five major county expressways; the Miami-Dade Metropolitan Planning Organization, which is the regional transportation planning body; and the Federal Highway Administration—the lead federal agency—which ensures that environmental concerns are addressed and facilitates coordination among other affected federal agencies.

Figure 13: Intermodal Connections at Miami International Airport



Source: GAO.

Note: Map is not to scale.

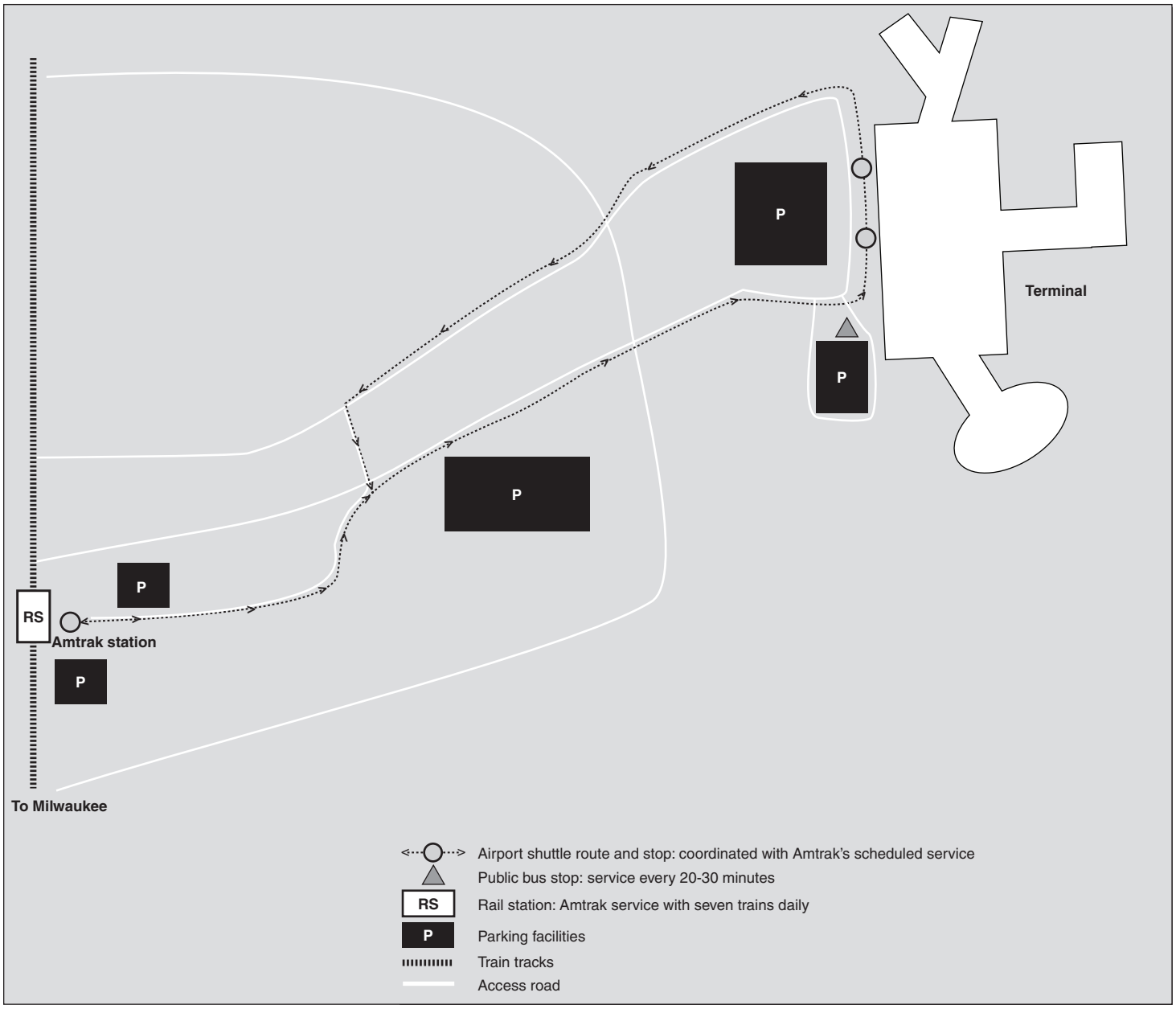
Milwaukee General Mitchell International Airport

Intermodal Facilities – Milwaukee General Mitchell International Airport has the following intermodal connections (see fig. 14).

- Local bus: Passengers can access local bus service at a bus stop about 1 block from the terminal.
- Local rail: No connections.
- Nationwide bus or rail: Passengers can access Amtrak at the Milwaukee airport rail station located on the western perimeter of airport property and connected to terminals by a free shuttle.
- Plans for additional facilities: A proposed commuter rail line between downtown Milwaukee and Chicago would include a station near the airport that would be connected to the airport by a free shuttle. In addition, there is a proposal to develop a network of five interconnected express bus routes in the Milwaukee area, with one route directly serving the airport.

Key Local Stakeholders - The Milwaukee airport is owned and operated by Milwaukee County. The Wisconsin Department of Transportation was the lead agency in developing and securing funding for the construction of the airport's Amtrak service and rail track improvements. In addition, airport staff participated in the planning and construction of the rail station. Amtrak and the Canadian Pacific Railway, which owns the track next to the airport, were key stakeholders. Amtrak agreed to make the additional stop on its Chicago-Milwaukee route, and Canadian Pacific Railway agreed to allow the construction of the new station subject to the Wisconsin Department of Transportation providing funding for track improvements to maintain freight capacity. Local bus service is provided by Milwaukee County Transit. Midwest Airlines, which is the largest tenant at the airport, advocated the development of the airport's rail station.

Figure 14: Intermodal Connections at Milwaukee General Mitchell International Airport



Source: GAO.

Note: Map is not to scale.

Minneapolis/St. Paul International Airport

Intermodal Facilities –The Minneapolis/St. Paul International Airport has the following intermodal connections (see fig. 15).

- Local bus: Passengers can access local bus service at the airport's transit center, which is located adjacent to the airport's main terminal (Lindbergh terminal).

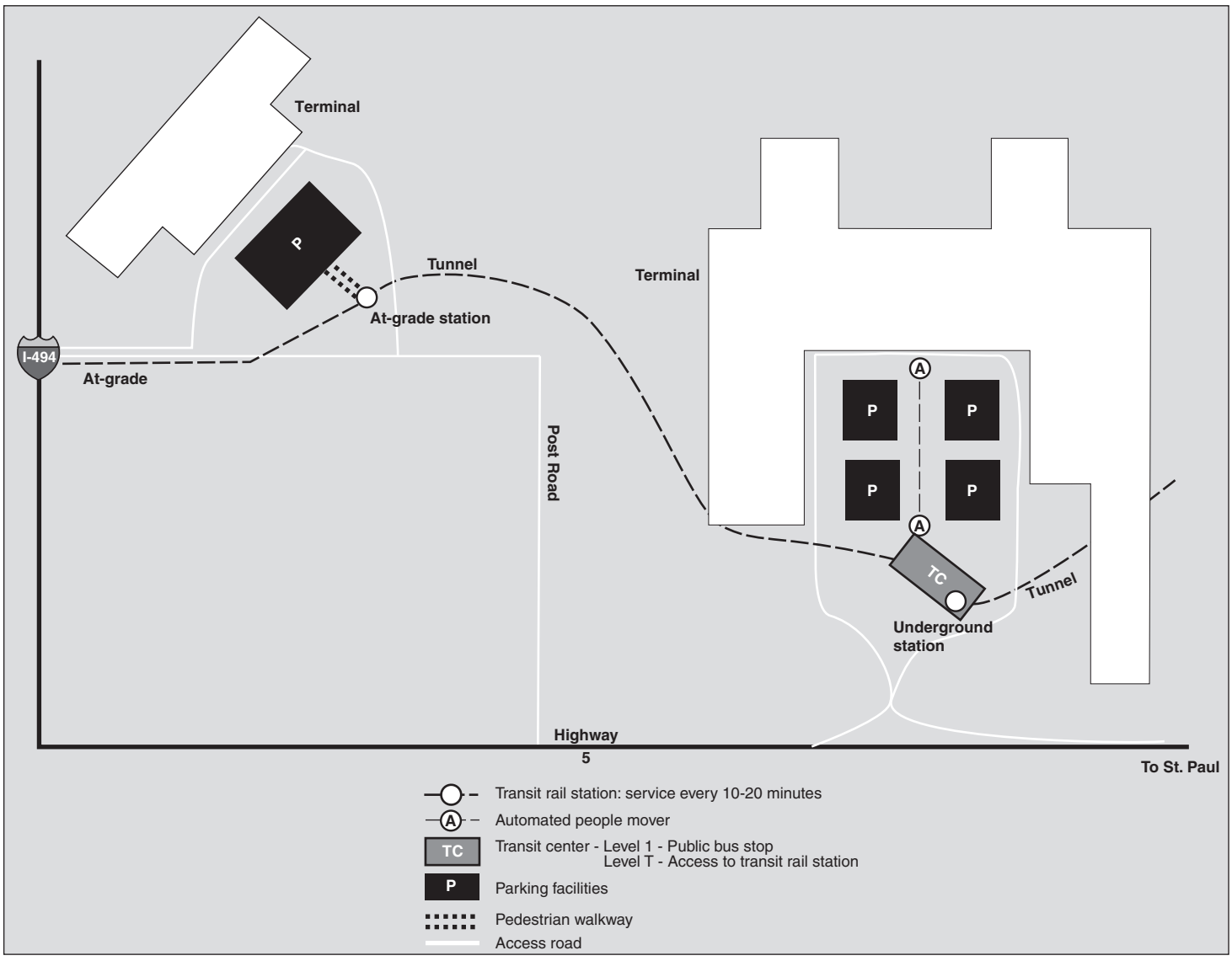
- Local rail: Passengers can access the local rail transit system at both of the airport's terminals. One station is located at the airport's transit center, which is in the main terminal and accessible by automated people mover. The second station, located outside of the airport's other terminal, is connected to that terminal by a covered walkway.

- Nationwide bus or rail: No connections.

- Plans for additional facilities: None reported.

Key Local Stakeholders – The Minneapolis/St. Paul airport is owned and operated by Metropolitan Airports Commission. The Metropolitan Council (a metropolitan planning organization), Metro Transit (the transit operating division of Metropolitan Council), Metropolitan Airports Commission, and the Minnesota Department of Transportation were the major stakeholders in building the local rail system, including the two stations at the airport. The Metropolitan Council is the owner of the local rail system and received the federal funds used to build the system. Metro Transit is the operator of the local rail system and served as the coordinating agency during construction. The Metropolitan Airports Commission managed construction of the rail tunnel and stations on airport property and provided partial funding. State and local governments, including the Minnesota Department of Transportation and Hennepin County, provided significant funding for this project. Metro Transit and Minnesota Valley Transit also provide local bus service to the airport.

Figure 15: Intermodal Connections at Minneapolis/St. Paul International Airport



Source: GAO.

Note: Map is not to scale.

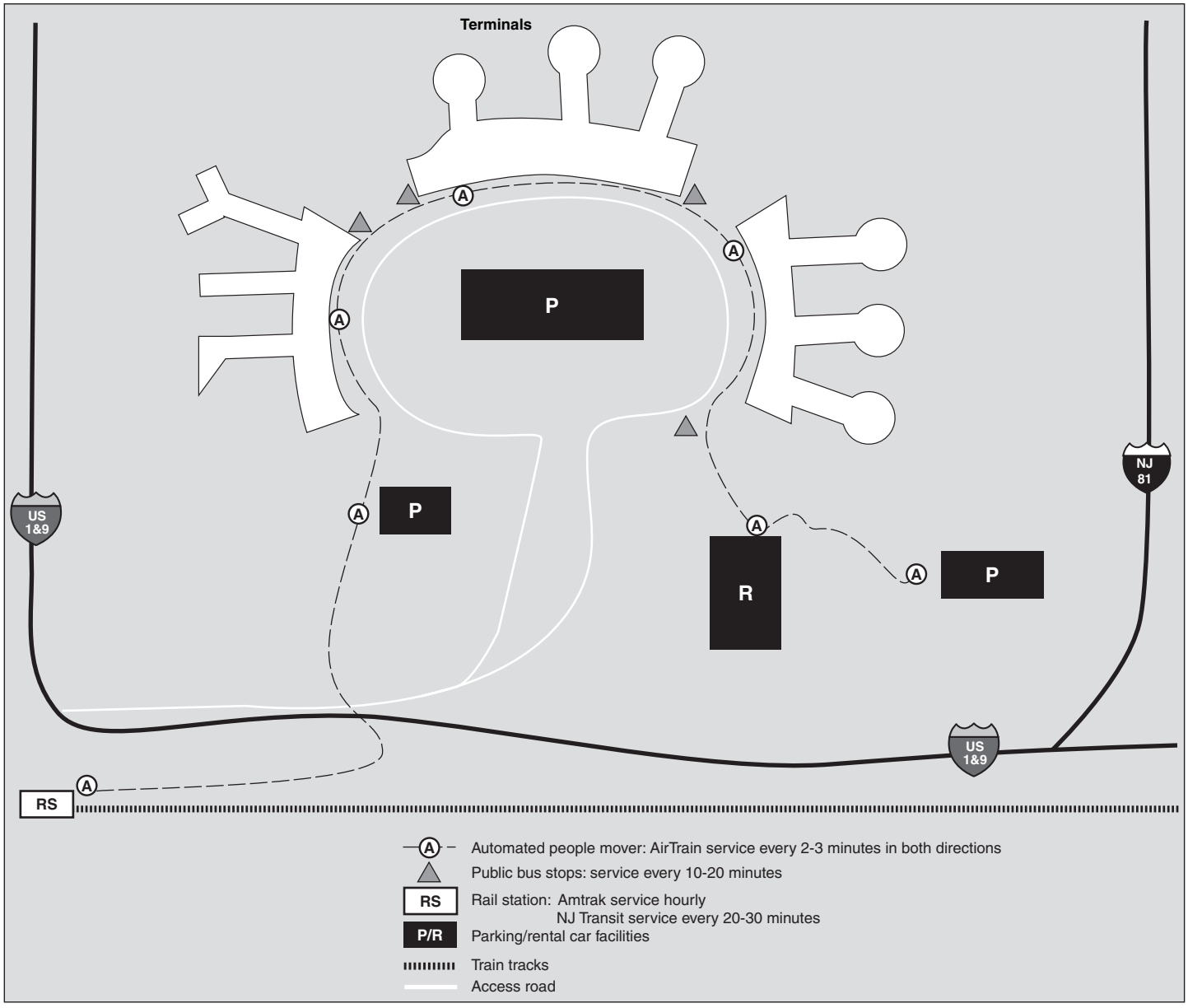
Newark Liberty International Airport

Intermodal Facilities –Newark Liberty International Airport has the following intermodal connections (see fig. 16).

- Local bus: Passengers can access local bus service at ground transportation courtyards located at each of the airport's three terminals.
- Local rail: Passengers can access two local rail transit systems at an airport rail station that is connected to each airport terminal by an automated people mover.
- Nationwide bus or rail: Passengers can also access Amtrak at the airport rail station.
- Plans for additional facilities: None reported.

Key Local Stakeholders – Newark airport is owned by the City of Newark and the Port Authority of New York and New Jersey, which also operates the airport. The port authority was the lead agency in planning, coordinating, and overseeing the construction of the automated people mover and the airport's rail station. As the lead agency, the port authority also coordinated with federal agencies such as FAA. New Jersey Transit and Amtrak also participated in the development of the airport's rail station and provide both transit rail service and nationwide rail service from the airport rail station. In addition, the Port Authority Trans-Hudson provides local rail transit service. Continental Airlines, which is the largest tenant at the airport, supported the use of passenger facility charges for this project.

Figure 16: Intermodal Connections at Newark Liberty International Airport



Source: GAO.

Note: Map is not to scale.

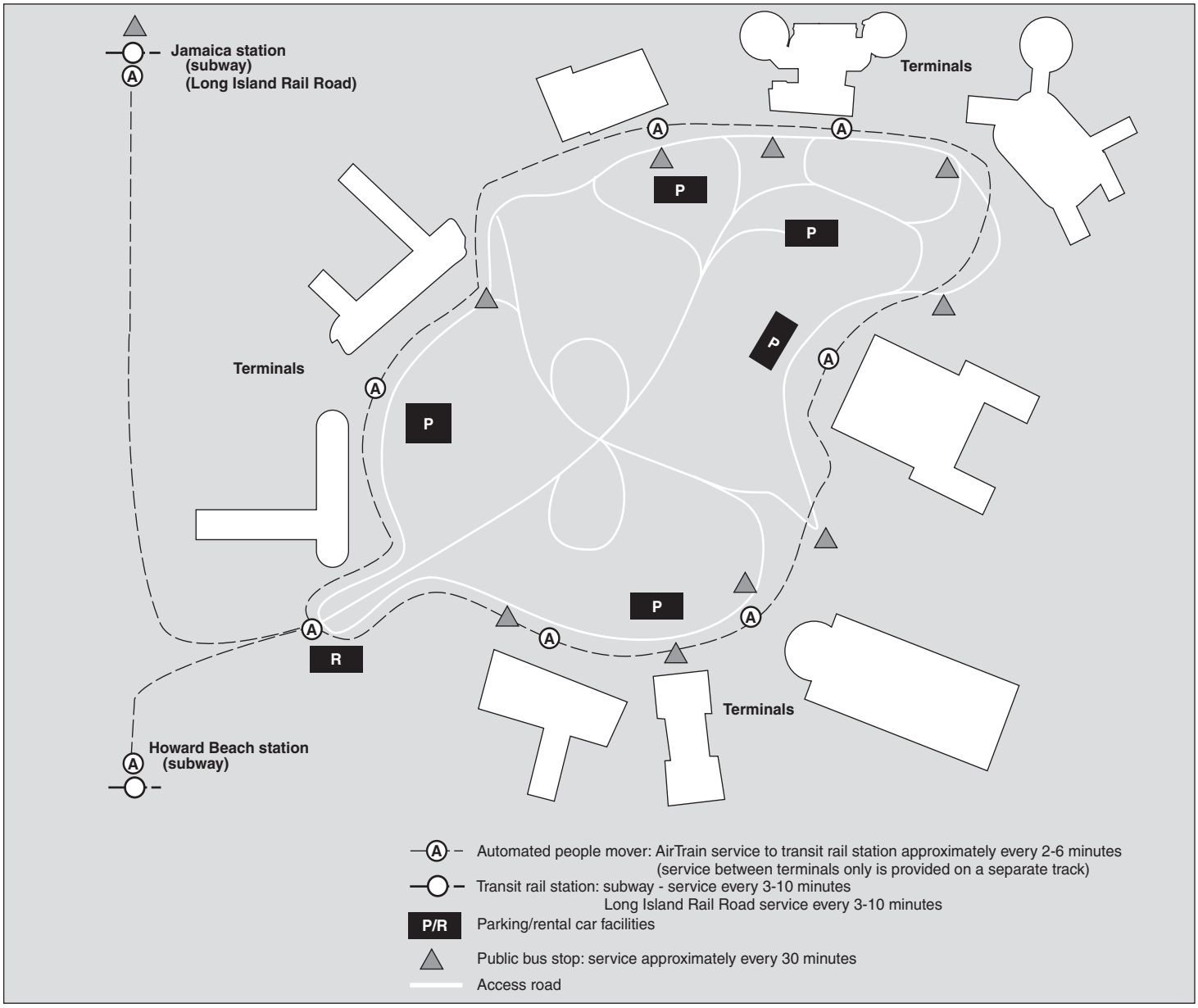
New York John F. Kennedy International Airport

Intermodal Facilities – New York John F. Kennedy International Airport has the following intermodal connections (see fig. 17).

- Local bus: Passengers can access local bus service at a local transit station connected to airport terminals by an automated people mover and at airport terminals.
- Local rail: Passengers can access two local rail transit systems—a New York commuter rail system and the New York City subway system—at transit stations that are connected to airport terminals by an automated people mover.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: There are plans to develop rail transit service from the airport to lower Manhattan, which would include building new rail infrastructure.

Key Local Stakeholders – The Port Authority of New York and New Jersey operates Kennedy airport. The port authority was the lead agency in planning, developing and implementing the automated people mover. As the lead agency, the port authority coordinated with key federal agencies, including FAA, and state and local agencies such as the New York Department of Transportation and the Metropolitan Transportation Authority. The New York Metropolitan Transportation Council (the local metropolitan planning organization), airlines, and the local community provided input during the planning and implementation of the automated people mover. In particular, the port authority worked with the Metropolitan Transportation Authority to adopt a similar fare system to assure that passengers could use one fare card to access both the automated people mover and the rail transit system, and to develop the infrastructure to facilitate transfers between the automated people mover and the rail transit system.

Figure 17: Intermodal Connections at New York John F. Kennedy International Airport



Source: GAO.

Note: Map is not to scale.

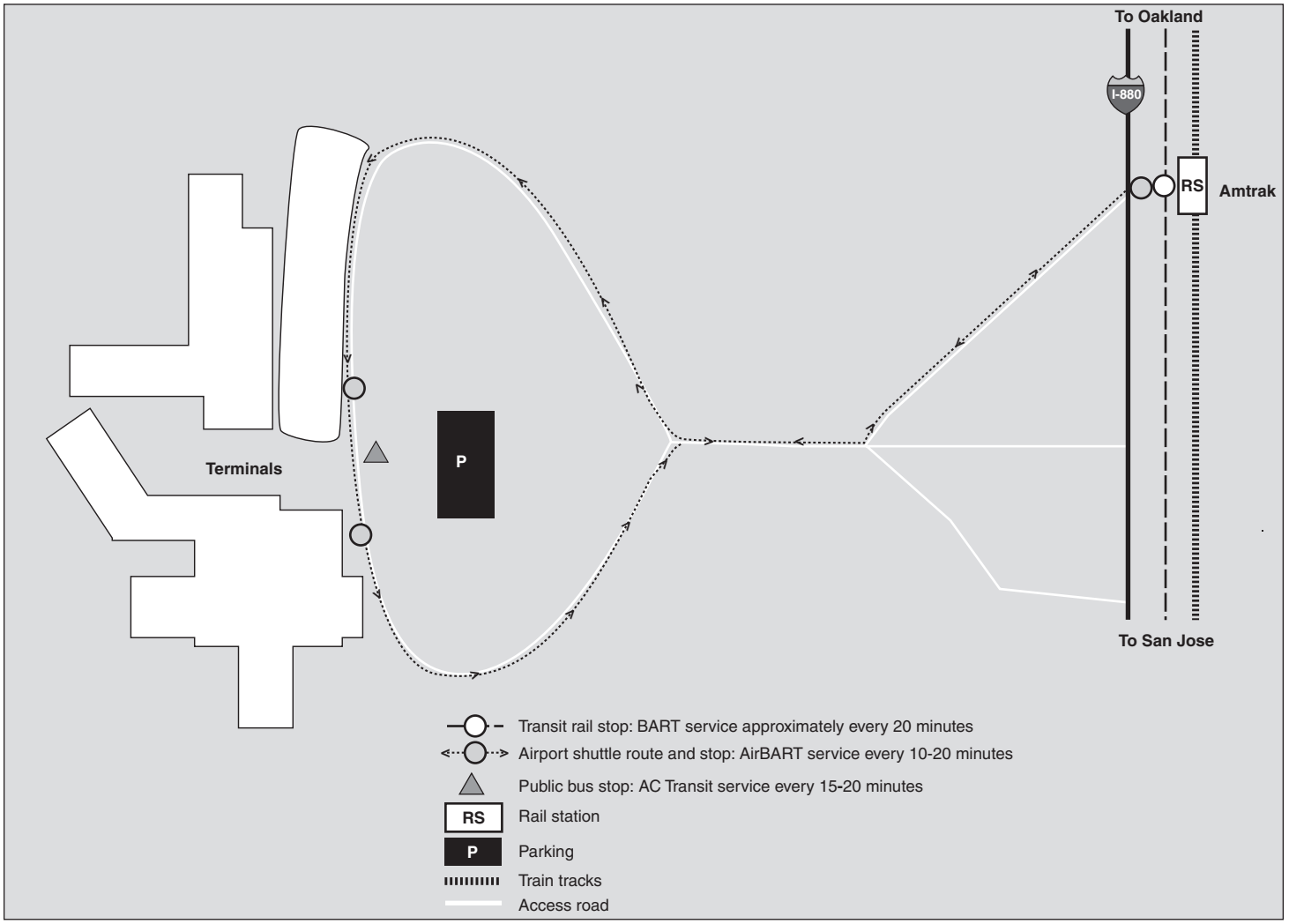
Oakland International Airport

Intermodal Facilities – Oakland International Airport has the following intermodal connections (see fig. 18).

- Local bus: Passengers can access local bus service at the airport's terminals.
- Local rail: Passengers can access the local rail transit system at a station about 3 miles east of the airport and connected to airport terminals by a shuttle. A fee is charged for this shuttle.
- Nationwide bus or rail: Passengers can also access an Amtrak station using the shuttle.
- Plans for additional facilities: There are plans to construct a 3.2 mile elevated automated people mover system that would connect the airport to a local rail station.

Key Local Stakeholders – Oakland airport is owned and operated by the Port of Oakland—a city agency. The airport is responsible for all ground transportation systems on airport property and works closely with the local rail transit agency, the Bay Area Rapid Transit (BART), and the Alameda-Contra Costa Transit District to provide public transportation service. Other agencies involved in the development of the planned automated people mover system include Alameda County, the city of Oakland, the Alameda County Congestion Management Agency, the Alameda County Transportation Improvement Authority, and the Metropolitan Transportation Commission.

Figure 18: Intermodal Connections at Oakland International Airport



Source: GAO.

Note: Map is not to scale.

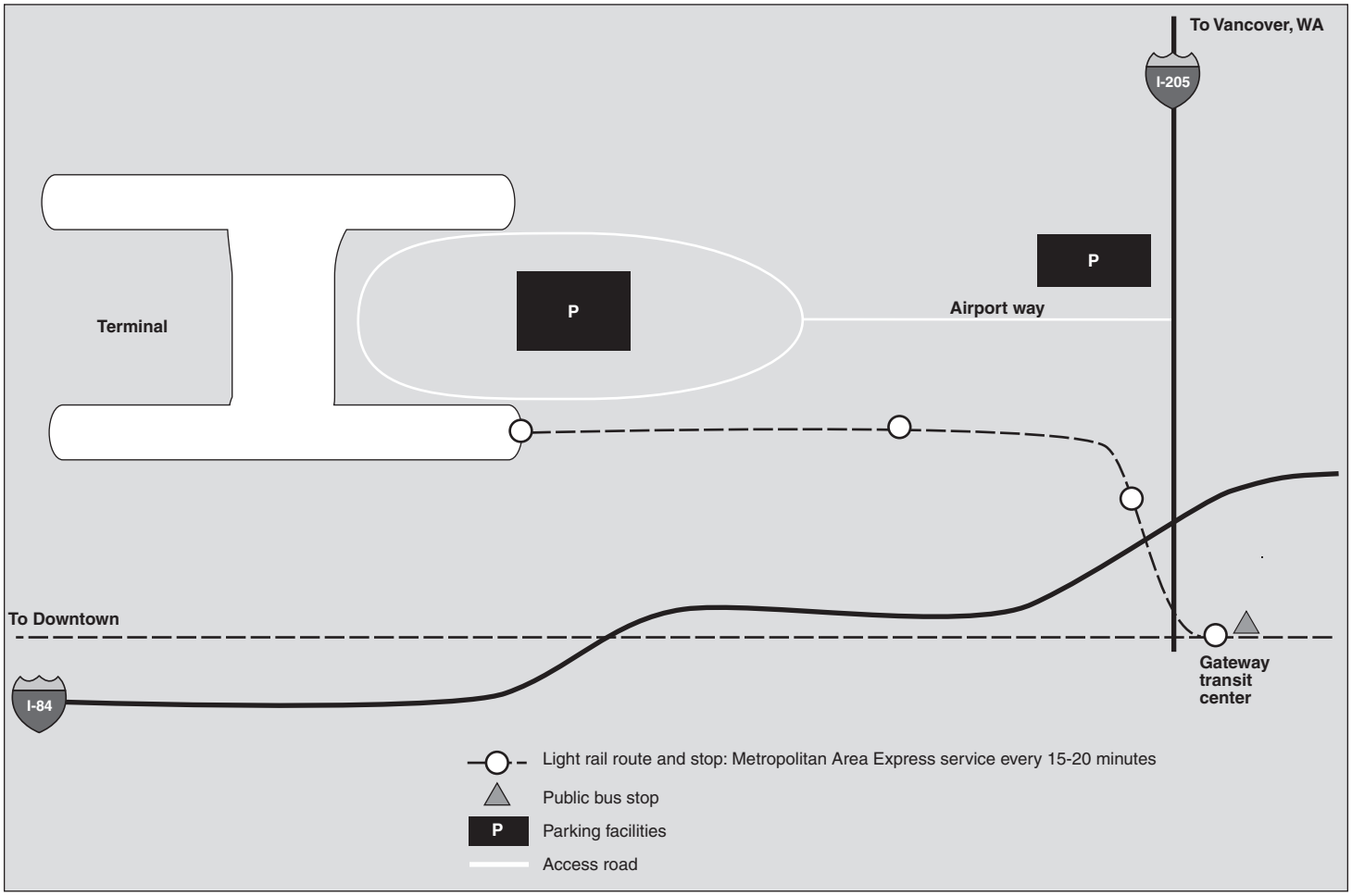
Portland International Airport

Intermodal Facilities – Portland International Airport has the following intermodal connections (see fig. 19).

- Local bus: No connections.
- Local rail: Passengers can access a local rail transit system at a station located at the west end of the airport terminal.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: None reported.

Key Local Stakeholders – Portland airport is owned and operated by the Port of Portland and is required by state and local regulations to promote the development of alternate modes of transportation. The light rail extension at the airport was funded, in part, by the Bechtel Corporation in exchange for a lease agreement with the airport allowing Bechtel to develop retail, office, and hotel sites on airport property. TriMet, which provides transit service to three Oregon counties, operates and owns the light rail extension, except for the portion of the light rail extension that is on airport property. The portion on airport property is owned by the Port of Portland and operated by TriMet. The city of Portland provided additional funding, and Metro (the region's metropolitan planning organization) included the light rail extension in the Regional Transportation Plan and provided travel demand forecasting. The Oregon Department of Transportation assisted in coordinating a significant portion of the light rail extension on a right-of-way in the median of an interstate highway.

Figure 19: Intermodal Connections at Portland International Airport



Source: GAO.

Note: Map is not to scale.

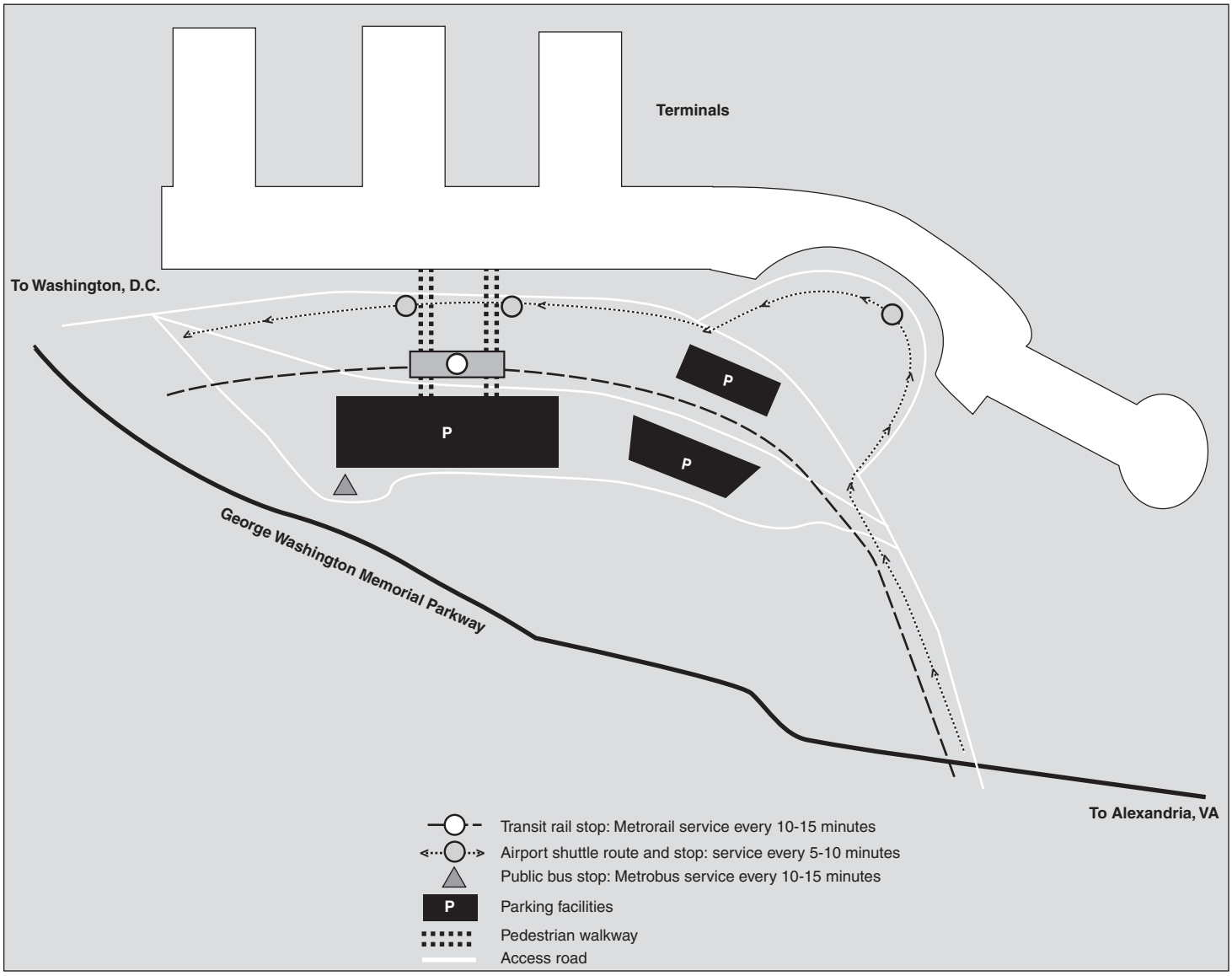
Ronald Reagan Washington National Airport

Intermodal Facilities – Ronald Reagan Washington National Airport (National airport) has the following intermodal connections (see fig. 20).

- Local bus: Passengers can access local bus service at both of the airport's terminals.
- Local rail: Passengers can access a local rail transit system at a station adjacent to the airport's main terminal and connected to that terminal by an elevated crosswalk and the other terminal by a free shuttle.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: None reported.

Key Local Stakeholders – National airport is owned by the federal government and leased to the Metropolitan Washington Airports Authority, which is responsible for its operation and development. Plans to build a local rail transit station at the airport were initiated in the 1960's when the local rail system was being designed. The Washington Metropolitan Area Transit Authority operates and maintains the local rail system and provides limited bus service to the airport. Other key stakeholders include the Metropolitan Washington Council of Governments (the metropolitan planning organization), which collects and processes air passenger survey data for the airport.

Figure 20: Intermodal Connections at Ronald Reagan National Airport



Source: GAO.

Note: Map is not to scale.

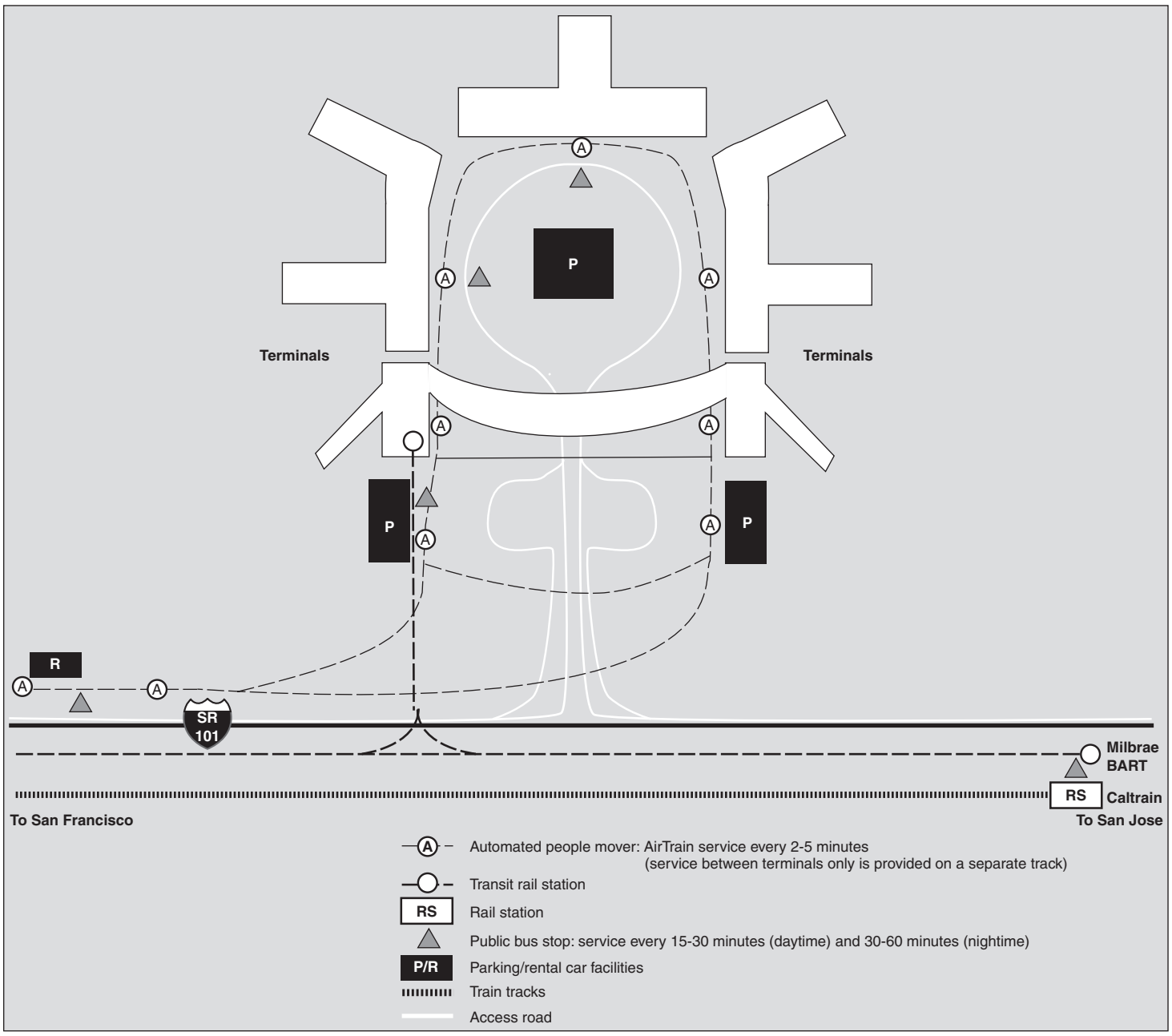
San Francisco International Airport

Intermodal Facilities – San Francisco International Airport has the following intermodal connections (see fig. 21).

- Local bus: Passengers can access local bus service at most airport terminals.
- Local rail: Passengers can access a local rail transit system at a station located in one terminal and connected to other terminals by an automated people mover.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: None reported.

Key Local Stakeholders – The city and county of San Francisco own and operate the San Francisco airport. San Mateo County Transit was the key local agency that supported the development of the BART extension south of San Francisco into San Mateo County. BART was the lead agency in planning and coordinating the BART extension, while the airport managed the design and construction of the airport station and guideway located on airport property. The San Francisco airport provided funding to this extension by signing an agreement with BART to pay up to $200 million for the costs associated with the design and construction of the BART train station, guideway, and operating systems on airport property. San Mateo County Transit provides local bus service from the airport to San Mateo and San Francisco counties.

Figure 21: Intermodal Connections at San Francisco International Airport



Source: GAO.

Note: Map is not to scale.

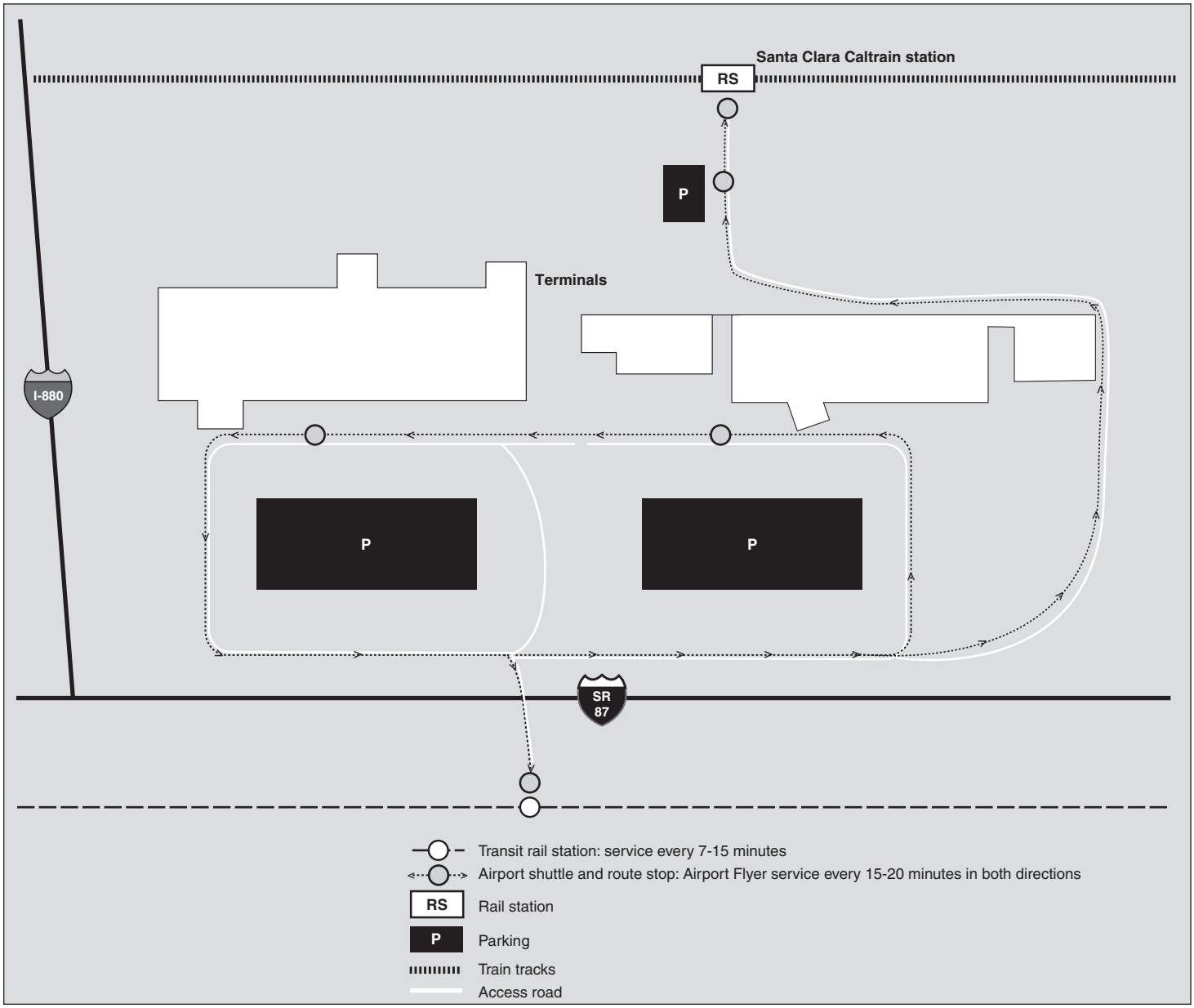
Norman Y. Mineta San Jose International Airport

Intermodal Facilities – The Norman Y. Mineta San Jose International Airport has the following intermodal connections (see fig. 22).

- Local bus: No connections.
- Local rail: Passengers can access two local rail transit systems at stations connected to airport terminals by a free shuttle.
- Nationwide bus or rail: No connections.
- Plans for additional facilities: There are plans to build an automated people mover that would connect the local rail station, the airport, and the local commuter rail station.

Key Local Stakeholders – The airport is owned and operated by the city of San Jose. The Valley Transportation Authority, a public agency that provides transit service, operates the shuttle that connects the airport to the commuter rail and local rail stations. Additional transit services to the airport are provided by a variety of local agencies, including the city of San Jose and CalTrain. Private operators also provide some transit services to the airport.

Figure 22: Intermodal Connections at Norman Y. Mineta San Jose International Airport



Source: GAO.

Note: Map is not to scale.

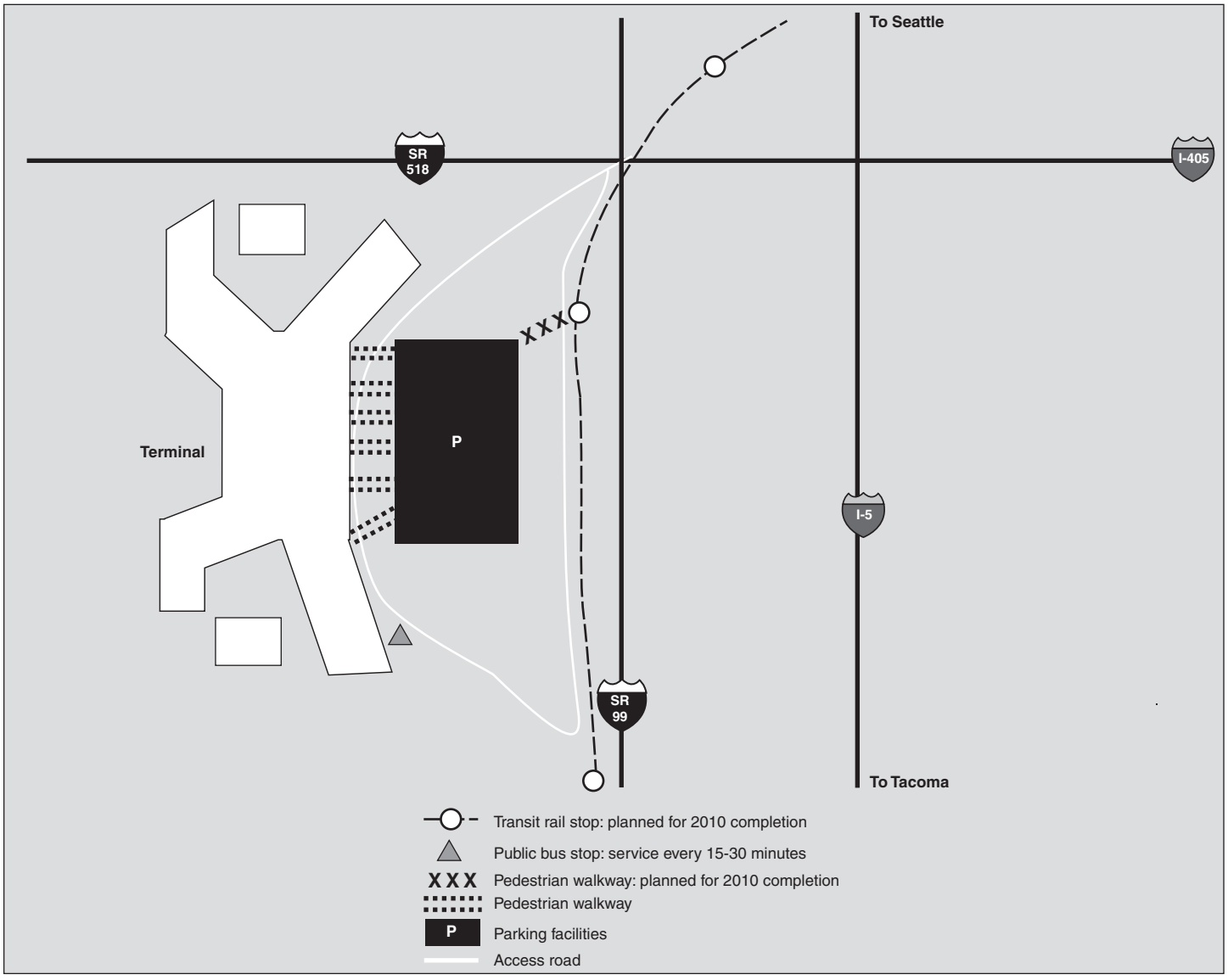
Seattle-Tacoma International Airport

Intermodal Facilities – Seattle-Tacoma International Airport has the following intermodal connections (see fig. 23).

- Local bus: Passengers can access local bus service at the south end of the airport's main terminal.
- Local rail: No connections.
- Nationwide bus or rail: Passengers may use a private shuttle operator that charges a fee to connect to the Amtrak station.
- Plans for additional facilities: There are plans for a local transit rail station to be developed at the airport to provide a connection to a local rail transit system that is under construction. The station will be located on the east side of the airport property, with passengers being able to access the station using a walkway. In addition, officials stated that a pedestrian bridge will be built to connect the airport with a planned local transportation hub, which will provide bus service by a number of local transit agencies. Completion is scheduled by December 2009.

Key Local Stakeholders – Seattle-Tacoma airport is owned by the Port of Seattle. Transit services are provided by two local agencies, King County Metro Transit and a tri-county agency, Sound Transit. Sound Transit not only provides regional bus service, but also operates the regional commuter rail service and is constructing the local rail transit system. Also involved in building the local rail transit station at Seattle-Tacoma airport is the city of Sea-Tac, which will permit all construction of the rail line within its city limits.

Figure 23: Intermodal Connections at Seattle-Tacoma International Airport



Source: GAO.

Note: Map is not to scale.

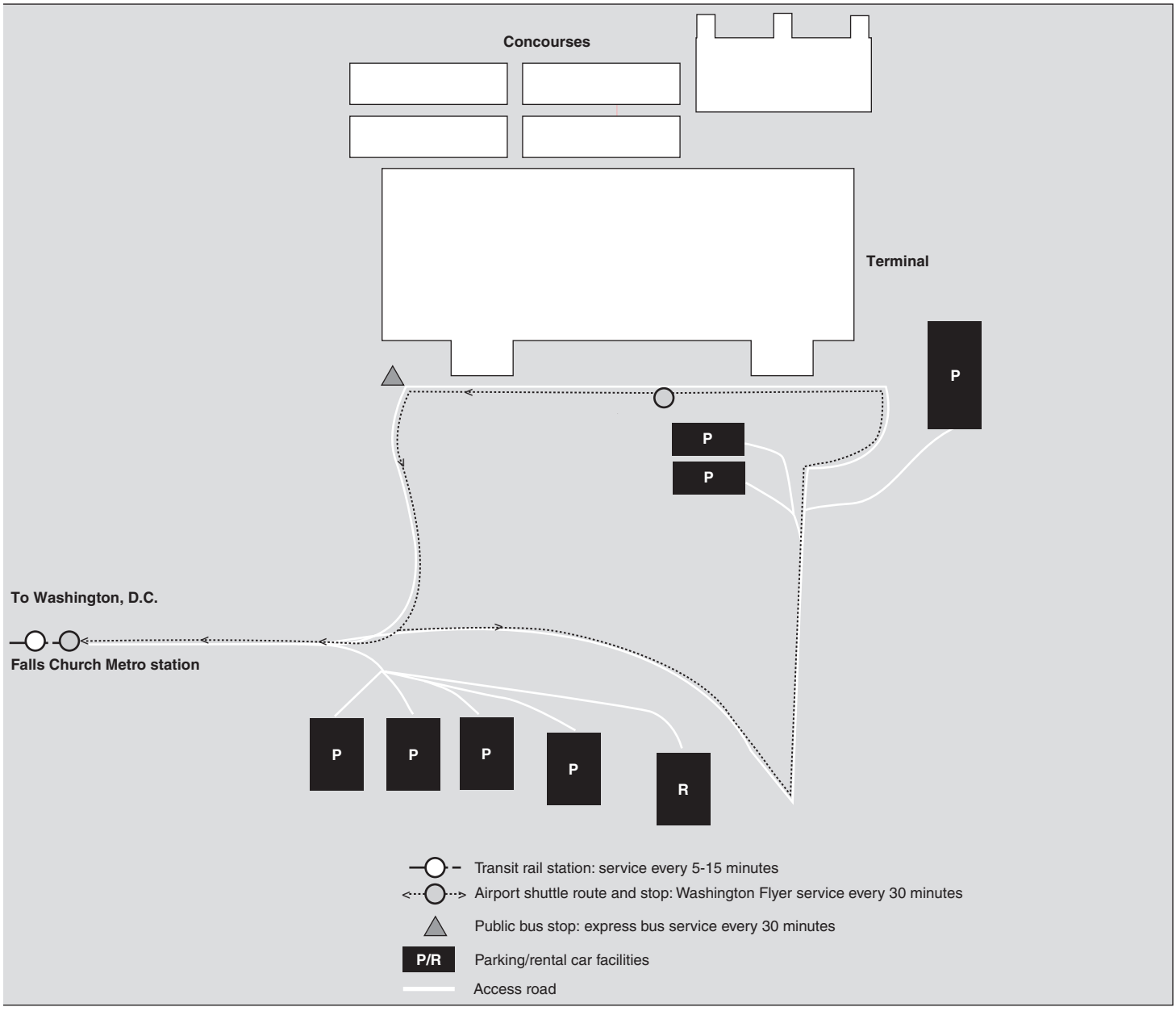
Washington Dulles International Airport

Intermodal Facilities – Washington Dulles International Airport has the following intermodal connections (see fig. 24).

- Local bus: Passengers can access local bus service at the airport's main terminal.
- Local rail: Passengers can access the local rail system at a station that is connected to airport terminals by a shuttle. A fee is charged for this shuttle.
- Nationwide bus or rail: Passengers can access nationwide bus service at the airport's main terminal.
- Plans for additional facilities: There is a plan to extend the local rail system to the airport. The Dulles Corridor Rapid Transit project is a planned 23 mile extension of the local rail system that will provide service to the airport. The rail extension project, if completely funded, will be developed in two phases, with the airport station planned for the second phase. Phase 1 (currently in preliminary engineering) and phase 2 are scheduled for completion in 2011 and 2015, respectively.

Key Local Stakeholders – The airport is owned by the federal government but is leased to the Metropolitan Washington Airports Authority, which is responsible for its operation and development. Local bus service is provided by the Washington Metropolitan Area Transit Authority, which also performs corridor-level planning. The Virginia Department of Rail and Public Transportation is the project leader for the local rail extension. The state coordinates with other stakeholders such as the airport, the Washington Metropolitan Council of Governments (the regional transportation planning body), Fairfax and Loudoun counties, and the Federal Transit Administration. Greyhound provides bus service to parts of Virginia with connecting service as far as New York.

Figure 24: Intermodal Connections at Washington Dulles International Airport



Source: GAO.

Note: Map is not to scale.

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