1 PURPOSE AND NEED AND OBJECTIVES

This chapter of the combined program environmental impact report and environmental impact statement (Program EIR/EIS) describes the need for a transportation proposal to relieve the growing capacity and congestion constraints on intercity travel using existing highway, airport, bus, and conventional passenger rail infrastructure. This chapter of the Program EIR/EIS also describes how improved intercity transportation provided by a proposed high-speed train (HST) system would deliver predictable, consistent, and shorter travel times; augment the existing infrastructure; and help relieve congestion and capacity constraints with a reliable, safe, low-emission, time-efficient travel alternative.

The proposed HST system is the programmatic project (Program) under consideration for intercity travel in California between the major metropolitan centers of Sacramento and the San Francisco Bay area in the north, through the Central Valley, to Los Angeles and San Diego in the south. The proposed HST System involves state-of-the-art, electrically powered, high-speed steel-wheel-on-steel rail technology capable of speeds in excess of 200 mph (322 kph). The HST System would help meet California's increasing demand for transportation and is projected to carry as many as 68 million passengers by the year 2020.

Many sources were used in the preparation of this document. References to these sources are provided in Chapter 12. In some cases to clarify a particular source, specific references are called out in the text.

1.1 INTRODUCTION

The California High Speed Rail Authority (Authority) was created pursuant to state legislation in 1996 to develop a plan for the construction, operation, and financing of a statewide, intercity high-speed passenger train system offering intercity service (California Public Utilities Code § 185000 et seq.). The Authority completed a number of initial studies to assess the feasibility of an HST system in California and to evaluate the potential ridership for a variety of alternative corridors and station areas. Based on the results of these studies, the Authority recommended the evaluation of a proposed HST system as the logical next step in the development of California's transportation infrastructure. The Authority does not have responsibility for other intercity transportation systems or facilities used for intercity trips, such as highways, airports, conventional passenger rail or transit.

In June 2000, the Authority adopted the final business plan (Business Plan) (California High Speed Authority 2000) for an economically viable 700-mile-long (1,127-kilometer-long) HST system. This system would be capable of speeds in excess of 200 miles per hour (mph) (322 kilometers per hour [kph]) and would travel on a mostly dedicated system with fully grade-separated tracks with state-of-the-art safety, signaling, and automated train control systems. It would connect and serve the major metropolitan areas of California, extending from Sacramento and the San Francisco Bay Area through the Central Valley to Los Angeles and San Diego. Such a system would be expected to carry a minimum of 42 million passengers annually, representing 32 million intercity trips and 10 million commuter trips, by the year 2020 and would have revenues in excess of operations and maintenance costs.

If the Authority should decide to proceed with the proposed HST system after the completion of this Program EIR/EIS process, the Authority envisions seeking possible future federal financial support for the system that might be provided through the Federal Railroad Administration (FRA), which is within the U.S. Department of Transportation. The FRA and the U.S. Department of Transportation have several loan and loan guarantee programs that might be potential sources of future financial assistance. Although no existing grant or federal bond financing programs provide such support, several proposals to create such programs, are pending before Congress. In addition to possible funding, a Rule of Particular

Applicability may be required from the FRA to establish safety standards for the proposed HST system for operating speeds over 200 mph (322 kph) and for operations in shared-use rail corridors.

Following adoption of the Business Plan, the Authority commenced this environmental review process to comply with federal and state laws, in particular the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. § 4321 et seq.) and the California Environmental Quality Act (CEQA) (Cal. P.R.C. § 21000 et seq.). NEPA requires federal agencies to prepare an environmental impact statement (EIS) for proposed actions that have the potential to cause significant environmental impacts. Because of possible funding and regulatory action, the FRA is the lead federal agency, working with the Authority as the lead state agency, for the environmental review required by NEPA and related statutes. The FRA has further determined that the preparation of a tier 1, program-level EIS for the proposed HST system is the appropriate NEPA document because of the comprehensive nature and scope of the HST system proposed by the Authority and the conceptual stage of planning and decision-making. The decisions related to advancing and ultimately constructing the proposed HST system would constitute major federal actions requiring environmental review under NEPA for several federal agencies in addition to the FRA. The Federal Highway Administration (FHWA), U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), Federal Aviation Administration (FAA), U.S. Fish and Wildlife Service (USFWS), and Federal Transit Administration (FTA) are cooperating federal agencies for the preparation of the Program EIS. The FRA, FHWA, EPA, USACE, and FTA executed a memorandum of understanding (MOU) outlining roles and responsibilities for preparation of the Program EIR/EIS and the integration of Section 404 of the Clean Water Act (July 2003 Federal Agency MOU for the California HST Program EIR/EIS). The memorandum of understanding (MOU) is included as Appendix 1-A.

The proposed HST system is subject to environmental review under CEQA, and the Authority is both the project sponsor and the lead agency for CEQA compliance. The Authority has determined that a program environmental impact report (EIR) is the appropriate CEQA document for the project at this conceptual stage of planning and decision-making, which includes selecting a preferred corridor and station locations and identifying options for phasing the development of the new system. No permits will be sought in this phase of environmental review. If the HST alternative is selected at the conclusion of the Program EIR/EIS, project development will continue with project-specific environmental documentation to assess in more detail the impacts of reasonable and feasible alignment and station options in segments of the system that are ready for implementation.

This document is being prepared as a combined program EIR/EIS for compliance with both NEPA and CEQA. The Program EIR/EIS will enable public agencies to evaluate the potential impacts of a proposed HST system, evaluate intercity travel alternatives, select a preferred alternative, and define general mitigation strategies to address any potentially significant adverse impacts. Since the HST alternative is selected as the preferred alternative, the Program EIR/EIS provides the information needed for approvals and initial financing decisions necessary to implement an HST system.

The California High Speed Train Program EIR/EIS consists of the Draft Program EIR/EIS, oral and written comments on the Draft Program EIR/EIS, and the Final Program EIR/EIS. The Final Program EIR/EIS contains revised analysis and text and responses to comments on the Draft Program EIR/EIS. As explained in the Final Program EIR/EIS, this is the first phase of a tiered[1] environmental review process, and the analysis has been prepared for the first and programmatic-level of review and consideration of early policy decisions on the high-speed train system. These documents have been prepared to support Authority and FRA decisions on the following:

[1] Tiering refers to a multilevel approach where a first tier environmental document analyzes general matters and subsequent tiers analyze narrower projects/actions, referencing the more general document.

1. To decide whether to pursue a high speed train system, involving steel-wheel-on-steel-rail technology designed to help meet California's increasing demand for transportation along certain of the conceptual corridors shown in Figures 2.6-13 and 2.6-14, versus doing nothing, or recommending a modal alternative; and

2. To determine which of the conceptual corridors, alignments, and station options evaluated in the Program EIR/EIS can be eliminated from consideration and which to select for further consideration in the tiered environmental reviews to be prepared subsequent to the Program EIR/EIS, if the Co-lead agencies choose to pursue the high speed train system.

The programmatic level of analysis presented in the Program EIR/EIS is appropriate for making these two basic decisions. It analyzes the environmental effects at a more generalized level to provide the decision makers with sufficient information to decide whether to continue with the process to pursue a high-speed rail system, and which conceptual corridor alignments to continue to consider. If the Authority and the FRA decide to do so, they will consider the more site-specific decisions in the more detailed project level environmental review and decision making.

Preparation of a program-level document followed by more detailed project-specific documents that "tier" off the program document offers a number of advantages. As described in Council on Environmental Quality (CEQ) regulations (40 C.F.R. § 1508.28), FHWA Guidelines (23 C.F.R. Part 771; 52 F.R. § 32646 [August 1987]), and the state CEQA Guidelines (14 C.C.R. § 15168[b]), this approach offers the following advantages.

- More exhaustive consideration of impacts and alternatives than would be practical in an individual or project-specific EIR/EIS.
- Consideration of cumulative impacts that might be slighted in a case-by-case analysis.
- An opportunity for decision-makers to consider broad policy alternatives and program-level mitigation strategies at an early stage, when the flexibility to incorporate them is greater.
- Avoiding reconsideration of policy issues in subsequent documents.
- Early coordination with USACE and EPA to identify avoidance and minimization opportunities that are likely to yield or will lead to the selection of a least environmentally damaging practicable alternative (LEDPA) under Section 404 of the Clean Water Act.
- Less paperwork by encouraging the reuse of data through incorporation by reference in subsequent tiered documents.

The required contents of a program EIR/EIS are the same as those of a project-level document. However, the level of detail provided in the two types of documents differs substantially because a program-level document analyzes a general conceptual design of the proposed program and alternatives rather than providing detailed analysis of a specific project proposal.

A program EIR/EIS is an informational document intended to analyze and to disclose to the public and to public decision-makers the environmental effects and benefits of a proposed program and its alternatives. The preparation, circulation, and review of a draft program EIR/EIS provides for the evaluation of alternatives, including a no-project/no-action alternative; the assessment of all significant environmental impacts; and the opportunity for public input and comments to help inform the decision-making process. Evaluating alternatives as required by the FRA (64 F.R. § 28545 [May 26, 1999]) and other federal agency NEPA regulations and state CEQA guidelines helps ensure that avoidance and minimization of potential environmental impacts are addressed, and potential benefits, costs, and trade-offs of the alternatives are considered.

ED_000733_DD_NSF_00017911-00003

This Program EIR/EIS has been prepared under the supervision and direction of the FRA and the Authority in conjunction with the federal cooperating agencies and with input from state and local agencies. It is intended that other federal, state, regional, and local agencies use the Program EIR/EIS to review the proposed program and develop expectations for the tier 2, project-level environmental reviews that would follow should the HST alternative be selected.

1.2 PURPOSE OF AND NEED FOR IMPROVED INTERCITY TRANSPORTATION IN CALIFORNIA

Purpose and need are closely linked but subtly different. Need may be thought of as the problem and purpose as an intention to address the problem. Purpose describes why the sponsoring agency is proposing an action that may have environmental impacts and provides the basis for selecting reasonable and practicable alternatives for consideration, comparing the alternatives, and selecting the preferred alternative (40 C.F.R. § 1502.13; ["The statement shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action"]; see also NEPA § 102.). CEQA requires that an EIR identify the project sponsor's objectives, which are similar to the purpose required by NEPA (CEQA Guidelines, C.C.R., Title 14, § 15124 [b]). The objectives provide benchmarks for selecting a reasonable range of alternatives for analysis, as required by CEQA.

1.2.1 Purpose of High-Speed Train System

The purpose of the proposed HST system is to provide a reliable mode of travel, which links the major metropolitan areas of the state, and delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit and the highway network and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources.

This proposal is consistent with recent expressions of federal transportation policy, most notably the Transportation Equity Act for the 21st Century (TEA-21) (105 Pub. L. 178; 112 Stat. 107 [1998]) and its predecessor the Intermodal Surface Transportation Efficiency Act (ISTEA) (102 Pub. L. 240; 105 Stat. 1914 [1991]), which encourage public transportation investment that increases national productivity and domestic and international competition while improving safety and social and environmental conditions. Specifically, these policies encourage investments that offer benefits such as those listed below.

- Link all major forms of transportation.
- Improve public transportation systems and services.
- Provide better access to seaports and airports.
- Enhance efficient operation of transportation facilities and service.

The Authority's statutory mandate is to plan, build, and operate an HST system that is coordinated with the state's existing transportation network, particularly intercity rail and bus lines, commuter rail lines, urban rail transit lines, highways, and airports. The Authority has responded to this mandate by adopting the following objectives and policies for the proposed HST system.

- Provide intercity travel capacity to supplement critically over-utilized interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by present transportation systems and increase capacity for intercity mobility.
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.

- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Preserve environmental quality and protect California's sensitive environmental resources by reducing emissions and vehicle kilometers/vehicle miles traveled for intercity trips.
- Consult with resource and regulatory agencies during the tier 1 environmental review and use all available information for assessing the alternative that is most likely to yield the least damaging practicable alternative by avoiding sensitive natural resources (wetlands, habitat areas, conservation areas) where feasible.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases by 2020, which would generate revenues in excess of operations and maintenance costs.

1.2.2 Need for High-Speed Train System

The capacity of California's intercity transportation system is insufficient to meet existing and future demand, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population and tourism in the state. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are currently operating at or near capacity and will require large public investments for maintenance and expansion in order to meet existing demand and future growth over the next 20 years and beyond. Moreover, the ability to expand many major highways and key airports is uncertain; some needed expansions may be impractical or may be constrained by physical, political, and other factors. Simply stated, the need for improvements serving intercity travel within California relates to the following issues.

- Future growth in demand for intercity travel.
- Capacity constraints that will result in increasing congestion and travel delays.
- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California.
- Increasing frequency of accidents on intercity highways and passenger rail lines in congested corridors of travel.
- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state.
- Poor and deteriorating air quality and pressure on natural resources as a result of expanded highway and airports.

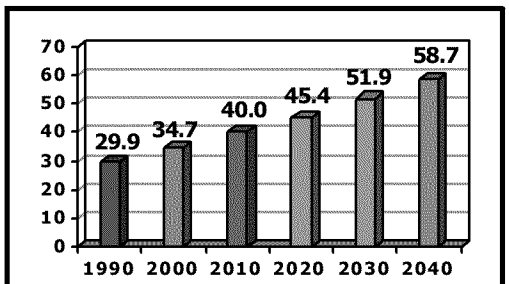
The following sections provide additional information on these factors, emphasizing the transportation constraints and capacity limitations relevant to intercity travel in California.

A. TRAVEL DEMAND

As described in the Authority's Business Plan, intercity travel in California is forecasted to increase up to 63% over the next 20 years, from 155 million trips to more than 253 million trips. The state population increase projected over the same period is 31%, with 69% population growth expected

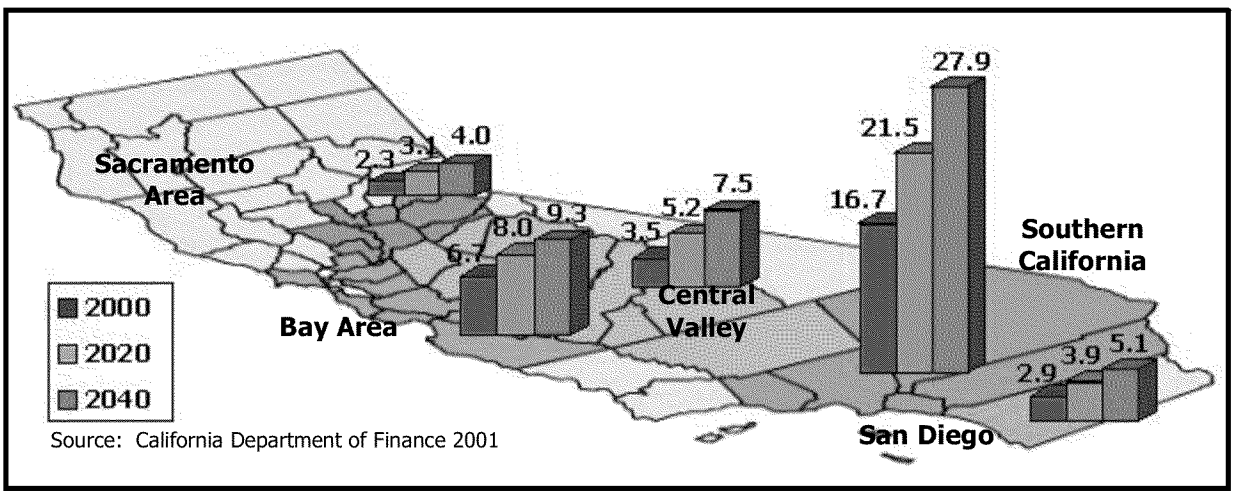
over the next 40 years, as shown in Figure 1.2-1. The highest regional growth rate is projected for the Central Valley (140% between 2000 and 2040), followed by the Sacramento area, with 91% growth projected over the same period, as shown in Figure 1.2-2. The greatest increase in population is projected to occur in the Los Angeles Metropolitan Area (11.2 million between 2000 and 2040). Californians currently make more than 154 million trips per year between the state's major metropolitan regions, including those in northern and southern California and in between. In 1997, more than 43 million of these trips were journeys of at least 150 miles (241 kilometers); by 2020, this number is expected to increase by 18 million trips per year. Without high-speed trains, almost 15% of all intercity travel and more than 40% of longer intercity trips (those in excess of 241 kilometers or 150 miles) are forecasted to be air travel. At present, the automobile dominates intercity travel, but air travel is preferred for an estimated one-third of longer intercity trips. Auto trips are expected to account for more than 84% of all intercity travel and close to 60% of longer intercity trips.

Figure 1.2-1
California Population (millions)



Source: California Department of Finance

Figure 1.2-2
Regional Population Growth 2000-2040 (millions)



Source: California Department of Finance 2001

Much of the intercity travel in California consists of trips of intermediate distance. Table 1.2-1 below shows the expected growth in traffic volumes on major highways from 2000 to 2020. These include more than 54 million annual intercity trips between the Central Valley and major metropolitan areas, or more than a third of all intercity travel. Travel between the Los Angeles and San Diego regions is the second-largest geographic market, with more than 36 million trips per year in 2020. Travel between Sacramento and San Francisco represents the third-largest intercity travel market in the state, at over 21 million trips per year. In addition, Los Angeles to San Francisco is the busiest air travel route in the United States. In 1997, there were an estimated 17.8 million intercity trips between these two regions.

Table 1.2-1
Travel Growth in 20 Years for Intercity Highways

Major Highways	Average Daily Volume 2000	Average Daily Volume 2020	% Change 2000-2020
I-5 between San Diego & Los Angeles (Orange County-LA County line)	171,000	280,000	64%
I-5 between Los Angeles & Bakersfield (I-5 junction with I-405)	243,000	380,000	56%
SR-99 in Central Valley (at Bakersfield)	109,000	180,000	65%
US 101 just south of San Jose	232,000	320,000	38%
I-580 between Bay Area & Stockton (at Pleasanton)	188,000	300,000	60%

Sources: California Department of Transportation, Southern California Association of Governments, Kern County Council of Governments, and Metropolitan Transportation Commission

Regional and urban traffic is steadily increasing, which affects intercity commutes by delaying travelers where capacity is constrained. According to the Bay Area Regional Transportation Plan (Bay Area RTP) adopted October 28, 1998, regional travel within the Bay Area is expected to grow 46% from 1990 to 2020, while interregional travel will likely grow 115%. Growth in regional and interregional travel impacts intercity travel, which competes for use of the same facilities, by increasing congestion along the corridor.

The demand for air travel has grown dramatically in California and nationwide with a recent downward shift resulting from the effects of the World Trade Center terrorist attack on September 11, 2001 (which has reduced or delayed growth in demand). However, federal, state, and regional transportation plans forecast recovery from this reduction and continued growth in air travel over the next 20 years. Table 1.2-2 shows air travel growth from 1992 with projections to 2010. Over the last 10 years, annual passenger demand at San Francisco International Airport (SFO) has increased from 31 million passengers in 1990 to 41 million in 2000; during the same period, the demand at Los Angeles International Airport (LAX) increased from 45.8 million to 67 million in 2000. By 2015, the FAA projects a 65% increase in passengers at SFO with an associated increase in airport congestion (Federal Aviation Administration 2001). Estimates for LAX indicate that regional demand for flights will increase by about 54% between 1996 and 2015 (LAX Master Plan Supplement to the Draft EIS/EIR 2003). The current Southern California Association of Governments (SCAG) regional transportation plan indicates that the practical physical capacity of LAX with its existing configuration is 78 million annual passengers (Southern California Association of Governments 2001[2]).

Demand for intercity rail travel is also expected to grow significantly in the next 20 years. In 2001, Amtrak's 20-year improvement plan modeled the expected growth in total travel demand and the proportion of that growth expected to affect intercity rail travel using the existing travel volume of 3.01 million riders per year as a base (Amtrak 2001). Ridership is expected to double to 6.34 million riders per year by 2005 and to triple to 12.01 million riders by 2020.

[2] SCAG finalized the 2004 Regional Transportation Plan (RTP) during the completion of the Draft Program EIR/EIS, and no significant changes in the results of this Final Program EIR/EIS were identified as a result of the updated RTP.

Table 1.2-2
Intercity Air Travel between Southern California and San Francisco Bay Area
(Annual Enplanements)

Airport	Historical 1992	Historical 1997	Projected Continued Trend 2000	Projected Continued Trend 2010	% Change 1992–2010
Bay Area To Southern California Airports					
San Francisco	1,667,290	1,580,610	1,531,306	1,372,085	(18%)
Oakland	1,317,960	1,739,000	2,072,328	3,396,394	158%
San Jose	687,680	1,349,160	2,127,815	6,221,309	805%
Bay Area	3,674,922	4,670,767	5,733,449	10,991,798	199%
Southern California To Bay Area Airports					
Los Angeles	1,688,870	2,035,590	2,286,330	3,225,084	91%
John Wayne	588,670	1,134,740	1,766,314	5,043,297	757%
Ontario	559,980	589,370	607,930	671,743	20%
Burbank	705,110	909,070	1,066,844	1,684,035	139%
Long Beach	130,300	0	0	0	(100%)
So. California	3,672,930	4,668,770	5,727,418	10,624,159	189%
All Travel	**7,345,860**	**9,337,540**	**10,856,550**	**16,743,614**	**128%**
Source: Kaku Associates 2002					

B. CAPACITY OF CALIFORNIA'S INTERCITY TRANSPORTATION SYSTEM

Population growth and increasing tourism in California places severe demands on the already congested transportation system serving the state's major metropolitan areas. As described in the regional transportation plans for areas that would be served by the proposed HST system, the highways and airports serving key cities are currently operating at capacity, and plans for expansion will not keep up with projected growth over the next 20 to 40 years. The volume of traffic on major highways and the number of enplanements at key airports are presented above in Tables 1.2-1 and 1.2-2. Figure 1.2-3 illustrates the major routes and airports used for intercity travel between the markets potentially served by the HST system.

An analysis of the LAX master plan in 2001 reports that:

> "The passenger terminal space and the number and size of the aircraft gates are inadequate to accommodate not only the number of passengers and aircraft, but also large aircraft now being used and those that the airlines expect to introduce in the next couple of decades. On-airport circulation roads and off-airport access roads currently operate at highly congested conditions and are inadequate to handle the forecasted number of vehicles in the near future. There is no direct freeway or transit access to the airport." (Los Angeles International Airport 2001)

Airports at or nearing capacity currently, like LAX, will likely be forced to reduce air service on intercity travel markets with high levels of service (such as between LAX and SFO). Without terminal and access improvements, the future airfield capacity at LAX will limit the airport's passenger capacity; the current facility modernization effort proposed by the mayor of Los Angeles is not designed to increase the existing maximum physical capacity, which is estimated to be 78 million annual passengers.

C. TRAVEL TIME

Travel time is the time spent in a highway vehicle, in an aircraft, or on a train for a specific point-to-point trip. Total travel time includes the time spent getting to a station or an airport, waiting for the next scheduled train or flight, getting to the boarding area, checking and retrieving luggage, getting a rental car or taxi, and getting to the final destination. Total travel time is an important economic factor for business travel, as it is a business cost that affects worker productivity and scheduling of business activities.

Table 1.2-3 shows the approximate existing total travel time in 2000 and the projected total travel time in 2020 for auto, air, and rail between various city pairs, based on the ridership analysis completed for the Authority's Business Plan, information collected from regional transportation planning agencies (RTPAs), and current Amtrak schedules.

Table 1.2-3
Estimated Total Travel Times (Door to Door) between City Pairs by Auto, Air, and Rail

City Pair	Auto 1999	Auto 2020	Air 2000	Air 2020[a]	Conventional Rail 2003
Los Angeles downtown to San Francisco downtown	6:57	7:57	3:02	3:32	10:05[b]
Fresno downtown to Los Angeles downtown [c]	4:00	4:30	2:47	3:02	5:46[c]
Los Angeles downtown to San Diego downtown	2:19	2:49	2:30	3:00	3:47
Burbank (Airport) to San Jose downtown	5:50	6:50	2:44	3:14	9:46[d]
Sacramento downtown to San Jose downtown	2:10	2:40	no service	no service	4:41

[a] Represents increased 15-minute delay at San Francisco, Los Angeles, and San Diego area airports. This is consistent with the Authority's high-end ridership and revenue assumptions. This number is consistent with the No Project/No Action Alternative travel time in Section 3.2, Travel Conditions.

[b] Based on October 27, 2003 San Joaquin schedule, which would require bus connections from Los Angeles to Bakersfield and from Emeryville to San Francisco. The travel time with the Coast Starlight from Los Angeles to San Francisco would be 13:05.

[c] Based on October 27, 2003 San Joaquin schedule, which would require bus connections from Los Angeles to Bakersfield.

[d] Based on October 27, 2003 San Joaquin schedule, which would require bus connections from Burbank to Bakersfield and from Stockton to San Jose.

Source: Parsons Brinckerhoff 2003

Projected increases in automobile travel time are largely caused by increased travel demand and resulting congestion on highways used for intercity travel, and programmed and funded improvements would not measurably change future conditions. Although Amtrak has proposed improvements that could reduce conventional rail travel time over the next 20 years, they are not programmed or funded. There are some capacity improvements funded for the Central Valley and southern California, but these are only basic enhancements that will do more to improve reliability than travel time. The 20-year 10-billion-dollar Amtrak plan includes adding 21 intercity roundtrips, adding capacity, increasing speeds, and enhancing grade crossing safety. These improvements will benefit all rail users, including both freight and commuter traffic. If Amtrak's 2020 plan is implemented, their estimates suggest total travel times on the San Joaquin service between Los

Angeles and San Francisco could be reduced from the current 10 hours and 5 minutes[3] to 8 hours and 45 minutes[4] by 2020 through incremental improvements (Amtrak 2000). However, this service would still require transferring to buses to travel between Emeryville and San Francisco and between Bakersfield and Los Angeles.

D. RELIABILITY

Reliability is the delivery of predictable, consistent, travel times that remain the same over a period of years. As discussed above, roadway congestion, limited airport capacity, track conflicts between passenger rail and freight rail, and a growing intercity travel market are adversely affecting the travel time reliability of air, conventional passenger rail, and automobile travel. Weather-related events are an additional source of disruption and delay that affect transportation reliability. Based on current performance and projected congestion levels, the reliability of highway and air travel will continue to worsen in future years.

From 1990 to 2020, the Bay Area RTP forecasts a 249% increase in average daily vehicle hours of delay. The Bay Area may be an extreme case, but there are many causes of increased highway congestion rates all over California. For example, accidents, road work, cars stranded along the roadside, or a routine traffic violation stop can create a bottleneck effect, potentially delaying commuters for miles. Poor weather conditions (rain, wind, and dense Central Valley fog) also have a negative effect on the reliability of highway travel times. Rain and wind can make the roads dangerously slick, increasing accident rates. Snow and icy weather make roads conditions even worse, especially in heavily traveled areas. Fog, haze, and glare at times can distract drivers or cause them to slow down.

Weather conditions are also a key factor in flight delay. For instance, during poor weather conditions at SFO as of 1999, more than 25% of flight departures have been delayed by more than 1 hour and 10% have been delayed by more than 2 hours. By contrast, when weather conditions were good, 83% of flights have arrived on time. The percentages of delayed arrivals and departures are illustrated in Figure 1.2-4 for each of the major California airports serving the intercity travel market. Some airlines adjust their schedules to achieve on-time arrivals even if departures are delayed; and some airlines have increased their scheduled flight times between high-demand city pairs such as LAX and SFO in order to maintain their on-time arrival statistics in the face of potentially increasing delays (Office of Inspector General 2000). Weather also results in flight cancellations. At SFO, for example, between 4,500 and 8,500 flights are cancelled each year due to weather-related problems. In 1999, 13% of flights between SFO and LAX were cancelled because of weather conditions.

Aircraft delays cost both the airlines and the traveling public time and money, and the FAA has identified the reduction of airport delay nationwide as one of its highest priorities. Data from the U.S. Department of Transportation's Air Travel Consumer Report show SFO and LAX ranking among the worst of major airports in the country in terms of delay (U.S. Department of Transportation 2003). Airport delays are a function of capacity, weather conditions, and safety conditions. When demand at an airport exceeds the capacity on the airfield at that time, flights are delayed until they can be safely accommodated. Delayed flights sometimes compound problems for other flights and can result in cancelled flights. Because the FAA Ground Delay Program holds flights at their point of departure until the destination airport can accept the demand, and because short flights (e.g., SFO to LAX) are more easily adjusted than longer flights (e.g., East Coast or Midwest to West Coast), short

[3] Train #713: San Joaquin timetable effective October 27, 2003, Amtrak and 55-minute access time to get to and from the train or bus stations.

[4] Assumes 2 hour 30 minute bus ride from Los Angeles to Bakersfield and 25 minute bus ride from Emeryville to San Francisco, and a 55-minute access time to get to and from the train or bus stations.

flights are more likely to experience delays or capacity reductions. Consequently, intercity air travel within California can be hard hit by delays related to total airport demand.

E. SAFETY

Projected growth in the movement of people and goods in California by auto, air, and rail over the next two decades underscores the need for improved travel safety. With more and more vehicles on the intercity highways, the potential for accidents increases. The California Department of Highway Safety and Motor Vehicles publishes an annual summary of accident data for state highways. In 1998, there were a total of 3,057 fatalities and 189,007 non-fatal injuries on California highways (California Department of Highway Safety and Motor Vehicles 1998). This corresponds to an estimated injury rate of 100 per 100 million vehicle miles of travel (VMT) or 160 million vehicle kilometers of travel (VKT) per year. These statistics are increasing; in 2000 and 2001, there were 3,753 and 3,956 vehicle deaths in California in 2000 and 2001, respectively, according to the National Center for Statistics and Analysis. Nationally, 42,116 persons were killed in auto accidents in 2002, compared to 41,945 in 2001, representing a 0.4% increase. The fatality rate per 100 VMT was 1.52 in 2001, with 1.09 persons injured per 100 VMT. California was one of three states in the United States with the highest number of persons killed in motor vehicle traffic accidents for the years 2000 and 2001. (The other two highest states were Texas and Florida.)

Nationally, commercial airline travel accident/injury rates have remained fairly constant over the last 10 years. In 1999, the number of accidents for commercial airlines was 0.0077 per 1 million miles (1.6 million kilometers) flown; this represents 0.0003 fatalities per 1 million miles flown (National Transportation Safety Board 2000).

Intercity rail travel in California is provided by Amtrak, which operates the Capitol Corridor (San Jose to Auburn), San Joaquin Corridor (Oakland/Sacramento to Bakersfield), Coast Corridor (Oakland to Los Angeles) and Pacific Surfliner (San Luis Obispo to San Diego). Nationally, there were 105 fatalities and 1,161 non-fatal accidents associated with Amtrak operation in 1999. For all rail operations in California in 1999 (freight and passenger) there were about 3.89 train accidents per 1 million train miles (1.6 million kilometers) (Federal Railroad Administration 2001), which were associated with a total of 114 railroad related fatalities. A variety of factors contribute to rail accidents. For instance, conventional railroad rights-of-way are typically unfenced and at grade. Drivers and pedestrians may fail to comply with grade-crossing warning devices. Approach pavement markings, such as turn arrows and other lane markings, are often worn and difficult to see. Pedestrians and drivers may not expect to encounter a train and may be therefore forced to react quickly. In addition, because large objects appear to be moving more slowly than they actually are, pedestrians and drivers may misjudge the speed of trains. Finally, it is more difficult for pedestrians and drivers to see trains at night.

F. MODAL CONNECTIONS

Limited connections currently exist between intercity travel facilities (primarily airports) and the extensive regional urban and commuter transit systems in the state. While some major connections with existing rail are planned/completed, such as the recently completed extension of the San Francisco Bay Area Rapid Transit District (BART) system to SFO and rail service connections to Burbank Airport, other airports remain entirely unconnected to the local and regional transit systems. Where connections currently exist (except for BART), the connections are cumbersome, often involving multiple transfers and long waits.

G. AIR QUALITY AND PROTECTION OF NATURAL RESOURCES

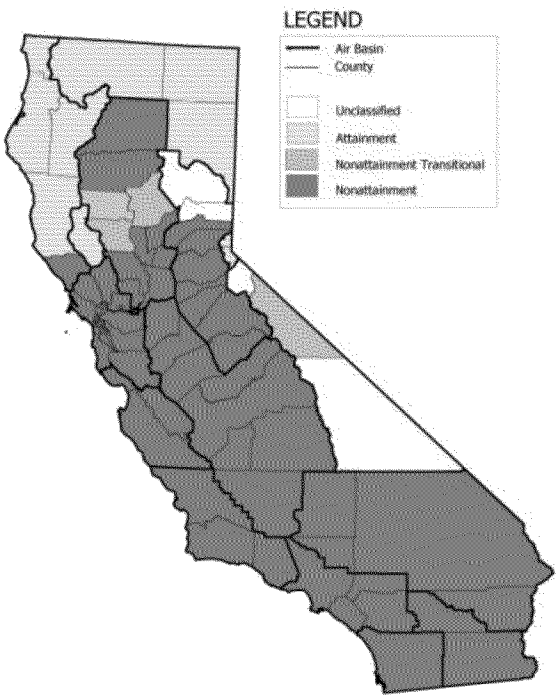
The Clean Air Act (CAA) makes transportation conformity the affirmative responsibility of the U.S. Department of Transportation and the Metropolitan Planning Organizations (MPOs). Transportation

conformity addresses strategies for the attainment and maintenance of air quality standards contained in the California State Implementation Plan (SIP) used to evaluate transportation alternatives, including the no-project/no-action alternative.

Figure 1.2-5 shows the counties in California designated as nonattainment areas. Maintaining air quality is one goal of the State Transportation Improvement Program (STIP) and the various regional transportation plans (RTPs). The transportation challenges for metropolitan areas are to continue to reduce emissions from a growing number of vehicles to acceptable levels and to maintain air quality standards by encouraging more efficient use of land resources, improving mobility, and providing alternative transportation facilities and services. Approaches aimed at reducing the demand for trips in single-occupant vehicles are integral to all transportation plans and programs in order to help areas presently in nonattainment conform to federal air quality standards. One statewide strategy adopted in the SIP is development of multi-use corridors that combine designated lanes for high-occupancy vehicles (HOVs), transit, and rail alternatives. Meeting federal and state air quality standards over the next 20 to 40 years will also require reductions in the total distance traveled by vehicles, integration of land use and transportation planning and development, development of transportation demand strategies, implementation of operational improvements, and use of new technologies that improve transportation efficiencies and provide a transportation alternative to the single-occupant automobile. For example, in 1997, 63% of intercity trips in California of a distance of at least 150 miles (241 kilometers) were made by automobile.

In addition to improving and maintaining the state's air quality, another critical need is to protect and preserve natural resources by limiting potential impacts related to expanding transportation systems. Key resources include wetlands and waterways, habitat areas for sensitive species of plants and animals, wildlife migration corridors, and agricultural lands. These natural resources have been subject to both direct and indirect impacts as the population has increased and growth has occurred in the less developed areas of the state. Avoidance of sensitive natural resources is a guiding criterion in the environmental review process. Various agencies, including USACE, USFWS, and the California Department of Fish and Game (CDFG) may have jurisdiction to impose specific restrictions on the use of wetlands and encroachment into wildlife habitat areas, wildlife migration corridors, and conservation areas important to the protection of threatened or endangered species. The environmental analysis process includes consideration of alternatives that offer opportunities to protect and enhance sensitive natural resources and improve existing conditions.

Figure 1.2-5
2001 Area Designations for National Ambient Air Quality Standards—Ozone



Source: California Air Resources Board 2001

Another priority is the conservation of energy, and particularly the reduction in demand for petroleum. The need to reduce per-passenger energy consumption is important now and is becoming ever more important as energy use depletes reserves, drives up the cost of fuels or energy, and affects air quality.