EXHIBIT A

Bay Area to Central Valley High-Speed Train

CEQA Findings of Fact and Statement of Overriding Considerations

April 2012

CALIFORNIA
High-Speed Rail Authority

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1 INTRODUCTION

These CEQA Findings of Fact and Statement of Overriding Considerations are intended to fulfill the California High-Speed Rail Authority's (Authority's) responsibilities under the California Environmental Quality Act (CEQA) for its approval of the Pacheco Pass Network Alternative serving San Francisco via San Jose, alignment alternatives, and station location options, as analyzed in the Bay Area to Central Valley High-Speed Train (HST) Partially Revised Final Program EIR.

CEQA provides that no public agency shall approve a project or program as proposed, if it would result in significant environmental effects as identified in an EIR, but must instead adopt and incorporate feasible mitigation to avoid and reduce such effects and adopt appropriate findings. In section 21081 of the Public Resources Code, CEQA provides as follows:

> Pursuant to the policy stated in Sections 21002 and 21002.1, no public agency shall approve or carry out a project for which an environmental impact report has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur:
>
> (a) The public agency makes one or more of the following findings with respect to each significant effect:
>
> (1) Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.
>
> (2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.
>
> (3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the environmental impact report.
>
> (b) With respect to significant effects which were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

These findings include a description of the Pacheco Pass Network Alternative serving San Francisco via San Jose (Preferred Pacheco Pass Network Alternative) to connect the HST system between the Bay Area and the Central Valley, findings concerning potentially significant environmental impacts and mitigation strategies to address such impacts, a discussion of cumulative and growth-inducing impacts, and a statement of overriding considerations.

2 PROJECT DESCRIPTION

2.1 Background—Approval of Statewide HST System

In November 2005, following a first-tier, programmatic environmental review process, the Authority and the Federal Railroad Administration (FRA) approved the HST system program 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 HST system is about 800 miles long, with electric propulsion and steel-wheel-on-steel-rail trains capable of maximum operating speeds 220 miles per hour (mph) (354 kilometers per hour [kph]) on a mostly dedicated system of fully grade-separated, access-controlled steel tracks and with state-of-the-art safety, signaling, communication, and automated train control systems. As part of the November 2005 decision, the Authority and the FRA selected, for further project-level study and implementation planning, a series of alignments and station locations for the HST system.

For the section of the HST system connecting the Bay Area and the Central Valley, the Authority directed staff to prepare a separate first-tier, program EIR to identify a preferred alignment within the broad corridor between and including the Altamont Pass and the Pacheco Pass.

2.2 Description of Pacheco Pass Network Alternative Serving San Francisco via San Jose to Connect Bay Area to Central Valley

The Authority's 2012 Partially Revised Final Program EIR is comprised of the following documents:

- 2012 Partially Revised Final Program EIR, 1 volume of analysis, comments, and responses to comments
- 2010 Revised Final Program EIR, 2 volumes of analysis, comments, and responses to comments
- 2008 Final Program EIR, 3 volumes of analysis, appendices, comments, and responses to comments, including addendum/errata issued in June 2008.

Chapter 6 of the 2012 Partially Revised Final Program EIR identifies the Pacheco Pass Network Alternative serving San Francisco via San Jose as the preferred network alternative to connect the HST between the Bay Area and Central Valley. It is comprised of the following components:

SAN FRANCISCO TO SAN JOSE

Alignment:

- Caltrain Corridor (Shared Use)

Preferred Station Locations:

- Downtown San Francisco Terminus: Transbay Transit Center
- San Francisco Airport Connector Station: Millbrae (SFO)
- Mid-Peninsula Station: Continue to investigate potential sites and work with local agencies and the Caltrain JPB to determine whether a Mid-Peninsula station site should be recommended. .

SAN JOSE TO CENTRAL VALLEY

Alignment:

- Pacheco Pass via Henry Miller Road (UPRR Connection): At project level, continue to seek and evaluate alignment alternatives utilizing Pacheco Pass that would minimize or avoid resources in the Grasslands Ecological Area.

Preferred Station Locations:

- Downtown San Jose Terminus: Diridon Station
- Southern Santa Clara County: Gilroy Station (Caltrain)

CENTRAL VALLEY

Alignment:

- UPRR N/S: At the project level, continue to evaluate BNSF or some combination of UPRR and BNSF, because of uncertainty of negotiating with the UPRR and the BNSF for use of some of their right-of-way and continue investigation of alignments/linkages to a potential maintenance facility at Castle Air Force Base (AFB).

Preferred Station Locations:

- Modesto: Downtown Modesto
- Merced: Downtown Merced
- Reaffirm that no station would be located between Gilroy and Merced.

Maintenance Facilities:

- No maintenance facility would be located at Los Banos. Castle AFB is identified as one of the options for future study for the location of an HST maintenance facility.

SAN FRANCISCO BAY CROSSING

No Bay crossing for the proposed HST system.

As described in Chapter 2 of the 2008 Final Program EIR, and consistent with the Authority's 2005 decisions, the project includes steel-wheel-on-steel-rail trains capable of maximum operating speeds 220 miles per hour (mph) (354 kilometers per hour [kph]) on a mostly dedicated system of fully grade-separated, access-controlled steel tracks and with state-of-the-art safety, signaling, communication, and automated train control systems.

3 THE ROLE OF TIERING AND THE LEVEL OF DETAIL FOR THIS PROGRAM EIR/EIS

The Authority prepared the 2008 Final Program EIR as a joint Program EIR/EIS ("environmental impact statement") with the FRA. The agencies intentionally fashioned the document as a first-tier, program environmental document under CEQA and NEPA to allow them to select a preferred network alternative and preferred station location options within the broad corridor between and including the Altamont Pass and the Pacheco Pass to connect the Bay Area and Central Valley. The Authority has continued this first-tier planning and environmental review process with its Partially Revised Final Program EIR. The Partially Revised Final Program EIR builds on, and tiers from, the prior Statewide Program EIR/EIS for the HST system, certified by the Authority in November of 2005. Specifically, the current EIR builds from the Authority's prior decisions, articulated in Authority Resolution No. 05-01, that approved the Statewide

HST System Program, defined the HST as a steel wheel/steel rail system with maximum speeds of up to 220 mph (354 kph), and selected corridor alignments and station location options. The current EIR also tiers from the prior Statewide Program EIR/EIS by incorporating the design practices and mitigation strategies identified in that document and approved by the Authority for the HST System Program.

At the same time that the Partially Revised Final Program EIR builds on and tiers from the 2005 first-tier, Statewide Program EIR/EIS, it is itself a first-tier, program EIR under CEQA. The focus of the first-tier, programmatic impact analysis is on the environmental impacts associated with different network alternatives to connect the Bay Area to the Central Valley for the HST system. The environmental analysis contained in the Partially Revised Final Program EIR is designed to adequately identify and analyze the significant effects of the planning approval at hand. (*In re Bay-Delta Programmatic Environmental Impact Report Cases* (2008) 43 Cal.4th 1143, 1170.) The network alternatives and station location options are defined conceptually, and the level of detail for the impacts analysis and the mitigation strategies is commensurately broad and general. (CEQA Guidelines, § 15146; see also *In re Bay-Delta Programmatic Environmental Impact Report Cases* (2008) 43 Cal.4th 1143; *Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal.App.4th 351, 371.) The use of tiering under CEQA, and the consideration of the Bay Area to Central Valley regional segment in a separate first-tier, program EIR allows the Authority to focus on the broad policy choices that are ripe for decision:

1. which proposed network alternative and alignment alternatives should connect the San Francisco Bay Area to the Central Valley for the HST system;
2. which station location options along the selected network alternative should be chosen.

The general analysis in the Partially Revised Final Program EIR provides sufficient information for making these broad policy decisions. While details about future, second-tier projects are deferred to second-tier, project-level EIRs, the first-tier program EIR contains a general, but comprehensive, examination of the environmental impacts of the choice of a network alternative to connect the HST between the Bay Area and the Central Valley.

The impacts analysis and mitigation strategies identified in the Partially Revised Final Program EIR will be used in the future as a basis for second-tier, detailed project-level EIRs assessing site-specific impacts of HST alignments and station locations that are ready for implementation in the Bay Area to the Central Valley region. The Authority will use relevant information from the first-tier impacts analysis to form the basis of more detailed, site-specific impacts analyses, incorporating the Partially Revised Final Program EIR by reference where appropriate. The general mitigation strategies will be refined and applied in second-tier EIRs as specific mitigation measures to avoid and minimize environmental impacts. The Authority will also consider additional mitigation measures for environmental impacts in second-tier, project-level EIRs.

4 FINDINGS ON SPECIFIC IMPACTS AND MITIGATION STRATEGIES

The environmental effects of the HST alignments and station locations of the Preferred Pacheco Pass Network Alternative that would be potentially significant or significant in the absence of mitigation strategies are described in Chapters 2-5 of the Partially Revised Final Program EIR, Chapters 2-4 of Volume 1 of the 2010 Revised Final Program EIR, and Chapter 3 of the 2008 Final Program EIR. These impacts are set forth below, along with mitigation strategies the Authority adopts, that will avoid or substantially lessen those potentially significant or significant impacts. As environmental studies for second-tier project implementation go forward, these mitigation strategies will be refined into more precise mitigation measures. These findings recognize that the strategies are not an exclusive list of mitigation, and that additional mitigation measures may be added at the second-tier, project level. In addition, as mitigation is developed at the project level, some mitigation included herein as programmatic mitigation strategies may be found to be the responsibility of other public agencies instead of, or in addition to, the Authority.

Also set forth in these findings are those impacts that the Authority finds cannot with certainty be avoided or reduced to a less-than-significant level even with the adoption of all feasible mitigation strategies proposed in the Partially Revised Final Program EIR. In adopting these findings and mitigation strategies, the Authority also adopts a Statement of Overriding Considerations. The Statement of Overriding Considerations describes the economic, social, and other benefits of the Preferred Pacheco Pass Network Alternative that will render these significant unavoidable environmental impacts acceptable.

The Authority is not required to make findings or adopt mitigation strategies or policies as part of this decision for impacts that are less than significant, or beneficial. For these resource areas, however, the Authority is choosing to include findings to provide context and rationale about the less-than-significant or beneficial impact conclusions at the programmatic level. The areas that are less-than-significant without mitigation or beneficial, but discussed in these findings include:

- highway and traffic capacity
- parking
- reduction in statewide and regional air pollutant emissions
- reduction in greenhouse gas emissions
- reduction of transportation energy consumption
- EMI/EMF

Finally, while the Partially Revised Final Program EIR includes a discussion of certain issues necessary to satisfy the National Environmental Policy Act, these issues do not necessarily represent environmental impacts for which findings are required under CEQA. The Authority has determined that the following areas discussed in the Partially Revised Final Program EIR do not require findings:

- travel considerations
- environmental justice
- property impacts
- mineral resources
- movement of goods
- emergency access

4.1 Traffic, Circulation, Transit and Parking

Impact 1. Traffic, Circulation, and Transit

By providing another mode of intercity travel in the Bay Area to Central Valley, the HST would improve reliability and increase mobility within the area's transportation system. The HST system would result in traffic improvement in areas where grade separation for the HST system would replace an at-grade crossing that was responsible for periodic local traffic delays.

TRIP DIVERSIONS / HIGHWAY CAPACITY IMPROVEMENTS / CONGESTION REDUCTIONS

The HST system would add capacity to the Bay Area and Central Valley's transportation infrastructure resulting in volume to capacity ratio improvements (V/C) and would relieve congestion on intercity highways linking the urban areas to the extent that trips taken by HST passengers would otherwise have used highways. Table 4-1 shows projected reductions in trips by major highway link.

Table 4-1
Impacts to 2030 Peak-Hour Traffic on Intercity Freeways from Diversion to HST

	2005	2030 No-Build		2030 HST			
Location	V/C, (LOS)[1]	V/C, (LOS)[1]	% Change from Existing	Peak-Period Trips Diverted[2]	% Change from No-Build	V/C (LOS)[1]	% Change from No-Build
US 101: San Francisco—SF Airport	0.81 (D)	0.95 (E)	17.2%	(596)	-0.6%	0.92 (E)	-2.7%
US 101: SF Airport — Redwood City	0.97 (E)	1.03 (F)	6.3%	(442)	-0.4%	1.03 (F)	-0.4%
US 101: Redwood City—I-880	0.75 (C)	1.47 (F)	96.5%	542	0.5%	1.48 (F)	0.5%
US 101: I-880—San José	0.73 (C)	0.79 (C)	8.3%	(5,392)	-4.6%	0.75 (C)	-4.6%
US 101: San José—Gilroy[3]	0.87 (D)	0.64 (B)	-26.7%	(4,948)	-4.0%	0.61 (B)	-4.0%
US 101: Gilroy—SR 152	0.72 (C)	1.17 (F)	64.0%	(2,986)	-3.7%	1.13 (F)	-3.7%
SR 152: US 101—I-5 [3]	0.78 (C)	0.51 (A)	-34.9%	(612)	-4.2%	0.49 (A)	-4.2%
SR 152: I-5—SR 99 [3]	0.59 (A)	0.46 (A)	-22.5%	(943)	-5.5%	0.43 (A)	-5.5%
I-80: SF—I-880	0.79 (C)	1.18 (F)	50.6%	(736)	-0.6%	1.18 (F)	-0.6%
I-80: I-880—I-5	0.81 (D)	0.98 (E)	19.9%	(2,545)	-3.7%	0.92 (E)	-5.6%
I-880: I-80—I-580	0.82 (D)	1.16 (F)	41.1%	(1,370)	-2.6%	1.13 (F)	-2.6%
I-880: I-580—Fremont/ Newark	0.95 (E)	1.12 (F)	18.0%	(1,852)	-1.8%	1.10 (F)	-1.8%
I-880: Fremont/Newark—US 101	0.96 (E)	1.58 (F)	65.5%	(325)	-0.3%	1.58 (F)	-0.3%
I-580: I-880 via SR 238—Livermore	0.74 (C)	1.28 (F)	73.8%	(3,938)	-2.5%	1.25 (F)	-2.5%
I-580: Livermore—I-5	0.51 (A)	1.22 (F)	137.8%	(6,325)	-5.4%	1.15 (F)	-5.4%
I-680: I-580—US 101	1.06 (F)	1.34 (F)	25.8%	630	0.5%	1.34 (F)	0.5%
I-5: I-580—SR 140 [3]	0.99 (E)	0.81 (D)	-17.6%	(7,897)	-20.2%	0.65 (B)	-20.2%
SR 99: Ripon—Merced	1.04 (F)	1.36 (F)	30.9%	(1,847)	-2.8%	1.32 (F)	-2.8%

Table 4-1
Impacts to 2030 Peak-Hour Traffic on Intercity Freeways from Diversion to HST

Location	2005	2030 No-Build		2030 HST			
	V/C, (LOS)[1]	V/C, (LOS)[1]	% Change from Existing	Peak-Period Trips Diverted[2]	% Change from No-Build	V/C (LOS)[1]	% Change from No-Build

[1] Peak-hour V/C changes based on diversion to HST. LOS values are defined from V/C values as follows: up to 0.60=A, above 0.60 to 0.70=B, above 0.70 to 0.80=C, above 0.80 to 0.90=D, above 0.90 to 1.00=E, above 1.00=F
[2] The peak period is the sum of the AM and PM 3-hour peak periods. Where the percentage diversion is different than the V/C percentage change, it is because of unequal directional split of diversion.
[3] Future capacity increases result in improved LOS between 2005 and 2030. Source: Caltrans 2005 AADT, Cambridge Systematics (base forecast), Parsons, June 2007.

As shown, 16 of the 18 highway links show improvements with the HST compared with 2030 No Build conditions. The links that degrade in performance do so only slightly. The number of trips diverted to the HST train system on the highway links ranges from 325 on I-880 (from Fremont/Newark to US 101), a 0.03% reduction, to 7,897 on I-5 (from I-580 to SR 140), a 20.2% reduction. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this is identified to be a beneficial impact.

Monterey Highway Traffic Congestion Impacts

The Preferred Pacheco Pass Network Alternative would result in narrowing the Monterey Highway from six lanes to four lanes from Southside Drive to Blossom Hill Road, a distance of approximately 3.3 miles, to accommodate HST track. Additional analysis was prepared in 2012 to address traffic congestion impacts related to the narrowing of Monterey Highway, both on Monterey Highway itself and on the surrounding street network. The VTA Model (Spring 2011), which does not incorporate the diversion of traffic to HST, was used for conducting this analysis. The analysis shows that analyzing 2035 no project vs. 2035 with HST conditions, one to five of the eight affected segments of Monterey Highway are projected to have potentially significant impacts, depending on the peak hour and travel direction, as shown in Tables 4-2a and b.

Table 4-2a
Traffic Conditions on Monterey Highway With and Without the Project During Morning Peak Hour (Year 2035)

MONTEREY HIGHWAY SEGMENT		Northbound					Southbound				
		2035 No Project		2035 + Project *		Impact**	2035 No Project		2035 + Project *		Impact**
From	To	V/C	LOS	V/C	LOS		V/C	LOS	V/C	LOS	
Southside	Capitol	0.81	D	0.97	E	**S**	0.48	A	0.64	B	LTS
Capitol	Senter	0.94	E	1.02	F	**S**	0.74	C	0.83	D	LTS
Senter	Branham	0.87	D	0.96	E	**S**	0.72	C	0.78	C	LTS
Branham	Chynoweth	0.91	E	0.97	E	LTS	0.82	D	0.89	D	LTS
Chynoweth	Blossom Hill	0.84	D	1.01	F	**S**	0.87	D	0.98	E	**S**
Blossom Hill	Bernal	0.59	A	0.6	B	LTS	0.68	B	0.7	C	LTS
Bernal	Metcalf	1.07	F	1.06	F	LTS	1	F	0.98	E	LTS
Metcalf	Bailey	0.88	D	0.85	D	LTS	0.99	E	0.99	E	LTS

Source: VTA Model, Spring 2011.
V/C = volume-to-capacity ratio.
*Does not account for trips that would be diverted from auto to high-speed rail
**Impact: LTS (less than significant); S (significant)

Table 4-2b
Traffic Conditions on Monterey Highway With and Without the Project During Evening Peak Hour (Year 2035)

MONTEREY HIGHWAY SEGMENT		Northbound					Southbound				
		2035 No Project		2035 + Project *		Impact**	2035 No Project		2035 + Project *		Impact**
From	To	V/C	LOS	V/C	LOS		V/C	LOS	V/C	LOS	
Southside	Capitol	0.61	B	.072	C	LTS	0.84	D	0.98	E	**S**
Capitol	Senter	0.76	C	0.82	D	LTS	0.91	E	0.97	E	LTS
Senter	Branham	0.75	C	0.8	D	LTS	0.88	D	0.94	E	**S**
Branham	Chynoweth	0.92	E	0.95	E	LTS	0.88	D	0.97	E	**S**
Chynoweth	Blossom Hill	0.96	E	1.03	F	**S**	0.79	C	0.97	E	**S**
Blossom Hill	Bernal	0.77	C	0.8	D	LTS	0.73	C	0.77	C	LTS
Bernal	Metcalf	1.11	F	1.12	F	LTS	0.96	E	0.97	E	LTS
Metcalf	Bailey	1.08	F	1.08	F	LTS	0.87	D	0.9	E	**S**

Source: VTA Model, Spring 2011.
V/C = volume-to-capacity ratio.
*Does not account for trips that would be diverted from auto to high-speed rail
**Impact: LTS (less than significant); S (significant)

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the narrowing of Monterey Highway is considered a new significant traffic impact for this specific 3.3 mile segment of Monterey Highway.

Effect of Monterey Highway Narrowing on Surrounding Streets

Traffic may be diverted from Monterey Highway to the surrounding street network, due to the narrowing. At the same time, traffic may be diverted from the region as a whole to the HST. The potential effects of traffic diversion to the surrounding street network are analyzed using the VTA Model (Spring 2011). The analysis showed that some of the surrounding streets, primarily the major freeways (US 101, I-280, SR-85 and SR-87) would operate under congested conditions even without the narrowing of Monterey Highway, and the additional traffic diverted onto roadways by the narrowing could lead to significant traffic congestion impacts. Although there is the potential for the mode shift to HST to offset local traffic congestion, considering the uncertainty of this potential, the narrowing of Monterey Highway is considered a significant traffic impact on the surrounding street network.

Potential Loss of Traffic Lanes Parallel to the Caltrain Right-of-Way Along the San Francisco Peninsula

The Preferred Pacheco Pass Network Alternative could potentially result in lane closures on streets adjacent to the Caltrain Right-of-Way along the San Francisco Peninsula. Additional analysis was

prepared in 2012 to address traffic impacts adjacent to the Caltrain right of way related to the potential lane closures. Although some of the closures assumed may not actually be required due to design modification at the second-tier project level, a conservative analysis based on traffic counts collected in 2009, 2010, 2011 and 2012 was conducted. This analysis showed that lane closures have the potential to cause traffic congestion at a number of intersections. Specifically, analyzing 2035 no project vs. 2035 with HST conditions, two to eight intersections are identified as experiencing a significant increase in traffic congestion (depending on the peak hour). These intersections are:

- Hillside Boulevard/El Camino Real ramps (northbound and southbound) in San Mateo,
- Brittan Avenue/El Camino Real in San Carlos,
- Howard Avenue/El Camino Real in San Carlos,
- Ravenswood Avenue/Alma Street in Menlo Park,
- Embarcadero Road/El Camino Real in Palo Alto,
- Churchill Avenue/Alma Street in Palo Alto, and
- Page Mill Road/El Camino Real in Palo Alto.

In light of the corridor being evaluated as a whole at the program level, this increase in traffic congestion is considered a new significant impact for the San Francisco to San Jose Corridor, even though the impact is limited to certain areas.

Localized Congestion and a Blended System

The Draft and Revised 2012 Business Plans illustrate how construction of the statewide HST system could be accomplished in phases of implementation. The Revised 2012 Business Plan recognizes that construction of the system will take longer than originally anticipated in the 2008 Final Program EIR. The Revised 2012 Business Plan also emphasizes a "blended approach" to implementation. While still conceptual, the blended approach for the Caltrain corridor between San Francisco and San Jose is for a primarily 2-track system shared by Caltrain and HST that would stay substantially within the existing right-of-way. The potential for local traffic effects related to implementation of a "blended approach" for the Caltrain corridor between San Francisco and San Jose is highly speculative. A "sample" blended approach that involves some grade separations but is assumed not to be fully grade separated has been analyzed to evaluate potential traffic effects.

In general, the grade separation proposed as part of the 4-track alignment analyzed in the Program EIR provides traffic circulation benefits by eliminating traffic congestion where vehicles would otherwise have to stop for passing commuter trains. Without full grade separation, at-grade crossings and associated traffic delays remain. The addition of HST trains to the Caltrain corridor, as part of a blended system, could cause adverse local traffic impacts at the at-grade crossings where traffic will be stopped for additional periods of time. This impact is speculative at this time.

The need for lane reductions on the San Francisco Peninsula described above, and the corresponding traffic congestion impact, would likely be largely eliminated with a blended system, because a blended system would operate predominantly within the existing right-of-way.

Station Area Traffic Impacts

The HST stations would create adverse impacts in some areas as a result of adding traffic to streets that would already be congested with other traffic under the No Project Alternative in 2030. Notably, capacity of these arterial streets would be the same under either the No Project Alternative or HST,

due to expected traffic increases by 2030. Table 4-3 shows the anticipated impacts to station area traffic from HST at the identified station area cordon lines.

Table 4-3
Impacts to Station Area Traffic from HST

HST Stations	Highway / Station Conditions / Impacts (V/C)		
	2005 Conditions	2030 without HST Conditions	2030 HST Impacts HST Preferred Alt.
Transbay Transit Center	0.80; LOS D	0.90; LOS D	1.08; LOS F
Millbrae/SFO	0.63; LOS B	0.91; LOS E	0.96; LOS E
Potential Mid-Peninsula Station at Redwood City (Caltrain)	0.61; LOS B	0.68; LOS B	0.72; LOS C
Potential Mid-Peninsula Station at Palo Alto (Caltrain)	0.85; LOS D	0.47; LOS A	0.50; LOS A
San Jose (Diridon)	0.25; LOS A	0.48; LOS A	0.59; LOS A
Gilroy (Caltrain)	0.44; LOS A	0.67; LOS B	0.74; LOS C
Modesto (Downtown)	0.53; LOS A	0.90; LOS D	0.92; LOS E
Merced (Downtown)	0.95; LOS E	1.15; LOS F	1.16; LOS F

As shown, cordon traffic operations at the following stations following construction of the full HST system may constitute an adverse impact: Transbay Transit Center, Millbrae, Modesto Downtown, and Merced Downtown. In these cases, traffic cordon conditions would deteriorate from LOS D to LOS E or F or from LOS E or F to a worse LOS E or F. Traffic effects at the cordon line at other station location options would not constitute an impact, but individual roadway segments (away from the Cordon Line) would operate at congested conditions under the No Project Alternative and/or with the HST for the San Jose and Gilroy stations.

Phasing, as described in the Draft and Revised 2012 Business Plan, may result in impacts to transit and public transportation by changing the level and duration of adverse traffic congestion at the San Jose station, which was not expected to be significant in the 2008 Final Program EIR. If San Jose were the temporary northern terminus during phased implementation of the HST system, the total number of passengers accessing trains in San Jose would be considerably higher than the number that would access trains in San Jose under a full system that terminated in San Francisco. The impact of these potential additional passengers accessing the San Jose station both by Caltrain and by road could affect local station area traffic. and at the program level the impacts are identified as potentially significant.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR and taking into account both phased implementation and full construction, local station area traffic would be a significant impact.

Transit/Public Transportation Impacts

HST stations would be multi-modal hubs that would provide for connectivity with other services. Table 4-4 shows current and anticipated transit connections.

Table 4-4
Stations and Connecting Transit Service

Transbay Transit Center	**Muni 5, 6, 10, 14, 14L, 14x, 38, 38L, 76, 108; AC Transit C, CB, E, F, FS, G, H, J, L, LA, N, NL, NX, NX1, NX2, NX3, NX4, O, OX, P, S, SA, SB, U, V, W, Z, 800 SamTrans DX, FX, KX, MX, NX, PX, RX, 391, 292; Golden Gate Transit Service 10, 20, 30, 50, 60, 70, 80, 2, 4, 8, 18, 24, 26, 28, 32, 34, 38, 44, 48, 54, 56, 72, 74, 76, 78, 90, 93; WestCAT; Greyhound; Caltrain; BART**
Millbrae	SamTrans MX, 242, 390, 391, Caltrain, BART
Potential Mid-Peninsula Station at Redwood City	SamTrans KX, PX, RX, 270, 271, 390, 391, Caltrain
Potential Mid-Peninsula Station at Palo Alto	SamTrans KX, PX, RX, 280, 281, 390, 391; SCVTA 22, 35, 88,522, Caltrain
San Jose	SCVTA 22, 63, 64, 65, 68, 180, 305, 522, Hwy. 17, Caltrain, ACE, Amtrak, DASH, LRT, MST 55 (Monterey to San Jose Express)
Gilroy	SCVTA 17, 19, 68, 121, Caltrain, Greyhound, San Benito Transit, MST 55.
Downtown Modesto	StaRT, CAT, Ceres Dial-A-Ride, ROTA, MAX Route 25.
Downtown Merced	Merced County Transit's "The Bus"
Source: Muni, SamTrans, Santa Clara Valley Transportation Authority, AC Transit, Golden Gate Transit, Merced County Transit, Caltrain, BART, 2003.	

Except at the downtown San Francisco Transbay Transit Center station location, transit serving the proposed station areas following construction of the HST system would have enough capacity to meet transit demand, and hence the impact attributable to additional HST traffic would be low or less than significant under the significance criteria. At the San Francisco station, however, transit lines would be operating above capacity during peak hours under the No Project Alternative. The additional HST traffic would deteriorate the conditions further and result in a significant impact.

Phasing as discussed in the Draft and Revised 2012 Business Plans may also create a new adverse impact on connecting commuter rail services, if San Jose were the temporary northern terminus during phased implementation of the HST system. The number of potential passengers transferring between Caltrain and the HST system at San Jose could result in significant impacts to the Caltrain system including overcrowding of Caltrain trains with HST passengers and consequently displacing regular Caltrain passengers.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR and taking into account both phased implementation and full construction, the impact to transit service from the deterioration in conditions at the San Francisco Transbay Transit Center would be a significant impact and the impact on Caltrain commuter rail service would also be a significant impact.

Construction Traffic Impacts

The construction of the HST system would result in short-term impacts of increased traffic in areas affected by the construction process for the duration of the construction in that area. In a few areas, construction of the HST system would result in closure, either temporary or permanent, of local roadways that in turn would result in increased traffic on nearby roads and longer travel routes for some travelers. Construction of the HST system could also require temporary construction easements, which may involve temporary traffic impacts. The Authority finds that the localized increases in traffic and congestion near HST station areas and during construction are significant at the programmatic level of analysis.

Mitigation Strategies

Program-level mitigation strategies would be further refined and specific measures would be considered during project-level environmental reviews where traffic impacts are found to be significant at the project level. The following mitigation strategies can be refined and applied at the project-specific level to reduce these impacts:

1. Require that HST system stations serve as multi-modal transportation hubs providing easy connection to local/regional bus, rail and transit services, as well as providing bicycle and pedestrian access.
2. Require the HST system to be grade-separated from all roadways to allow vehicular traffic to flow without impediment from the HST system.
3. Work with local and regional agencies to develop and implement transit-oriented development strategies around HST stations, as described in Chapter 6 of the 2008 Final Program EIR/EIS.
4. Work with public transportation providers to coordinate services and to increase service and/or add routes, as necessary, to serve the HST station areas, including for any interim period of phased implementation.
5. Work with local and regional agencies to identify, plan, coordinate, and implement traffic flow improvements around HST station locations during project-level planning. Such improvements may include:
    - Provide additional parking for any interim period of phased implementation.
    - Consider offsite parking with shuttles for any interim period of phased implementation.
    - Share parking strategies for any interim period of phased implementation.
    - Implement parking permit plans for neighborhoods for any interim period of phased implementation.
    - Employ parking and curbside use restrictions for any interim period of phased implementation.
    - Develop and implement a construction phasing and traffic management plan.
    - Minimize closure of any proximate freight or passenger rail line or highway facility during construction.
    - Widen roadways.
    - Install new traffic signals.
    - Improve capacity of local streets with upgrades in geometrics, such as providing standard roadway lane widths, traffic controls, bicycle lanes, shoulders, and sidewalks.
    - Install modifications at intersections, such as signalization and/or capacity improvements (widening for additional left-turn and/or through lanes).
    - Coordinate and optimize signals (including retiming and rephrasing).
    - Designate one-way street patterns near some station locations.
    - Truck route designations.
    - Implement turn prohibitions.
    - Coordinate with Caltrans regarding nearby highway facilities. Use one-way streets and traffic diversion to alternate routes.

6. Work with regional transportation agencies on regional strategies including:

    - Coordination with regional transportation (highway and transit) planning (e.g., regional transportation plans).
    - congestion management plans.
    - freeway deficiency plans, etc.
    - Intelligent Transportation Systems Strategies (ITS).

7. To address traffic impacts on Monterey Highway and impacts on surrounding streets, mitigation strategies include:

    - Optimizing signal timings (for the revised traffic volumes and capacity)
    - Synchronizing signals (Coordinating the timing of the signals between successive intersections, and automatically adjusting the traffic signals to facilitate the movement of vehicles through the intersections. This will help in reducing overall stops and delays. This works well if the distance between adjacent signals is a quarter of a mile or less).
    - Selectively adding new turn lanes at intersections. (For example, adding two left-turn lanes instead of an existing single left-turn lane. The traffic analysis will show which intersections would require additional turn lanes. Adding turn lanes would be much more economical/affordable than adding whole lanes.)
    - Promoting more transit usage in the corridor by increasing frequency of popular transit services.

8. To address traffic impacts from Peninsula lane loss, mitigation strategies include:

    - Determine the amount of diverted traffic onto parallel facilities and make improvements to those facilities to accommodate the diverted traffic.
    - Realign the roadway to replace any loss of capacity.
    - Change the affected roadway to one way to maintain access to properties along roadway and assess the diversion of traffic eliminated onto parallel facilities, mitigating any new effects as required.
    - Use physical barriers for protection to separate bicycle lanes from moving traffic.
    - Restriping of parking spaces to fit with changed circulation patterns and/or to maintain number of spaces.
    - Calculate project-related level of impact at intersections and roadways that are affected by the lane closures in combination with other cumulative projects and growth. Work with local jurisdictions and congestion management agencies to determine “fair share contribution” to fund reasonable share of necessary improvements.

9. To address impacts on Caltrain commuter rail service, the Authority would work closely with Caltrain to implement the following mitigation strategies, as jointly determined to be appropriate as part of future planning and environmental analysis:

    - Adding more train cars (i.e., seats) to the existing train consists
    - Providing additional and more frequent Caltrain service to and from San Jose
    - Providing a dedicated train service that would specifically serve the HST customers between San Francisco and San Jose

- Working with public transportation providers to add or enhance connectivity to commuter rail stations
- Providing commuter station improvements (i.e., interim additional on-site or off-site parking, expanded or enhanced waiting areas for passengers)

10. To address impacts on traffic from construction, mitigation strategies include:

- Off-street parking for construction-related vehicles. Identify adequate off-street parking for all construction-related vehicles throughout the construction period. If adequate parking cannot be provided on the construction sites, designate a remote parking area and use a shuttle bus to transfer construction workers to the job site.
- Maintain pedestrian access. Prepare specific construction management plans to address maintenance of pedestrian access during the construction period. If sidewalks are maintained along the construction site frontage, provide covered walkways.
- Maintain bicycle access. Prepare specific construction management plans to address maintenance of bicycle access during the construction period.
- Restrict construction hours. Limit construction material deliveries to outside of peak traffic periods.
- Establish construction truck routes for delivery of all construction-related equipment and materials. Prohibit heavy construction vehicles from accessing the site via other routes.
- Protect public roadways during construction. Repair any structural damage to public roadways, returning any damaged sections to their original structural condition. Survey the condition of the public roadways along truck routes providing access to the proposed project site both before construction and after construction is complete. Complete a before-and-after survey report and submit to the Authority for review, indicating the location and extent of any damage.
- Maintain public transit access and routing. Coordinate with the appropriate transit jurisdiction before limiting access to public transit and limiting movement of public transit vehicles.
- Prepare a detailed construction transportation plan prior to commencing any construction activities, to address in detail the activities to be carried out in each construction phase. Such activities include, but are not limited to, the routing and scheduling of materials deliveries, construction employee arrival and departure schedules, employee parking locations, and emergency vehicle access. The plan would include a traffic control plan that addresses temporary road closures, detour provisions, allowable routes, and alternative access. The plan would also include communication protocols and procedures on how to inform the public on construction activities as well as temporary detours, closures, and changes in transit and existing rail operations.
- Limit construction during special events. Provide a mechanism to prevent roadway construction activities from reducing roadway capacity during special events that attract a substantial number of visitors. Mechanisms to maintain roadway capacity include police officers directing traffic, special event parking, and use of traffic cones and within-the-curb parking or shoulder lanes for through traffic.
- Minimize closure of any proximate highway facility during construction.
- Maintain passenger and freight rail operations within an active rail corridor through close coordination with Caltrain and freight operations (UPRR).

- Prior to the commencement of construction, contractors will conform to safety training requirements of the respective rail operators (Caltrain and UPRR) when work occurs within an active rail corridor.
- Require construction contractors to coordinate construction methods, construction activities, best management practices, and mitigation with all applicable local jurisdictions that would be affected by construction.

A transportation impact analysis will be conducted at the project-level, which will include a detailed evaluation of traffic, parking, pedestrian, bicycle, transit, construction and cumulative transportation impacts of the proposed HST project. This information will identify:

- Changes in traffic volumes on regional roadways that result from HST construction and operations;
- Changes in traffic volumes on local streets that result from passengers accessing/leaving HST stations, from project construction, and from other HST related roadway changes, and the effect of these changed volumes on roadway operations and critical intersections;
- The analysis of number of parking spaces required and the placement of the parking facilities will be evaluated. Potential parking impacts will be evaluated based on the existing and future parking supply and the projected parking demand. Parking demand will be based upon the patronage and mode of access forecasts at each proposed station, including parking and related circulation impacts for adjacent neighborhoods;
- Potential impacts to transit including potential for inadequate capacity of feeder bus service, potential for traffic congestion from project to disrupt or delay bus service that serve or run near stations or other transit operations. Potential impacts of project construction on transit service will also be evaluated in detail;
- The project-level traffic impact analysis study will also evaluate the effect of the project and project construction on existing and planned pedestrian and bicycle facilities. Potential impacts on pedestrian and bicycle connections to and across HST facilities will be analyzed. Detailed information and analysis of potential traffic impacts including impacts to pedestrian and bike facilities and feasible mitigation measures will be included in project-level EIR/EIS; and
- Cumulative potential traffic impacts due to the proposed project. Detailed information and analysis of impacts and feasible mitigation measures will be included in project-level EIS/EIR.

The Authority finds that these mitigation strategies, in particular the coordination of construction methods, activities, and best management practices with local jurisdictions, will reduce traffic impacts associated with construction to a less than significant level. The Authority further finds that these mitigation strategies are expected to avoid or substantially lessen traffic impacts around station areas to a less-than-significant level in most circumstances. Planning multi-modal stations, coordinating with transit providers to coordinate service to HST station areas, providing accessible locations and street improvements, and encouraging transit-oriented development in station areas would help to ease traffic constraints in station areas. Sufficient information is not available at this programmatic level, however, to conclude with certainty that the above mitigation strategies would reduce impacts around stations, to a less-than-significant level in all circumstances, including in a situation where San Jose would be an interim northern terminus of the HST system. The Authority further finds that these mitigation strategies are expected to minimize traffic congestion impacts on Monterey Highway and on the surrounding street network. Sufficient information is not available at this programmatic level, however, to conclude with certainty that the above mitigation strategies would reduce impacts on Monterey Highway or on the surrounding street network to a less-than-significant level in all circumstances. The Authority further

finds that these mitigation strategies are expected to avoid or substantially lessen traffic congestion impacts at specific locations along the Caltrain corridor related to potential lane closures. In particular, design refinement at the project-level may avoid the need for lane closures and avoid the traffic congestion impacts entirely. Sufficient information is not available at this programmatic level, however, to conclude with certainty that the above mitigation strategies would reduce traffic congestion impacts at specific locations along the Caltrain corridor related to potential lane closures to a less-than-significant level in all circumstances. The Authority further finds that these mitigation strategies are expected to avoid or substantially lessen impacts to connecting Caltrain commuter rail service, during any interim period for which the San Jose station served as an interim northern terminus of the HST system. Sufficient information is not available at this programmatic level, however, to conclude with certainty that the above mitigation strategies would reduce impacts to connecting Caltrain commuter rail service to a less-than-significant level in all circumstances.

The Authority therefore finds that traffic impacts around station areas, traffic impacts on Monterey Highway and on the surrounding street network, traffic congestion impacts related to lane closures at specific locations along the Caltrain corridor, and impacts to connecting Caltrain commuter rails service, may be significant, even with the application of mitigation strategies. Additional environmental assessment will allow a more precise evaluation in the second-tier, project-level environmental analyses. The co-lead agencies will work closely with local government agencies at the project level to implement mitigation strategies.

The Authority further finds that a more detailed evaluation of localized traffic impacts that may be caused by the Preferred Pacheco Pass Network Alternative can only be examined at the project-level when the appropriate modeling tools can be applied to provide a more detailed forecast of traffic levels in light of both HST diversion and future local traffic conditions.

Impact 2. Parking

The EIR analysis of traffic included consideration of parking near the locations of proposed HST stations. Inadequate parking capacity was removed from Appendix G of the CEQA Guidelines in 2010. Inadequate parking is no longer considered an environmental impact per se. Rather, this issue only falls within the purview of CEQA if there is substantial evidence that a significant secondary environmental impact may occur as a result of an identified lack of parking. Parking issues fall outside the scope of environmental review and are not required to be addressed. For purposes of consistency with the 2008 Final Program EIR, parking is discussed below.

HST stations were described as including parking at a level consistent with local plans and policies and adequate for the increment of parking demand attributable to HST service at a multi-modal hub, also taking into account conditions at specific locations during project-level studies. Coordination and integration of the HST system with public transportation services will reduce demand for parking, and result in shared parking in some areas for public transportation services.

With the additional traffic accessing the HST stations, it is anticipated that parking will be added at the stations that is sufficient to meet demand, and the impacts on parking at all stations would remain at V/C less than 1, except in downtown San Francisco, where private parking operators are expected to provide sufficient parking at market rates.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR and the removal of inadequate parking capacity from Appendix G of the CEQA Guidelines, this is identified to be a less-than-significant impact when viewed on a Bay Area to Central Valley region-wide basis.

Mitigation Strategies

To ensure parking impacts will be avoided, the Authority will develop and coordinate implementation at the project level of parking improvement strategies considering local policies, including share parking, off-site parking with shuttles, and parking and curbside use restrictions parking permit plans for neighborhoods near HST stations. During project-level studies, environmental analyses will provide more detailed review of parking demand and parking to be included with proposed HST stations, plus identify coordination needed with local/regional public transportation providers, and provide further consideration of the following mitigation strategies:

1. Consider offsite parking with shuttles.
2. Share parking strategies.
3. Implement parking permit plans for neighborhoods.
4. Employ parking and curbside use restrictions.

The Authority finds that these mitigation measures will ensure that parking impacts remain less-than-significant.

4.2 Air Quality

The Partially Revised Final Program EIR analyzed the potential statewide, regional, and localized impacts on air quality of implementing the Preferred Pacheco Pass Network Alternative by examining highway vehicles miles traveled (VMT), number of plane operations, number of train movements, and power requirements for the proposed HST system statewide. Local impacts were examined based on level of service information and volume to capacity ratios for intercity freeway segments.

Impact 1. Reduction in Statewide and Regional Air Pollutant Emissions

The HST system would result in air quality improvement across the state and in the Bay Area to Central Valley study region. The Preferred Pacheco Pass Network Alternative could result in a daily reduction in VMT of about 9.74 million as compared to the No Project Alternative in 2030. This VMT reduction is expected to result in on-road mobile source emissions reductions statewide, and within the air basins that are part of the Bay Area to Central Valley study region. The emissions reductions are depicted in the 2008 Final Program EIR at Table 3.3-4. The HST system statewide is expected to reduce the emissions burdens associated with air travel by shifting flights to HST trips. The emission reductions are depicted in the Final Program EIR/EIS Table 3.3-5. The demand for additional electric power may result in increased emissions of criteria pollutants by 1.2%, as shown in Table 3.3-6 of the 2008 Final Program EIR. Viewing all of these changes collectively, the 2008 Final Program EIR concluded that the HST system statewide and in the Bay Area to Central Valley study region would result in a decrease in criteria pollutant emissions, as shown in Table 3.3-7 of the 2008 Final Program EIR. Additional air quality improvement would result from congestion relief afforded by the use of HST to the extent that: (1) congested highway traffic would be relieved on intercity highway segments, (2) grade separations for the HST system improve local traffic flow by removing traffic impediments that cause congestion and delays, and (3) public transportation use increases.

The Authority finds that the HST system and the Preferred Pacheco Pass Network Alternative will have a beneficial impact on statewide and regional air quality by reducing pollutant emissions.

Impact 2. Localized Air Quality Impacts due to Congestion/Traffic near HST Stations

The Preferred Pacheco Pass Network Alternative would create an increase in traffic and congestion around HST stations, generating a localized increase in mobile-source air pollution that could potentially exceed air quality standards. Due to the uncertainty inherent in a program level of analysis, it is not

possible to know the exact location, extent, and characteristics of increased traffic and congestion that will be generated around various HST station sites. Considering the thresholds of significance in the Partially Revised Final Program EIR, and the programmatic level of analysis, this localized impact is considered potentially significant.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project level to reduce this impact:

1. Assure that HST stations are multi-modal hubs and include appropriate parking, including increased parking for carpools, bicycles, and other alternative transportation methods (see the mitigation strategies for Traffic and Circulation, Impact 1).
2. Increase use of public transit by coordinating with local and regional public transportation providers to increase opportunities for connection between the HST system and other public transportation services.
3. Increase use of alternative-fueled vehicles.
4. Work with local and regional agencies to implement local street and roadway improvements, including various traffic flow improvements and congestion management techniques, and parking management strategies to reduce localized pollution from traffic related to the HST system (see the mitigation strategies for Traffic and Circulation, Impact 1)

The Authority finds the mitigation strategies listed above will reduce this impact to a less-than-significant level.

Impact 3. Short-term Air Quality Impacts due to Construction

Construction impacts associated with the Preferred Pacheco Pass Network Alternative include emissions from various activities, such as the use of diesel equipment, soil disturbance, and congestion-related traffic and route changes, all of which are expected to generate temporary short-term localized increases in air pollution. This impact is considered significant at the program level.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-level to reduce this impact:

1. Water all active construction areas at least twice daily.
2. Require that all trucks hauling soil, sand, and other loose materials be covered or maintain at least two feet of freeboard.
3. Pave, apply water three times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at active construction sites.
4. Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at active construction sites.
5. Sweep nearby streets daily (with water sweepers) if visible soil materials from HST system construction are carried onto adjacent public streets.
6. Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
7. Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles of dirt, sand, etc.

8. Limit traffic speeds on unpaved roads to 15 mph
9. Install sand bags or other erosion control measures to prevent silt runoff to public roads.
10. Replant vegetation in disturbed areas as quickly as possible.
11. Use alternative fuels for construction equipment when feasible.
12. Minimize equipment idling time.
13. Maintain properly tuned equipment.

The Authority finds that the above mitigation strategies will reduce this impact to a less-than-significant level.

Impact 4. GHG Emissions and Global Climate Change

The HST system as a whole, and the Preferred Pacheco Pass Network Alternative in the Bay Area to Central Valley study region, would result in beneficial impacts related to greenhouse gas emissions and global climate change. While some increased carbon dioxide may enter the atmosphere due to construction and operation of the HST system statewide, or due to removal of carbon sequestering plants via agricultural land conversion, any increases are offset by the reduction of carbon dioxide emissions due to reduced automobile vehicle miles traveled and reduced airplane travel. The HST system is not only consistent with, but a critical tool for achieving, the mandate to reduce carbon dioxide emissions statewide under AB 32. The Authority therefore finds that the Preferred Pacheco Pass Network Alternative, as a component of the statewide HST system, will have a beneficial impact on greenhouse gas emissions and global climate change and no mitigation is required.

4.3 Noise and Vibration

For purposes of assessing the Bay Area to Central Valley HST noise and vibration impacts, a GIS analysis was completed for potential impacts on sensitive receptors or receivers, such as people in residential areas, schools, and hospitals. Noise and vibration impacts were evaluated for a 2,000 foot study area along the HST alignments, 1,000 feet from each side of the HST centerline. The relative level of potential noise and vibration impact for each HST alternative is shown in Table 4-5a. The table includes the length of alignment alternatives, residential population, mixed use population, acreage of parkland, number of schools, and number of hospitals. The noise and vibration impact ratings are based on the population densities along each alignment and the proximity of parkland, hospitals, and schools where noise and vibration impacts might occur. Segments where trains would operate at higher speeds, over 150 mph, would have a greater level of impact.

Additional analysis was prepared in 2012 to address the noise and vibration impacts from the potential for freight trains on the Caltrain corridor to be moved to the outside track of a future, four track alignment, as well as the noise and vibration impacts from shifting Monterey Highway to the east.

Table 4-5a
Noise and Vibration Impact Summary for Preferred Alternative
Alignments and Station Location Options

Corridor	Preferred Alignment	Total Segment (Miles)	Residential Population	Mixed Use Population	Parkland (Acres)	Hospitals	Schools	Noise Impact Rating*	Vibration Impact Rating
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	28.8	5,509	140	-	-	2	Medium	Medium
	Dumbarton to San Jose	21.6	9,456	62	5.3	-	-	Medium	High
San Jose to Central Valley: Pacheco Pass	Pacheco	70.6	8,029	48	736	-	4	Medium	Medium
	Henry Miller (UPRR Connection)	62.6	1	1	1,437	-	1	Low	Low
Central Valley	UPRR N/S	87.3	7,401	649	205	2	2	Medium	Low
Station Location Options									
Transbay Transit Center								Low	Low
Millbrae/SFO								Medium	Medium
Potential Mid-Peninsula Station at Redwood City (Caltrain)								Medium	Medium
Potential Mid-Peninsula Station at Palo Alto (Caltrain)								Medium	High
San Jose (Diridon)								Medium	Medium
Gilroy (Caltrain)								Medium	Medium
Modesto (Downtown)								Medium	Low
Merced (Downtown)								Medium	Low

Note: *Accounts for Grade Crossing Elimination on alignment segments on or adjacent to existing non-grade separated tracks, the potential for freight trains to travel on outside tracks of 4-track alignment, and the shifting of Monterey Highway to the east.

Impact 1. Increased Noise from Train Operations and Construction

The HST could create long-term noise impacts along the alignment segments from train operations by creating intermittent increased noise. As a new noise source the HST system would be far quieter than typical passenger and freight trains. Within the study area, the HST system could result in noise impacts on approximately 31,295 people, 2,385 acres of parkland, 2 hospitals, and 9 schools, The HST system could also result in noise impacts on sensitive wildlife species, particularly those nesting or breeding nearby.

Construction of the HST could also cause short-term construction-related noise impacts. Noise impacts from construction of the project would be generated by heavy equipment used during major construction periods as close as 50 feet from existing structures along the HST alignment and around stations.

Alignment

Operation of the HST system adjacent to the Caltrain corridor along the San Francisco Peninsula would pass through densely populated communities where there is high potential for noise impacts. The noise study area also includes schools and parkland that would be sensitive to noise. The potential noise impacts would result primarily from the greater frequency of trains, since the HST

service would be operating at reduced speeds and would create noise levels similar to the existing services. The HST system would be expected to result in the elimination of up to 48 grade crossings on the peninsula. Grade separation of existing rail services would result in considerable benefits from the elimination of the warning bells at existing at-grade crossings and the horn blowing of the existing commuter/intercity services currently in operation. Because the HST system would be traveling at reduced speeds and the communities would benefit from grade separation improvements, it was rated as having a medium level of potential noise impacts.

There is also a potential for an additional increment of HST project noise from freight trains along the Caltrain corridor between San Francisco and San Jose traveling predominantly on the exterior two tracks of a four track alignment, placing these freight trains closer to homes, schools, and other noise sensitive land uses. Utilizing the FTA guidance manual approach to programmatic noise screening, this movement of freight trains was captured within the previously discussed analysis, and the ranking for these areas would remain medium.

The San Jose to Gilroy portion of the San Jose to Central Valley alignment is rated as having medium potential for noise impacts. Although the HST system could reach speeds as great as 186 mph along the Caltrain/UPRR Corridor between San Jose and Gilroy, the densities are less than on the San Francisco Peninsula, and the communities would receive considerable benefit from the elimination of up to 24 grade crossings. Four schools, parkland, and varying residential populations are located along this portion of the alignment. The alignment through the Diablo Range and along Henry Miller Road would be within an area that is sparsely populated, but the HST would introduce new noise sources to adjacent open space and ecologically sensitive areas where the alignment is at grade or elevated. While the Henry Miller portion of the alignment was rated as low for potential noise impacts, primarily due to low populations, this alignment would likely have potentially high noise impacts on wildlife and would be further evaluated at the project-level environmental review once biological field surveys are conducted and the types, location, density, and sensitivity of wildlife is determined.

There is also a potential for an additional increment of HST project noise from freight trains along the Caltrain corridor between San Jose and Lick traveling predominantly on the exterior two tracks of a four track alignment, placing these freight trains closer to homes, schools, and other noise sensitive land uses. Utilizing the FTA guidance manual approach to programmatic noise screening, this movement of freight trains was captured within the previously discussed analysis, and the ranking for these areas would remain medium.

Along the UPRR alignment through the Central Valley, the HST system would be operating at maximum speeds throughout most of the Central Valley. This alignment was rated as having a medium potential for noise impacts due generally to the sparseness of residential land use and the extent of open space along most of its length. However, there are a number of locations in the Central Valley where the HST system would pass through populated areas and have high potential noise impact ratings for short segments. Examples include portions of Modesto and Merced that could be exposed to higher noise levels from HST operations. In several populated areas, the HST would be on aerial structure, primarily to reduce potential conflicts with freight railroad spur tracks or freight railroad yards. The vertical elevation of the aerial structure would allow potential noise impacts to extend further than they would at grade.

Stations

Because the HST stations are located in already developed urban areas, the ambient noise conditions are already high. The proposed Transbay Transit Center station would be underground and noise impacts on surrounding sensitive receptors would not occur. All of the other stations were rated as having a medium potential for noise impacts. In addition, increased vehicular traffic around stations may result in an increase in noise levels.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, including the FRA and FTA noise impact criteria and methods, this impact is considered significant when viewed on a region-wide basis. The significant noise impact from operations will not occur along the entire HST system alignment. Rather, the impact would be localized, because certain areas along the proposed HST system alignment have no sensitive receptors, and because trains speeds are slower in some places leading to lower noise impact ratings.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Continue to utilize design practices to identify grade separations to eliminate grade crossing related noise.
2. Noise barriers, such as sound walls, trenches or earth berms, where there are severe noise impacts.
3. Building sound insulation or related treatments for individual properties/noise receivers.
4. Acquire property to serve as a noise buffer.
5. Require noise reduction in HST equipment design and track structures design.
6. Where not already included, consider placing alignment sections in tunnel or trenches or behind berms where possible and where other measures are not available to reduce significant noise impacts.
7. Use of enclosures or walls to surround noisy construction equipment, and installation of mufflers on engines; substitution of quieter equipment or construction methods, minimizing time of operation and locate equipment farther from sensitive receptors.
8. Suspend construction between 7:00 pm and 7:00 am and/or on weekends or holidays in residential areas where there are severe noise impacts.
9. Require construction contractor to comply with local sound control and noise-level rules, regulations, and ordinances.
10. Equip each internal combustion engine with a muffler of a type recommended by the manufacturer.
11. Specify the use of the quietest available
12. Turn off construction equipment during prolonged periods of non-use.
13. Require contractors to maintain all equipment and to train their equipment operators to reduce noise levels and increase efficiency of operation.
14. Construct temporary sound walls along shooflys and other temporary facilities for work conducted within an active rail corridor to reduce noise levels.
15. Use “state of the art” construction equipment, materials, and abatement techniques to mitigate construction noise impacts.
16. Notify local residents prior to construction operations.
17. Establish a program to receive and respond to residents’ concerns regarding construction noise, vibration, and light disturbances.

18. Require construction contractors to coordinate construction activities and mitigation with all applicable local jurisdictions that would be affected by construction.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 2. Increased Traffic Noise from Lane Narrowing and Shifting of Monterey Highway

To accommodate the HST, Monterey Highway is proposed to be narrowed from six lanes to four lanes and shifted to the east within the existing right-of-way from approximately Southside Drive to south of Blossom Hill Road. The alignment would be generally at grade, but may have some raised or lowered areas for grade separations, depending on second-tier design. At some locations north and south of Capitol Expressway, the narrowed four lanes and right-of-way of Monterey Highway may need to be shifted to the east up to 25 feet. In addition, the existing four lanes south of Blossom Hill Road would be shifted east within the existing right-of-way and in some locations the right-of-way itself may be shifted east up to 60 feet. The changes are shown in Figure 2-2 of the Partially Revised Final Program EIR.

Based on an analysis of the consequences of the lane narrowing and shift of Monterey Highway using Federal Highway Administration (FHWA) guidance, there could be both adverse and beneficial traffic noise impacts on nearby noise sensitive receptors, including residences, as shown in Table 4-5b.

Table 4.5b
Noise Impacts Related to Monterey Highway Narrowing or Shifting

Monterey Highway Narrowing/ Shifting	Noise Impact	Receptors Considered / Included as part of 2008 FRA Noise Screening	Significant Impact
Monterey Highway Narrowing (6 to 4 lanes)			
Traffic lanes shifted east within existing right-of-way (Southside Drive to south of Blossom Hill Road)	Traffic noise levels reduced by 1 to 2 decibels (dB) as a result of the roadway realignment and lane reduction (less traffic).	Yes	No, beneficial
Traffic lanes and right-of-way shifted east up to 25 ft (Southside Drive to Fehren Drive and Capitol Expressway Ramp to Senter Road)	Right-of-way acquisition on east side and removal of existing property walls with traffic lanes closer to sensitive receptors to the east; increase in noise levels by greater than 5 dB without replacement in kind of property walls (similar noise levels with replacement of property walls)	Yes	Yes
Monterey Highway Shifting (Existing 4 lanes remain)			
Traffic lanes shifted east within existing right-of-way (Blossom Hill Road to Bernal Road and south of Coyote Ranch Road to Bailey Avenue)	Traffic noise levels increased by 1 to 2 dB as a result of the roadway realignment.	Yes	Yes
Traffic lanes shifted east up to 60 ft (Bernal Road to just south of Metcalf Road and Bailey Avenue to	Right-of-way acquisitions on east side and removal of existing property walls with traffic lanes	Yes	Yes

Monterey Highway Narrowing/ Shifting	Noise Impact	Receptors Considered / Included as part of 2008 FRA Noise Screening	Significant Impact
Cochrane Road)	closer to sensitive receptors to the east; increase in noise levels by greater than 2 to 3 dB with replacement in kind of property walls (any existing walls would be removed due to acquisitions)		

Although these noise impacts were within the screening distances for the original noise analysis in 2008 under the Federal Railroad Administration noise screening procedures, out of an abundance of caution and in consideration of the CEQA significance criteria for noise, these traffic noise impacts are considered a separate, significant impact.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Use noise barriers located at the HST right-of-way line, the roadway right-of-way line, or potentially at the private property line. The location and height of potential barriers depends on the results of more detailed noise analysis and design. Where existing property walls must be removed, such walls will be replaced at the appropriate locations to achieve noise reduction benefits.

2. Develop traffic management measures, including vehicle speed limits and vehicle type limitations, for Monterey Highway. Work with the City of San Jose and Santa Clara County to establish appropriate traffic management measures to reduce Monterey Highway traffic noise.

3. Continue to consider building sound insulation or related treatments at the receiver where appropriate and effective along the shift of Monterey Highway and along the San Francisco Peninsula.

4. Continue to consider acquisition of property, in limited circumstances, to service as a noise buffer as part of project-level environmental review.

5. Continue to utilize design practices to identify grade separations to eliminate grade crossing related noise.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 3. Exposure to Ground-borne Vibration from Construction and Operations

Ground-borne vibration from trains is the fluctuating motion experienced by people on the ground and in buildings near railroad tracks. Vibration can create impacts to adjacent buildings, and therefore adjacent buildings were considered as receptors for the EIR's analysis. The HST system could cause an increase in ground-borne vibrations when the HST passes by an area, or when a relocated freight train passes by an area. The ground-borne vibration impact would not occur along the entire length of the HST system alignment. Construction activities can also cause some short-term ground-borne vibration.

Alignment

Operation of the HST system starting at the Transbay Transit Center in San Francisco would result in a low potential for vibration impacts primarily because a portion of the alignment is underground. The other portions of the San Francisco to San Jose alignment would have the potential for medium to high vibration impacts because of the proximity of residential structures to the alignment. The potential for movement of freight trains to the outside tracks of a four track alignment between San Francisco and San Jose contributes to, but does not change, these rankings.

The San Jose to Gilroy portion of the San Jose to Central Valley alignment is rated as having medium potential for vibration impacts. Similar to noise, schools, parkland, and residential populations are located along this portion of the alignment and may be affected. The potential for movement of freight trains to the outside tracks of a four track alignment between San Jose and Lick contributes to, but does not change, this ranking. The shifting of Monterey Highway would not contribute to vibration impacts because automobile rubber tires do not cause vibration impacts.

The alignment through the Diablo Range and along Henry Miller Road would be within an area that is sparsely populated and would have a low potential for vibration impacts.

Along the UPRR alignment through the Central Valley, the HST system would have a low potential for vibration impacts.

Stations

Because the Transbay Transit Center station would be underground the potential for vibration impacts would be low. Modesto (Downtown) and Merced (Downtown) are also rated low for vibration impacts. Millbrae/SFO, Redwood City (Caltrain), San Jose (Diridon) stations are rated as having medium potential for vibration impacts. Only the Palo (Caltrain) station was rated high for vibration impacts.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact on some adjacent buildings is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Specify the use of train and track technologies that minimize ground vibration such as state of the art suspensions, resilient track pads, tie pads, ballast mats or floating slabs.
2. Phase construction activity, use low impact construction techniques and avoid use of vibrating construction equipment where possible to avoid vibration construction impacts.
3. Use “state of the art” construction equipment, materials, and abatement techniques to mitigate vibration impacts.
4. Establish a program to receive and respond to residents’ concerns regarding construction noise, vibration, and light disturbances.

The Authority finds that vibration mitigation is less predictable at a program level of analysis because of the site-specific nature of vibration transmission through soil along the alignment. Although the mitigation measures will reduce vibration impact levels, at the programmatic level it is uncertain whether the reduced vibration levels will be below a significant impact. The type of vibration mitigation and expected effectiveness to reduce the vibration impacts of the HST Alignment Alternatives to a less-than-

significant level will be determined as part of the second-tier project-level environmental analyses. Therefore, the Authority finds that vibration impacts may be significant, even with application of the foregoing mitigation strategies.

4.4 Energy

In the Statewide Program EIR/EIS, the Authority assessed the energy needs for the construction and operation of the HST system as a whole. For this Bay Area to Central Valley Partially Revised Final Program EIR, the analysis again assesses a representative HST alternative for the nearly 800 mile system, updated with new travel demand forecasts prepared by Cambridge Systematics. The statewide study area for the analysis was necessary to determine potential energy impacts because most of the State's electricity generation and transmission infrastructure contributes to the statewide energy grid. The analysis cannot apportion particular power demands from implementing the HST in the Bay Area to Central Valley study region to particular regional generation facilities.

Impact 1. Increased Long-term Electric Power Consumption for Operation of HST System

The HST system would increase transportation energy use in California compared to existing conditions. Specifically, the HST system would result in an increase in demand on the statewide electricity supply that could reach 794 MW during peak electricity demand periods in 2030. Although it is difficult to predict how this additional load will affect the statewide electricity generation and transmission system, the additional load would represent 0.96% of the 2016 statewide electricity demand predicted by the California Energy Commission for 2016, and extrapolated to 2030. The HST system would be constructed in stages, however, so the additional demand would not occur abruptly. In addition, the statewide electricity grid is expected to expand now and through 2030 to anticipate and respond to new demands, including that of the HST system, so the new HST system demand could be an even smaller percentage of statewide demand in the future.

At the same time that the HST would increase transportation energy use compared to existing conditions, it would result in decreased VMT and decreased energy consumption for transportation purposes compared to the No Project Alternative at 2030. Forecast energy use would decline by the equivalent of about 5.8 million barrels of oil annually when comparing the HST and No Project alternatives at 2030, or a 1.5% savings. Additional energy savings could be larger than this to the extent that the HST system relieves congestion on intercity highway links, since congestion contributes to increases in fuel consumed per mile by vehicles on the highway. The HST system would also result in decreased overall energy consumption per passenger mile traveled. The HST system would require just 975 Btus for each passenger mile traveled, whereas cars and trucks would require 2,320 Btus and airplanes 3,230 Btus.

At a regional level, it is possible that the HST system could contribute to electricity transmission deficiencies, known as bottlenecks. If bottlenecks were to occur, a potentially significant impact could result. Proper planning and design of the power distribution facilities for the HST system in relation to the overall state electrical grid would avoid such impacts.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for long-term operational energy impacts from implementing the HST system is considered significant, particularly due to the uncertainty of future projections of energy demand and generation capacity to 2030.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the Project level to reduce this impact:

1. HST stations will be multi-modal hubs providing linkage for various transportation modes, which will contribute to increased efficiency of energy use for intercity trips and by commuters, and the stations will be required to be constructed to meet Title 24 California Code of Regulations energy efficiency standards.
2. Design practices will require that the electrically powered HST technology be energy efficient, include regenerative braking to reduce energy consumption, and minimize grade changes in steep terrain to reduce energy consumption.
3. Design practices will require that localized impacts be avoided through planning and design of the power distribution system for the HST system.

The Authority finds that the above mitigation strategies will reduce this impact to a less-than-significant level.

Impact 2. Increased Short-term Energy Use During Construction of the HST System

Construction of the HST system would result in one-time non-recoverable energy consumption cost, which would occur during construction of on-the-ground, underground, and aerial facilities. Although details regarding energy conservation practices and construction/staging methods have not been specified for the HST system, which has not yet been designed in detail, it is anticipated that the construction energy demand from building the HST system would be substantial.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for shorter-term construction-related energy impacts from building the HST system is considered significant, particularly due to the uncertainty of future projections of energy demand and generation capacity to 2030.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-level to reduce this impact:

1. Develop and implement a construction energy conservation plan.
2. Use energy efficient construction equipment and vehicles.
3. Locate construction material production facilities on-site or in proximity to project construction sites.
4. Develop and implement a program encouraging construction workers to carpool or use public transportation for travel to and from construction sites.
5. Develop potential measures to reduce energy consumption during operation and maintenance activities.

The Authority finds that the above mitigation strategies will reduce this impact to a less-than-significant level.

4.5 Electromagnetic Fields and Electromagnetic Interference

In the Statewide Program EIR/EIS, the Authority assessed electromagnetic fields (EMFs) and electromagnetic interference (EMI) for the HST system as a whole by conducting a search of existing

literature and expert opinion based on that literature. This assessment considered the diverse geography, communities, and land uses that would be traversed by the HST system, including the Bay Area to Central Valley study region. The Statewide Program EIR/EIS concluded there were no differences among the statewide alignment alternatives considered in that document, and that EMF/EMI impacts would be less than significant. For purposes of the Bay Area to Central Valley Program EIR/EIS, the prior statewide programmatic analysis was updated with new studies and literature on EMF/EMI. The analysis concludes that within the Bay Area to Central Valley study region, there are no measurable differences among alignment alternatives at this program level of detail for EMF/EMI exposure and that these impacts are less than significant.

Impact 1. Exposure of HST system workers, passengers, and nearby residents, schools and other facilities to EMFs

EMFs occur naturally and as a result of human activity such as the generation, transmission, and use of electric power. The EMFs result from the flow of current through wires or electrical devices, and the strength of the magnetic fields depends on equipment design and level of current. Depending on the configuration of the source, the strength of an EMF decreases in proportion to distance or distance squared, or even more rapidly. EMFs are measured in terms of their frequency. Because of their rapid decrease in strength with distance, EMFs in excess of background levels are likely to be experienced only relatively near sources of EMFs.

The health effects of long-term exposure to extremely low frequency magnetic fields remain unresolved. There is no scientific consensus that there are adverse effects associated with human exposure to low-level EMF. Numerous studies have addressed but failed to establish any significant adverse health effects. A California Department of Health Services 2002 study found no evidence to substantiate a relationship between extremely low frequency magnetic fields and cancer or other diseases.

Neither the federal government nor the State of California has established regulatory limits for EMF exposure, and there are no established standards or levels of exposure that are known to be either safe or harmful. Various industry, government and scientific organizations with expertise in electromagnetic fields technology have produced a range of voluntary standards that represent their best judgment of what levels are considered safe. These include the American Conference of Industrial Hygienists (ACGIH) for occupational exposure and the Institute of Electrical and Electronics Engineers (IEEE) for occupational and public exposure (IEEE C95.1 and C95.6).

The HST catenary and distribution systems will operate primarily at 60-Hz fields, which are considered an extremely low frequency (ELF). The operation of the HST system could result therefore result in people being exposed to additional levels of ELF EMFs. The level of exposure will depend on a number of factors that will vary depending on the track alignment and operations, including design of power supply systems and vehicles, details to be determined at the project-level of design. The ELF EMF that is expected to result from the operation of the HST system is predicted to be substantially below the voluntary standards of the ACGIH or the IEEE. This conclusion is bolstered by a 2006 FRA study of EMF/EMI exposure caused by conversion of a section of Amtrak's Northeast Corridor to electric traction, which determined that EMF exposure in that case was far below the voluntary ACGIH and IEEE standards designed to protect workers and the public.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for increased levels of ELF EMF exposure from implementing the HST system in the Bay Area to Central Valley study region is considered less than significant.

Mitigation Strategies

Although exposure to ELF EMF is considered less than significant, the Authority reaffirms its commitment to use the following design practices and mitigation strategies at the project-specific level to avoid ELF EMF exposure or reduce it to a practical minimum:

1. Use standard design practices for overhead catenary power supply systems and vehicles, including appropriate materials, location and spacing of facilities and power supply systems to minimize exposure to receptors over distance, and shielding with vegetation and other screening materials.
2. Design overhead catenary system, substations, and transmission lines to reduce the electromagnetic fields to a practical minimum.

The Authority finds that the above design practices/mitigation strategies are to be included in the HST system and that they will ensure that exposure of persons to ELF EMF will be a less than significant impact.

Impact 2. Electromagnetic Interference with Electronic and Electrical Devices

Electromagnetic interference (EMI) occurs when radiofrequency (RF) fields or EMFs produced by a source adversely affect the operation of an electrical, a magnetic, or an electromagnetic device. The HST system could cause EMI in two ways. First, the HST system would generate RF fields at the right-of-way by intermittent contact (unintentional arcing) between the pantograph power pickup and catenary wire. The HST system would also use wireless communications that generate RF fields. Second, the HST catenary and distribution systems would also be source of ELF EMFs. There is a possibility that ELF EMFs could interfere with implanted biomedical devices used by HST maintenance workers, but with current data and designs it is unlikely that EMF inside an HST vehicle would cause EMI.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for electromagnetic interference with electronic and electrical devices from implementing the HST system in the Bay Area to Central Valley study region is considered less than significant.

Mitigation Strategies

Although the potential for EMI is considered less than significant, the Authority reaffirms its commitment to use the following design practices and mitigation strategies at the project-specific level to avoid EMI or reduce it to a practical minimum:

1. Design the overhead catenary system, substations, and transmission lines to reduce electromagnetic interference to a practical minimum.
2. Design the project component to minimize arcing and radiation of radiofrequency energy.
3. Choose devices generating radiofrequency with a high degree of electromagnetic compatibility.
4. Where appropriate, add electronic filters to attenuate radiofrequency interference.
5. Relocate receiving antennas and use antenna models with greater directional gain where appropriate, particularly for sensitive receptors near the HST system.
6. Comply with the FCC regulations for intentional radiators, such as the proposed HST wireless systems.
7. Establish safety criteria and procedures and personnel practices to avoid exposing employees with implantable medical devices to EMF levels that may cause interference with such implanted biomedical devices.

The Authority finds that the above design practices/mitigation strategies are to be included in the HST system and that they will ensure that potential exposure of persons to EMI will be a less than significant impact.

4.6 Land Use Impacts and Station Area Development

The Partially Revised Final Program EIR evaluated the potential for the construction and operation of the HST system to cause land use compatibility impacts. The discussion encompasses typical impacts on the natural environment, as well as social and economic considerations related to property impacts and environmental justice. The conclusions below regarding land use compatibility impacts are informed by these economic and social considerations.

Impact 1. Long-Term Land Use Compatibility Impacts with HST Operations

The Partially Revised Final Program EIR examined the impact of placing a new HST system next to existing and planned land uses using GIS databases, along with local and regional planning documents. This includes the impacts of laying new track and installing electric power distribution facilities for the HST system and of providing multi-modal transit stations as part of the HST system. Maintenance, storage and cleaning facilities will be part of the HST system, and general potential locations for these facilities were identified to consider representative impacts of such facilities in the program analysis. Locations for these facilities will be determined in conjunction with future project-level studies and decisions on implementation phasing. There are no maintenance and storage facilities considered in the Los Banos area, or in the vicinity of the GEA, as part of the Partially Revised Final Program EIR. The Merced (Castle AFB) site has been identified for further study, among other sites, for a location of a maintenance facility.

Efforts have been made to incorporate alignments and station locations that are compatible with existing local land use plans and ordinances to the extent feasible, and two thirds of the Preferred Alternative alignment is in or along existing transportation corridors (existing railroad or highway rights of way) or in tunnel. Moreover, proposed station locations are proposed as multi-modal transit hubs. Each of these serve to reduce the extent of land acquisition needed for the proposed HST system.

In the Partially Revised Final Program EIR, land use compatibility of the HST system with adjacent uses was ranked low, medium or high, with compatibility being inversely related to the sensitivity of the land use to the HST system (e.g., business, commercial and industrial areas would have high compatibility, while single family residential areas and habitat preservation areas would have low compatibility with the HST system). The HST system would be compatible with policies to support multi-modal transportation and use of public transportation, and the Authority will work closely with local and regional agencies to implement the system.

A potential impact on a community or neighborhood was identified if the alignment would create a new physical barrier, isolating one part of an established community from another and potentially resulting in a physical disruption to community cohesion. Improvements to existing transportation corridors, including grade separations, would not generally result in new barriers. In many areas, (e.g., the Caltrain Corridor, locations with UPRR tracks), the HST system would improve an existing transportation corridor with grade separations and thus improve local access and traffic patterns, and not serve as a community divider or barrier. In a few areas, however, installation of the HST system could affect land uses by creating a new barrier dividing or disrupting existing communities. This is considered a significant impact at the program level.

Assessment of potential property impacts was based on the types of land uses adjacent to the HST alignment, the amount of right-of-way (ROW) potentially needed for the construction type, and the land use sensitivity to potential impacts. In some instances, relatively minor strips of property would be needed for temporary construction easements or permanent ROW for the proposed HST Alignment. In

other instances, development of proposed facilities could result in acquisition, displacement, and/or relocation of existing structures. The types of property impacts that could occur include displacement of a residence or business or division of a farm or other land use in a way that makes it harder to use. Mitigation may also be required to maintain property access.

Overall, based on the analysis below, and considering the design practices, the Preferred Alternative has a high or medium land use compatibility along its entire length, there would be little or no community cohesion impacts, and property impacts range between low and medium. Given that portions of the alignment have medium ratings and given future uncertainties associated with land use development adjacent to the proposed alignment over the 20- to 25 year horizon for implementing the HST system, land use incompatibility is considered significant at this programmatic level. In many cases, local plans and ordinances do not address transportation options such as the HST system. In addition, many local land use plans and ordinances have not been updated for several years, though they may be updated over time to acknowledge and support implementation of a HST system.

At the project level, HST alignments would be refined for the Preferred Alternative in consultation with local governments and planning agencies, with consideration given to minimizing barrier effects in order to maintain neighborhood integrity. Potential land use displacement and property acquisition (temporary use and/or permanent and nonresidential property) are expected to be avoided to the extent feasible by also considering further alignment refinement at the project level. In addition, analysis at the project level would take into account relocation assistance in accordance with the Federal Uniform Relocation and Real Property Acquisition Policies Act of 1970.

Alignment

San Francisco to San Jose
Between San Francisco and San Jose, the alignment is considered to have high compatibility with existing land use because it would be constructed primarily within the existing Caltrain right-of-way. In San Francisco, between 4th & King and the Transbay Transit Center, the alignment would be constructed underground and would not have an effect on community cohesion. Because the alignment would primarily be within an existing, active commuter and freight rail corridor on the Peninsula, it would not constitute any new physical or psychological barriers that would divide, disrupt, or isolate neighborhoods, individuals, or community focal points in the corridor. Construction of grade separations between San Francisco and San Jose would have a beneficial effect on community cohesion by improving circulation between neighborhood areas.

San Jose to Central Valley
Between San Jose and Gilroy, the alignment is considered to have high compatibility with existing land use because it would be constructed primarily within or adjacent to the existing Caltrain corridor. Between San Jose and Lick, the alignment is proposed to be located within the publicly owned right-of-way. Between Lick and Gilroy, the alignment would be adjacent to the UPRR right-of-way. East of Gilroy, the alignment veers from the existing right-of-way and is potentially incompatible as it proceeds through agricultural land and recreational areas. The alignment is compatible with existing land uses as it traverses along Henry Miller Road between Santa Nella and Elgin Avenue but becomes highly incompatible with agricultural land uses east of Elgin Avenue and the Grassland Ecological Area (GEA). Overall, this portion of the alignment has a medium land use compatibility rating.

Where this alignment would create a new transportation corridor (east of Gilroy), the alignment would primarily pass through agricultural or open space lands and would not result in community cohesion impacts on neighborhoods. The alignment along Henry Miller Road primarily passes through agricultural lands and would not result in community cohesion impacts on neighborhoods.

Central Valley
The UPRR alignment in the Central Valley would be adjacent to some residential development between Stockton and Modesto. The predominant land use adjoining the alignment consists of agricultural uses. Between the cities of Modesto and Chowchilla, along the existing UPRR corridor, land uses are mostly agricultural with some residential. This land use pattern is considered to have a medium compatibility with the alignment.

Throughout much of the Central Valley, the alignment follows the existing rail corridor. In many cases, smaller rural communities are developed along the existing UPRR railroad tracks. There would be little to no neighborhood cohesion impact on these communities as a result of the alignment. In larger communities such as Stockton, French Camp, Ripon, Modesto, Ceres, Atwater, Merced, and Chowchilla, the existing UPRR rail line already divides the community. A parallel, at-grade set of HST tracks would therefore not generally be expected to result in an additional physical separation which exists between land uses on either side of the corridor.

Stations

- Transbay Transit Center: An underground HST station at the proposed Transbay Transit Center in downtown San Francisco is highly compatible with the existing transportation use at the terminal site. The Transbay Transit Center station location is supportive of the high-intensity land use associated with the San Francisco financial district.
- Millbrae/SFO: The Millbrae/SFO HST station is highly compatible with the existing Caltrain/BART station and would support future planned use for the creation of a transit-oriented district surrounding the Millbrae BART/Caltrain station area. Construction of the HST parking and drop-off facilities would convert approximately 2 acres of commercial property to transportation use.
- Redwood City: An HST station at Redwood City is highly compatible with the existing Caltrain station and adjacent downtown commercial/service oriented uses. The station location would be consistent with the Redwood City Strategic General Plan, which promotes development of convenient transit alternatives to the use of the automobile.
- Palo Alto: An HST station at Palo Alto is highly compatible with existing land use in the area, including multifamily housing and other facilities associated with Stanford University, and would be consistent with the Palo Alto Comprehensive Plan, which supports the continued development and improvement of the University Avenue Multi-modal Transit Station. Construction of the Palo Alto station, parking garage, and ancillary facilities would entail conversion of approximately 10 acres of industrial property to transportation use. The City of Palo Alto sent a letter dated November 9, 2010, to the Authority opposing the consideration of a HST station anywhere in Palo Alto.
- San Jose (Diridon): The proposed San Jose (Diridon) station location is highly compatible with the existing San Jose Diridon Caltrain station and the surrounding industrial and high-density residential uses. The station location is consistent with the San Jose Downtown Strategy Plan that promotes redevelopment of the downtown toward the west and closer to the station location.
- Gilroy: The Gilroy station location is highly compatible with the existing Caltrain station and adjoining commercial uses but is incompatible with the adjacent single-family residential uses. The proposed station is consistent with the policies and actions stated in the Gilroy General Plan that place a high priority on strengthening and restoring the downtown area, including the development of an active multi-modal transit center. Although the proposed station location is incompatible with the existing low-density residential uses, the general plan promotes the future development of higher-density residential and mixed uses in close proximity to the Caltrain station and the multi-modal transit center.

- Modesto (Downtown): The Modesto (Downtown) station location area has a small amount of residential land uses. Predominant land uses are commercial and industrial, resulting in a high level of compatibility with the HST station location.
- Merced (Downtown): The Merced (Downtown) station location is characterized by a moderate amount of residential development and supportive community commercial and governmental functions. Given the extent of residential uses and the community-serving nature of the commercial activities (as opposed to more regional-serving uses), this station location option is assigned a medium compatibility rating.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-level to reduce this impact:

1. Continue to apply design practices to minimize property needed for the HST system and to stay within or adjacent to existing transportation corridors to the extent feasible.
2. Work with local governments to consider local plans and local access needs and to apply design practices to limit disruption to communities. Access may need to be modified, including possible over or undercrossings, where land acquisition results in a division of a farm or other land use.
3. The Authority will seek agreements with freight rail operators (UP and/or BNSF) to utilize portions of the existing rail right-of-way to the greatest feasible extent.
4. Work with local governments to enhance multi-modal connections for HST stations.
5. Coordinate with cities and counties to ensure that HST facilities will be consistent with land use planning processes and zoning ordinances.
6. Provide opportunities for community involvement early in project-level studies.
7. Hold design workshops in affected neighborhoods to develop understanding of vehicle, bicycle, and pedestrian linkages in order to preserve those linkages through use of grade-separated crossings and other measures.
8. Ensure that connectivity is maintained across the rail corridor (pedestrian/bicycle and vehicular crossings) where necessary to maintain neighborhood integrity.
9. Develop facility, landscape, and public art design standards for HST corridors that reflect the character of adjacent affected neighborhoods.
10. Maintain a high level of visual quality of HST facilities in neighborhood areas by implementing such measures as visual buffers, trees and other landscaping, architectural design, and public artwork.
11. The Authority will work with local governments to establish requirements for station area plans and opportunities for Transit Oriented Development (TOD). Local governments would play a significant role in implementing station area development by adopting plans, policies, zoning provisions, and incentives for higher densities, and by approving a mix of urban land uses. Station area TOD development principles to be applied at the project level for each HST Station include higher density development, mix of land uses, pedestrian-oriented design, context-sensitive building design, and parking limits and preferences.
12. Select station locations that are multi-modal transportation hubs with a preference for traditional city centers.

13. Adopt HST station area development policies and principles that require TOD, and promote value-capture at and around station areas as a condition for selecting a HST station site.
14. Provide incentives for local governments where potential HST stations may be located to prepare and adopt Station Area Plans and to amend City and County General Plans that incorporate station area development principles in the vicinity of HST stations.
15. Give priority to stations for which the city and/or county has adopted station area TOD plans and general plans that focus and prioritize development on the TOD areas rather than on auto-oriented outlying areas.
16. The Authority will undertake a comprehensive economic study in the Central Valley of the kinds of businesses that would uniquely benefit from being located near HST station areas, including an estimate of the kinds and numbers of jobs that such businesses would create.
17. The Authority will work with local governments, interested agencies and organizations, and provide funding and technical support, along with other partners, to build upon blueprint processes, to focus on supporting downtowns and increasing transit ridership, to increase development densities in the vicinity of HST station areas, and to assist in developing a vision with local partners as to how HST can encourage further in-fill development in Central Valley cities and support environmentally and economically sustainable future growth.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce this impact to a less-than-significant impact in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered significant and unavoidable.

The Authority further finds that certain of the above mitigation strategies related to planning for HST stations are partially within the responsibility of local governments and other public agencies and that these government agencies can and should adopt these mitigation strategies or an appropriate version of them at the project-level for planning of HST stations and their vicinities.

Impact 2. Short-Term Land Use Compatibility Impacts from HST Construction

In addition to the above noted potential impacts of the HST system resulting in a new barrier or dividing some established communities, short term impacts of the HST system during construction include potential neighborhood disruption and division. This impact would be reduced by phasing the construction of segments of the system and by the use of in-line construction techniques where appropriate. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant.

Mitigation Strategies

The Authority finds that the following mitigation strategies, along with mitigation identified for construction impacts on other resources (e.g., traffic, air quality, noise) can be refined and applied at the project-specific level to reduce this impact:

1. Develop a traffic management plan to reduce barrier effects during construction.
2. To the extent feasible maintain connectivity during construction.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce this impact to a less-than-significant impact in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered significant and unavoidable.

4.7 Agricultural Lands

Impact 1. Conversion of Prime, Statewide Important, and Unique Farmlands, and Farmlands of Local Importance, to Project Uses

The conversion of farmland is the change in the use of important farmland (i.e., farmland listed as prime, statewide important, unique, and farmland of local importance on the Department of Conservation's Farmland Mapping and Monitoring Program (FMMP) to non-agricultural uses. For alignments adjacent to existing railroad or highway corridors, the Partially Revised Final Program EIR considered a study area of 100 feet from the rail right-of-way on the side selected for study. For new alignments in undeveloped areas, the study area was 50 feet on each side of the centerline of the alignment, for a total study area width of 100 feet. The study area was intended to capture the direct conversion of agricultural land to new transportation uses. The analysis identified the conversion of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance as listed in Table 4-6. Overall, the HST system could directly impact 1,128 acres of farmland.

Table 4-6
Farmland Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Preferred Alignment	Prime Farmland (Acres)	Farmland of Statewide Importance (Acres)	Unique Farmland (Acres)	Farmland of Local Importance (Acres)	Total (Acres)
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	-	-	-	-	-
	Dumbarton to San Jose	-	-	-	-	-
San Jose to Central Valley: Pacheco Pass	Pacheco	176	56.2	0	8.8	241
	Henry Miller (UPRR Connection)	154.4	111.5	57.4	29.1	352.4
Central Valley	UPRR N/S	268.9	161.0	67.3	37.4	534.6
Station Location Options						
Transbay Transit Center		-	-	-	-	-
Millbrae/SFO		-	-	-	-	-
Potential Mid-Peninsula Station at Redwood City (Caltrain)		-	-	-	-	-
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		-	-	-	-	-
San Jose (Diridon)		-	-	-	-	-
Gilroy (Caltrain)		-	-	-	-	-
Modesto (Downtown)		-	-	-	-	-
Merced (Downtown)		-	-	-	-	-

Alignment

The Preferred Alternative could convert approximately 1,128 acres of important farmland along the proposed alignments.

From San Francisco to San Jose, no potential impacts on farmland in any of the four farmland categories were identified because the area is already urbanized

Between San Jose and Gilroy, the San Jose to Central Valley alignment would encounter some farmland, primarily between the community of Coyote and Gilroy, west of the Diablo Range. Between the Diablo Range and the Central Valley the farmland is located primarily adjacent to Henry Miller Road and east of the Los Banos area. This alignment would convert a combined total of 593.4 acres of farmland.

Within the Central Valley, the alignment would convert a combined total of 534.6 acres of farmland.

Stations

The proposed station locations for the Preferred Pacheco Pass Network Alternative are not expected to result in any additional conversion of important farmland given the developed areas that stations would be located.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for conversion of important farmland is considered a significant environmental impact.

Mitigation Strategies

The Authority finds that following mitigation strategies can be refined and applied at the project-specific level to avoid or reduce this impact:

1. Avoid farmland whenever feasible during the conceptual design stage of the project.
2. Reduce the potential for impacts by sharing existing rail rights-of-way where feasible or by aligning HST features immediately adjacent to existing rail rights-of-way.
3. Reduce the potential for impacts by reducing the HST right-of-way width to 50 feet in constrained areas.
4. Coordinate with private agricultural land trusts, local programs, mitigation banks, and Resource Conservation Districts to identify additional measures to limit important farmland conversion or provide further protection to existing important farmland.
5. The Authority, or other entities designated and supported by the Authority will acquire, from willing sellers, agricultural conservation easements encompassing at least 3,500 acres of important farmland (as defined by the FMMP). The eventual locations and total acreage for these easements would be determined in consultation with the California Department of Conservation, and others, and in conjunction with project-level decisions of the HST system.

The Authority finds that the mitigation strategies described above will substantially lessen this impact. In particular, the potential to locate portions of the alignment within existing transportation corridors can reduce the direct conversion of agricultural land to HST system uses to a negligible amount in some areas, such as along Henry Miller Road. At the project level, the Authority will share right-of-way to the extent feasible. Moreover, the use of conservation easements can provide permanent protection for agricultural and open space uses that will protect and promote the agricultural nature of selected easements lands in a manner not otherwise available. Accordingly, although the Authority finds that at least some conversion of agricultural land will be necessary to implement the HST system in the Bay Area

to Central Valley Study area, the Authority finds that the above mitigation strategies will be effective in reducing this impact to a less-than-significant level.

Impact 2. Severance of Prime, Statewide Important, and Unique Farmlands, and Farmlands of Local Importance, due to Project Uses

Farmland severance is the division of one farmland parcel into two or more areas of operation by placement of a barrier through the parcel, in this case the HST system. Implementation of the HST system along the Preferred Pacheco Pass Network Alternative could potentially cause farmland severance in some locations. Specifically, farmland severance could occur along the Pacheco alignment and on the western and eastern ends of the Henry Miller UPRR Connection alignment, where the alignment would not be within an existing rail right-of-way or transportation corridor. Due to the programmatic nature of this analysis, it is not possible to estimate the number of parcels or acres that could be affected by severance.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential farmland severance is considered a significant environmental impact.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Avoid farmland whenever feasible during the conceptual design stage of the project.
2. Minimize severance of agricultural land by constructing underpasses and overpasses at reasonable intervals to provide property access.
3. Work with landowners during final design of the system to enable adequate property access.
4. Provide appropriate severance payments to landowners.

The Authority finds that the mitigation strategies described above will substantially lessen this impact. Nevertheless, the Authority finds that at least some farmland severance may result from implementing the HST system in the Bay Area to Central Valley Study area, and it is unclear absent site-specific information that this impact can be mitigated to a less-than-significant level. Therefore, for purposes of this Programmatic EIR, the impact is considered significant and unavoidable.

4.8 Aesthetics and Visual Resources

The construction and operation of the HST system would alter existing scenic landscapes and cause impacts on visual resources related to the addition of infrastructure in, or removal of infrastructure from, the existing landscape. The infrastructure may include construction and improvements of the HST system, tunnels, fences, noise walls, elevated guideways, catenaries (support-pole systems for power supply for trains), and stations. Visual impacts will have a higher sensitivity in areas of scenic open space and mountain crossings. The programmatic analysis of the visual impacts focused on a broad comparison of potential impacts on visual resources (particularly scenic resources, areas of historic interest, and natural open space areas and significant ecological areas) along proposed HST alignments and around station locations. The 2008 Final Program EIR included photo simulations of conceptual design of the HST system and facilities for a set of representative landscapes and concentrated on the locations where elevated structures, tunnel portals, or areas with extensive cut or fill and proposed. Potential changes to the dominant landscape features, or potential visual impacts, were described and ranked as high, medium, or low according to the potential extent of change to existing visual resources. Visual contrast rankings, or impact rankings, were defined as follows:

- *High visual impacts* would be sustained if features of the alignment or station were obvious and began to dominate the landscape and detract from the existing landscape characteristics or scenic qualities.
- *Medium visual impacts* would be sustained if features of the alignment or station were readily discernable but did not dominate the landscape or detract from existing dominant features.
- *Low visual impacts* would be sustained if features of the alignment or station were consistent with the existing line, form, texture, and color of other elements in the landscape and did not stand out.
- *Shadow impact ranking* would be high if the new (not existing) elevated structure were within 75 feet of residential or open space, natural areas, or parkland.
- *Beneficial visual impact* would result if the alignment eliminated a dominant feature in the landscape that currently detracts from scenic qualities or blocks vistas.

Table 4-7 lists the visual impact ranking of the changes within each alignment and corridor.

Table 4-7
Visual Impacts Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Alignment	Change	Visual Impact Ranking	Alignment Visual Impact Ranking
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	Two additional tracks	Low	Low
		Pedestrian overcrossings at stations	High	
		Pedestrian undercrossings at stations	Low	
		Raised Caltrain right-of-way	Low	
	Dumbarton to San Jose	Two additional tracks	Low	Low
		Pedestrian overcrossings at stations	High	
		Pedestrian undercrossings at stations	Low	
		Raised Caltrain right-of-way	Low	
		New 2-track bridge next to historic San Francisquito Creek truss bridge	Low	
		Two additional tracks at El Palo Alto Redwood	Low	
		Elevated facilities at Diridon San Jose station	Medium	
San Jose to Central Valley: Pacheco Pass	Pacheco	Elevated facilities at Diridon San Jose station	Medium	Medium
		Elevated facilities south of Diridon station	Low and shadowing impacts	
		Highway grade separations	Low	
		Addition of HST corridor adjacent to UPRR right-of-way	Medium	
		New transportation corridor between Gilroy and Pacheco Valley	Medium	
		Elevated crossing of SR 152 in Pacheco Valley	High	
		Cut and fill sections over Pacheco Pass	Medium	
	Henry Miller	Trench alignment near San Joaquin National Cemetery	Medium	Low

Table 4-7
Visual Impacts Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Alignment	Change	Visual Impact Ranking	Alignment Visual Impact Ranking
	(UPRR Connection)	Elevated crossing of I-5	Low	
		Wetlands crossing	Medium	
		UPRR Connection	Low	
Central Valley	UPRR N/S	Elevated crossing of SR 4 viaduct in downtown Stockton	Medium	Low
		Elevated crossing of SR 99 near French Camp	Medium	
		Elevated structure through downtown Manteca	Low	
		Curve realignment in Modesto	Low	
		Elevated structure through downtown Turlock	Low	
		Elevated structure through downtown Chowchilla	Low	
		Curve realignment at Chowchilla River	Low	
Station Location Options				
Transbay Transit Center		Underground facilities at station	No	
Millbrae/SFO		Additional two tracks west of existing tracks	No	
Potential Mid-Peninsula Station at Redwood City (Caltrain)		Elevated 4-track station	Low	
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		Additional track between existing tracks, one to the east of existing tracks, pedestrian underpasses	Low	
San Jose (Diridon)		Elevated concourse and platforms at San Jose Diridon station	Medium	
Gilroy (Caltrain)		Elevated station	Medium	
Modesto (Downtown)		At grade station	No	
Merced (Downtown)		At grade station	Low	

Impact 1. Long-term Visual Quality Impacts due to Operation

Because the HST alignment would primarily be placed within or adjacent to existing transportation corridors and many of the stations would be co-located with existing facilities and in urban areas, the overall visual impacts ranged from low to high.

Alignment

From San Francisco and San Jose, the Caltrain corridor would be expanded from two to four tracks. In most locations, the addition of two tracks would be within existing right-of-way and would have a low visual impact. In some cases, it would be necessary to remove mature trees. The addition of HST to the Caltrain corridor also would require full grade-separation of the railway with overcrossings resulting in visual impacts, and undercrossings that would result in low impact. The HST alignment would be visible from I-280, a designated state scenic highway, but due to the distance of about 1 mile and the industrial landscape in this area, no visual impact would occur. There are several

historic stations along the Caltrain corridor, including the Menlo Park Caltrain station. Many of the communities along the Caltrain corridor developed with construction of the railroad and many of the main streets are oriented toward the railroad corridor. Introduction of HST would result in a low visual impact. Overall, the alignment would have a low visual impact between San Francisco and San Jose.

Going south from San Jose, the line would run adjacent to Caltrain and UPRR on an elevated structure, in a retained fill section, and at-grade. The retained fill and aerial sections would be a low visual impact on the surrounding landscape, creating shadow impacts on residential areas immediately adjacent to the right-of-way. Where the alignment is at-grade through the urban and suburban landscape to Gilroy it would require removal of mature trees and result in a low to medium visual impact ranking. South of Gilroy, the landscape is rural agricultural and the alignment would have a medium visual impact, introducing a new transportation corridor to a rural area. At San Felipe, the line crosses SR-152, resulting in a high visual impact, and enters a series of tunnels to pass into the Pacheco Creek Valley and through Pacheco Pass. The visual impact of the section through the pass varies from none (tunnels), medium (deep cuts or fills), and high (crosses over SR-152, an eligible scenic highway in Santa Clara County and designated scenic highway in Merced County). Once through the pass, the alignment would follow Romero Creek and pass the San Joaquin National Cemetery in a trench, where the line would have a medium visual impact. The alignment would also pass O'Neill Forebay and the San Luis Reservoir State Recreation Area before reaching Santa Nella. At Santa Nella, the alignment would cross I-5, a designated state scenic highway, and would have a low visual impact due to existing structures and a roadway overcrossing. East of Santa Nella, the line would traverse a landscape of rural agriculture and open space, including the Volta Wildlife Area and Los Banos Wildlife Area. The alignment would be placed on a 3-mile elevated structure to cross some wetland areas along Henry Miller Road. The introduction of the HST to the open space and near parklands would be a medium visual impact because the line would be low to the ground and would blend with the horizontal landscape. Overall, the alignment would have a low to medium visual impact between San Jose and the Central Valley.

The UPRR N/S alignment would generally run adjacent to the existing UPRR corridor unless an agreement to share right-of-way with UPRR can be reached. In many cases, grade separations would cross both the HST alignment and the UPRR tracks. Except at stations and where soundwalls are erected, these new grade separations, primarily in urban areas, would be the main visual impact of the HST in this corridor. Between Manteca and Fresno, the line would run parallel to both the UPRR Corridor and SR-99 and the introduction of the HST alignment would have no visual impact due to the existing twin lineal elements of the highway and railway. The alignment through Modesto would require the removal of existing buildings, resulting in a low visual impact because the area is dominated by the existing railway and freeway. An elevated structure would take the HST through downtown Turlock and have a low visual impact on the existing community. South of Merced, the line would continue alongside the UPRR corridor and SR-99 and would require new grade separations where the alignment crosses the railroad and freeway. Through Chowchilla, the HST would ascend to an elevated structure. This would have a low visual impact on the surrounding landscape. Overall, the alignment would have a low visual impact through the Central Valley.

Stations

The Transbay Transit Center would be constructed underground and would not result in any visual impacts. The Millbrae/SFO station site is an existing station where travelers transfer from Caltrain to BART to make the connection to the San Francisco International Airport and would not result in a visual impact. Where additional HST passenger boarding platforms would be required at existing stations a low visual impact would result.

The potential Mid-Peninsula station location at Palo Alto would result in a low visual impact, as the existing configuration of two tracks with outside platforms would be replaced by a configuration of

four tracks with twin island platforms, designed so as to be complementary to the existing historic station building. Because Redwood City has planned for redevelopment of the area surrounding the existing Caltrain station, the visual impact of a fully-elevated HST station would be low because the proposed buildings around the station would be much taller than the buildings currently there. Because the City of San Jose is planning for an intensification of land uses in and around the San Jose (Diridon) station, the expanded HST station at this location would constitute a medium visual impact. The Gilroy (Caltrain) station would result in a medium visual impact due to the addition of four tracks and elevated HST facilities.

The Modesto (Downtown) station would be at grade, with sidings to serve the station platforms. The platforms would be accessed by an underground walkway, keeping the station profile low, resulting in no visual impact. The Merced (Downtown) station would also be at grade at the location of the now vacant Southern Pacific depot. To accommodate both conventional rail and HST, the station and platforms would need to be expanded. This would require the acquisition of adjacent property for both the station facilities and the expanded trackway serving the station. Because the station is at grade, the visual impact would be low.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential long-term visual impact is considered a significant environmental impact.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-level to reduce this impact:

1. At the project level, design proposed facilities that are attractive in their own right and that would integrate well into landscape contexts so as to reduce potential view blockage, contrast with existing landscape settings, light and shadow effects, and other potential visual impacts.
2. Design bridges and elevated guideways with graceful lines and minimal apparent bulk and shading effects.
3. Design elevated guideways, stations, and parking structures with sensitivity to the context, using exterior materials, colors, textures, and design details that are compatible with patterns in the surrounding natural and built environment and that minimize the contrast of the structures with their surroundings.
4. Use neutral colors and dulled finishes that minimize reflectivity for catenary support structures, and design them to fit the context of the specific locale.
5. Use aesthetically appropriate fencing along rights-of-way, including decorative fencing, where appropriate, and use dark and non-reflective colors for fencing to reduce visual contrast.
6. Where at-grade or depressed route segments pass through or along the edge of residential areas or heavily traveled roadways, install landscape treatments along the edge of the right-of-way to provide partial screening and to visually integrate the right-of-way into the residential context.
7. Use the minimum amount of night lighting consistent with that necessary for operations and safety.
8. Use shielded and hooded outdoor lighting directed to the area where the lighting is required, and use sensors and timers for lights not required to be on all of the time.
9. Design stations to minimize potential shadow impacts on adjacent pedestrian areas, parks, and residential areas, and site all structures in a way that minimizes shadow effects on sensitive portions of the surrounding area.

10. Seed and plant areas outside the operating rail trackbed that are disturbed by cut, fill, or grading to blend with surrounding vegetated areas where the land will support plants. Use native vegetation in appropriate locations and densities.
11. Use strategic plantings of fast-growing trees to provide partial or full screening of elevated guideways where they are close to residential areas, parks, and public open spaces.
12. Where elevated guideways are located down the median strips or along the edge of freeways or major roadways, use appropriate landscaping of the area under the guideway to provide a high level of visual interest. Landscaping in these areas should use attractive shrubs and groundcovers, and emphasize the use of low-growing species to minimize any additional shadow effects or blockage of views.
13. Design soundwalls for the HST and for the shift of Monterey Highway with aesthetic treatments in visually sensitive environments, including artistic elements, color, landscape screening or signage to enhance the appearance of soundwalls.

The Authority finds that while the mitigation strategies described above will substantially lessen impacts to aesthetics and visual resources, it is uncertain absent site-specific information that this impact can be mitigated to a less-than-significant level. This is of greatest concern in areas where changes in scenic open space and mountain crossing areas are anticipated. As part of the site-specific design, many of the impacts on aesthetics and visual resources can be avoided or substantially mitigated. However, because of the size of the project and the variety of types of terrain it affects, the Authority does not have sufficient evidence to make that determination on a program-wide basis at this stage of design. Therefore, for purposes of this programmatic EIR, this impact is considered significant and unavoidable.

Impact 2. Short-term Visual Quality Impacts due to Construction

Construction of the HST system would have short-term impacts on visual resources that vary with the type of alignment (at-grade, elevated, tunnel, etc.) selected. The construction process is similar to that of roadway construction. For all above-grade construction activities and cut and cover tunnels, staging areas with construction materials, signage, and night lighting would be visible from adjacent properties and roadways during the construction period. The short-term visual impacts would vary from low to high, depending on the surrounding land uses.

Short-term visual impacts from construction of grade separations, overpasses, underpasses, and short sections of tunnel would include increased truck traffic on local streets and the presence of construction machinery in the immediate area. Temporary detours of streets and adjacent rail lines (rail detours are known as shooflies) during construction have the potential for high visual impacts.

Construction of elevated alignments would require placing piles and excavating foundations for the support columns, erecting formwork for columns that support the structure, delivering concrete to the site by truck, and constructing the elevated spans. The use of large construction machinery would be a high visual impact in most locations.

Construction of retained fill sections would require removal of existing topsoil and vegetation in the immediate construction area. To support the retaining walls, pile-supported concrete foundation beams would be built and pre-cast interlocking panels would be set in place. Truck traffic would be increased in the area as the soil and other materials are brought in and out of the site. The visual impact of the truck traffic would vary, from low to high, depending on general traffic conditions.

Construction of retained cut sections would involve steel sheet piles driven down each side of the excavation area. The tall pile-driving machinery would have a high visual impact. Detours would take roadways around the construction of permanent bridges to carry traffic over the completed cut section.

Heavy machinery would be used for excavation and hauling soil away from the site and would create a visual impact.

Temporary stockpiles of excavated soil for cut and cover tunnels could create a medium to high visual impact.

The short-term visual impacts of bored tunnel construction would be confined to the tunnel portals and possible vent shafts. Short-term visual impacts would be high. Support facilities for tunneling include concrete plants, soil transfer stations, and construction offices. Tunnel vent shaft locations are less intrusive, yet the short term visual impact from construction would be high.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-level to reduce this impact:

1. Plan hours of construction operations and locate staging sites to minimize impacts to adjacent residents and businesses.
2. Screen construction sites, as appropriate, to minimize visual construction impacts.
3. Establish a program to receive and respond to residents' concerns regarding construction noise, vibration, and light disturbances.
4. Fencing and signage will be utilized to physically buffer construction sites from public space as well as to provide sufficient warning to the public. The vulnerability of construction sites would be minimized through the use of fencing which would act as a deterrent to vandalism and trespassing.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce this impact to a less-than-significant impact in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered significant and unavoidable.

4.9 Public Utilities

Impact 1. Conflicts with Utilities

Improvements associated with the proposed HST system could cause conflicts between a proposed alignment alternative or station location and a pipeline or facility associated with a utility, including crossings. Because utilities are so prevalent in the Bay Area to Central Valley study region, the EIR/EIS could not practically assess each potential conflict. The evaluation considered three of the most common major facilities that may pose construction challenges as representative utility conflicts: electrical transmission lines, and natural gas facilities. To analyze the potential for conflicts between the HST system and utilities, the alignment alternatives and station location options were overlaid on available utility maps showing the locations of infrastructure for the three representative utilities.

The relative utility impact for each alignment alternative was identified by quantifying the number and type of potential conflict for each alternative, and then assigning a qualitative ranking of each conflict as low, medium, or high to describe its severity. High impact conflicts involve those with fixed facilities such as electrical substations or power plants, and large numbers of gas lines, or large pipelines. Low impact conflicts involve smaller wastewater pipelines, smaller numbers of gas lines, and smaller electrical facilities. For pipelines, the analysis also provided a medium ranking.

Alignment

The Partially Revised Final Program EIR considered potential conflicts with natural gas pipelines and electrical transmission lines to be low or medium impact conflicts and less-than-significant because these utilities are generally relatively easy to avoid or relocate. Conflicts with fixed facilities such as electrical substations were considered high conflicts and significant.

As shown in Table 4-8, the Preferred Pacheco Pass Network Alternative could result in up to 75 conflicts with natural gas pipelines, 3 conflicts with electrical transmission lines, and 1 conflict with an electrical substation or power station. These conflicts are distributed as follows:

- San Francisco to San Jose Corridor: 30 natural gas pipelines (medium conflict)
- San Jose to Central Valley Corridor via Pacheco Pass and Henry Miller (UPRR Connection): 3 electrical transmission lines (low conflict) and 22 natural gas pipelines (high conflict)
- Central Valley Corridor via UPRR N/S: 1 electrical substation or power station (high conflict) and 23 natural gas pipelines (medium conflict)

Stations

None of the stations are anticipated to have conflicts with utilities.

Table 4-8
Utilities Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Preferred Alignment	Number of Electrical Transmission Lines	Number of Electrical Substations or Power Stations	Number of Natural Gas Pipelines
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	-	-	22
	Dumbarton to San Jose	-	-	8
San Jose to Central Valley: Pacheco Pass	Pacheco	2	-	14
	Henry Miller (UPRR Connection)	1	-	8
Central Valley	UPRR N/S	-	1	23
Station Location Options				
Transbay Transit Center		-	-	-
Millbrae/SFO		-	-	-
Potential Mid-Peninsula Station at Redwood City (Caltrain)		-	-	-
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		-	-	-
San Jose (Diridon)		-	-	-
Gilroy (Caltrain)		-	-	-
Modesto (Downtown)		-	-	-
Merced (Downtown)		-	-	-

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for conflicts with utilities along the Preferred Pacheco Pass Network Alternative as a whole is considered a significant environmental impact.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to avoid or reduce this impact:

1. Make adjustments to the HST system alignments and vertical profiles to avoid crossing or using major utility right-of-way or fixed facilities during engineering design.
2. If avoidance is not feasible, in consultation and coordination with the utility owner, relocate or protect in place transmission lines, substations, and any other affected facilities.
3. For acquisition projects which result in utility relocation, follow the uniformity and equitable treatment policies, and comply with the requirements, of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 for all property necessary for the proposed HST system.

The Authority finds that the mitigation strategies described above will avoid or reduce utilities conflicts impacts of the Preferred Pacheco Pass Network Alternative to a less-than-significant level.

4.10 Hazardous Materials and Wastes

Impact 1. Exposure of Workers or the Public to Hazardous Substances due to Disturbance of Known Contaminated Sites

Construction, operation, and maintenance of the Preferred Pacheco Pass Network Alternative could cause disturbance of existing, known hazardous waste sites or hazardous materials, in turn exposing workers and the general public to hazardous materials. For this programmatic analysis, a potential hazardous waste impact is considered wherever the route of a proposed alignment, station location option, or maintenance facility conflicts with a known contaminated site. The assessment for the Program EIR/EIS was limited to known and major hazardous materials sites and hazardous waste sites listed on the federal National Priorities List (NPL), the State Priority List (SPL), and the California Integrated Waste Management Board's list of solid waste landfills (SWLF) in the State of California as listed in Table 4-9. The sites that pose the greatest concern are those with soil or groundwater contamination within or adjacent to the right-of-way for a proposed alignment or a station facility, and those with groundwater contamination near areas where excavation down to groundwater would be necessary.

Table 4-9
Hazardous Materials Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Preferred Alignment	National Priorities List/ Superfund Listings	State Priority List Listings	Solid Waste Landfills Listings
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	-	-	22
	Dumbarton to San Jose	-	-	8
San Jose to	Pacheco	2	-	14

Table 4-9
Hazardous Materials Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Preferred Alignment	National Priorities List/ Superfund Listings	State Priority List Listings	Solid Waste Landfills Listings
Central Valley: Pacheco Pass	Henry Miller (UPRR Connection)	1	-	8
Central Valley	UPRR N/S	-	1	23
Station Location Options				
Transbay Transit Center		-	-	-
Millbrae/SFO		-	-	-
Potential Mid-Peninsula Station at Redwood City (Caltrain)		-	-	-
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		-	-	-
San Jose (Diridon)		-	-	-
Gilroy (Caltrain)		-	-	-
Modesto (Downtown)		-	-	-
Merced (Downtown)		-	-	-

Alignment

The Preferred Pacheco Pass Network Alternative involves a total of 79 hazardous materials/waste sites, distributed as follows:

San Francisco to San Jose Corridor: 30 hazardous materials/waste sites, including 3 NPL sites, 0 SPL sites, and 30 SWLF sites.

San Jose to Central Valley Corridor via Pacheco Pass and Henry Miller (UPRR Connection): 25 hazardous materials/waste sites, including 3 NPL sites, 0 SPL sites, and 22 SWLF sites.

Central Valley Corridor via UPRR N/S: 24 hazardous materials/waste sites, including 0 NPL sites, 1 SPL sites, and 23 SWLF sites.

Stations

No known hazardous materials/waste sites were identified at the station location options for the Preferred Pacheco Pass Network Alternative.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the potential for exposing workers or the public to hazardous materials from disturbance of known contaminated sites is considered a significant environmental impact.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to avoid or reduce this impact:

1. Investigate soils and groundwater for contamination and prepare environmental site assessments when necessary and consult with Department of Toxic Substance Control (DTSC) and California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) about sites of concern.
2. Design realignment of the HST corridors to avoid identified sites.
3. Relocate HST associated facilities such as stations to avoid identified sites.
4. Remediate identified hazardous materials and hazardous waste contamination.
5. Prior to demolition of buildings for project construction, survey for lead-based paint and asbestos-containing materials.
6. Follow BMP's for testing, treating, and disposing of water, and acquire necessary permits from the regional water quality control board, if ground dewatering is required.
7. When indicated by project level environmental site assessments, perform Phase II environmental site assessments in conformance with the ASTM Standards related to the Phase II Environmental Site Assessment Process to identify specific mitigation measures.
8. Prepare a Site Management Program/Contingency Plan prior to construction to address known and potential hazardous material issues, including:
    - Measures to address management of contaminated soil and groundwater;
    - Site-specific Health and Safety Plan (HASP), including measures to protect construction workers and general public; and
    - Procedures to protect workers and the general public in the event that unknown contamination or buried hazards are encountered.
9. As part of the second-tier environmental review, consider impacts to the environment on sites identified on the Cortese list (Government Code section 65962.4) at that time.

The Authority finds that the mitigation strategies described above will avoid or reduce impacts to the public and the environment as a result of construction or operation of the HST system to a less-than-significant level.

4.11 Cultural and Paleontological Resources

The EIR analyzed the occurrence of cultural and paleontological resources within an “Area of Potential Effect” or “APE.” The APE was defined as: (1) 500 feet on each side of the centerline of proposed new rail routes where additional right-of-way could be needed; (2) 100 feet on each side of the centerline for routes along existing highways and railroad rights-of-way; and (1) 500 feet around station locations. For paleontological resources, the APE was defined as 100 feet on each side of the centerline of proposed rail routes and station locations in both urban and nonurban areas. For each resource type, the HST system was ranked as having low, medium, or high occurrence of the resource within the APE as listed in Table 4-10.

Table 4-10
Cultural Resources Summary Data Table for Preferred Alternative
Alignment Alternatives and Station Location Options

Corridor	Preferred Alignment	Number of Recorded Archaeological Resources	Number of Recorded Architectural Resources	Traditional Cultural Properties	Cultural Resources Ranking (High, Medium, Low)	Paleontology Sensitivity (High, Medium, Low)
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	16	35	No	High	Low
	Dumbarton to San Jose	10	24	No	High (burials, Mission)	Low
San Jose to Central Valley: Pacheco Pass	Pacheco	7	5	No	Medium (heritage trees)	Low
	Henry Miller (UPRR Connection)	1	4	No	Medium	Low
Central Valley	UPRR N/S	4	63	No	Medium	Low
Station Location Options						
Transbay Transit Center		0	2	No	High*	Low
Millbrae/SFO		0	1	No	High	Low
Potential Mid-Peninsula Station at Redwood City (Caltrain)		0	0	No	Low	Low
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		0	1	No	Medium	Low
San Jose (Diridon)		0	1	No	Medium	Low
Gilroy (Caltrain)		0	0	No	Low	Low
Modesto (Downtown)		0	0	No	Medium*	Low
Merced (Downtown)		0	0	No	Medium*	Low
Note: * Based on knowledge and experience in the area of the APE.						

Impact 1. Impacts to Archaeological Resources and Traditional Cultural Properties

The HST could impact archaeological resources and traditional cultural properties by causing physical destruction or damage during construction. Archaeological resources include both prehistoric and historic sites. The EIR identified the number of known archaeological sites within the APE for alignments and stations. Based on the number of sites and expert knowledge of the area, a rating of sensitivity for archaeological resources was provided. Overall, the HST system has a low to high sensitivity for archaeological sites that have the potential to be impacted.

Alignment

From San Francisco to San Jose there is a high density of cultural resources, primarily within these two cities. In total, there are 26 recorded archaeological resources located within the APE. The area around San Francisco has been developed since before the 1850s and therefore is rich in archaeological sites. The majority of prehistoric sites are shell middens, and many of the historical

sites are deposits from various activities dating from the late 1800s as well as the earthquake in 1906. One archaeological site in San Jose, the Santa Clara de Asis Mission, includes both prehistoric and historic resources and burials. This alignment has a high sensitivity for prehistoric and historical resources. No traditional cultural properties were identified within the APE.

Eight previously recorded archaeological resources are located within the APE from San Jose to the UPRR connection. These include prehistoric sites that typically include midden and lithic debitage. Though little archaeological work has been conducted in this area, it is known to be highly sensitive for prehistoric archaeological resources. No traditional cultural properties were identified within the APE.

The UPRR alignment generally follows existing railroad lines. In total, there are four previously recorded archaeological resources. These are prehistoric sites, such as a habitation site associated with burials, and historic sites that date to early 1900s industrial activities. Overall, this alignment alternative has medium sensitivity for cultural resources. No traditional cultural properties were identified within the APE.

Stations

No previously recorded archaeological sites were identified within the APE for the station location options. No traditional cultural properties were identified within the APE.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Avoid the impact, or when avoidance cannot be accommodated, minimize the scale of the impact.
2. Incorporate the site into parks or open space.
3. Cap or cover the site before construction.
4. Provide data recovery for the archaeological resources, which may include excavation of an adequate sample of the site contents so that research questions applicable to the site can be addressed.
5. Develop procedures for fieldwork, identification, evaluation, and determination of potential effects to archaeological resources in consultation with SHPO and Native American tribes. Procedures may include on-site monitoring when sites are known or suspected of containing Native American human remains and be reflected in Memoranda of Agreement with appropriate bodies.
6. Coordinate and consult with tribal representatives.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level.

Impact 2. Impacts to Historic Properties/Resources

The HST could impact historic properties and resources by causing physical destruction or damage. The EIR identified the number of known historic properties and resources within the APE for alignments and stations. Based on the number of sites and expert knowledge of the area, a rating of sensitivity for archaeological resources was provided. Overall, the HST system has a low to high sensitivity for archaeological sites that have the potential to be impacted.

Alignment

The alignment from San Francisco to San Jose has a high density of cultural resources within the city of San Francisco. In total, there are 59 recorded architectural resources. The area along the alignment has been developed since before the 1850s and therefore is rich in historical architecture and resources including structures, canals, and railroads. The alignment would extend through numerous historic districts. This alignment alternative has a high sensitivity for architectural resources.

Nine previously recorded architectural resources are located within the APE from San Jose to the UPRR connection. These include the Keesling shade trees, historic canals, bridge, and residences. Much of the area along the Henry Miller alignment has seen little development historically. Overall, this alignment alternative has medium sensitivity for cultural resources.

The UPRR alignment generally follows existing railroad lines. There are 63 recorded architectural resources within the APE. Most of the architectural resources are around the communities of Delhi, Livingston, Atwater, and Chowchilla. There are a series of historic canals and freeway bridges, as well as recorded commercial and residential properties dating from the 1890s. Overall, this alignment alternative has medium sensitivity for cultural resources.

Stations

Four of the station location options have recorded cultural resources that are within the APE. There are a total of 5 known resources within the APE of the station location options, including the Millbrae Train Station built in 1907, Palo Alto train station built in 1941, the Transbay Terminal and the Transbay Terminal Loop Ramp, and the San Jose Diridon station. The Transbay Transit Center station location option within San Francisco also has a large number of adjacent unrecorded architectural resources. No recorded resources were identified for either the Modesto (Downtown) or Merced (Downtown) station location options. Due to the location of these two station options, there is the potential for adjacent resources and was determined to have a medium sensitivity for architectural resources.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Avoid the impact through project design. Prepare and utilize a treatment plan for protection of historic properties/resources that would describe methods to preserve, stabilize, shore/underpin, and monitor buildings, structures, and objects.
2. Avoid high vibration construction techniques in sensitive areas.
3. Record and document cultural resources that would be adversely affected by the project to the standards of the Historic American Building Survey or Historic American Engineering Record.

4. Develop design guidelines to ensure sympathetic, compatible, and appropriate designs for new construction.
5. Consult with architectural historians or historical architects to advise on appropriate architectural treatment of the structural design of proposed new structures. Prepare interpretive and/or educational materials and programs regarding the affected historic properties/resources. Materials may include: a popular report, documentary videos, booklets, and interpretive signage.
6. Make interpretive information available to state and local agencies, such as salvage items, historic drawings, interpretive drawings, current and historic photographs, models, and oral histories. Also assist with archiving and digitizing the documentation of the cultural resources affected, and disseminating material to the appropriate repositories.
7. Relocate and rehabilitate historic properties/resources that would otherwise be demolished because of the project.
8. Monitor project construction to ensure it conforms to design guidelines and any other treatment procedures agreed to by the parties consulting pursuant to Section 106 of the National Historic Preservation Act. Repair inadvertent damage to historic properties/resources in accordance with the Secretary of the Interior's Standards for Treatment of Historic Properties.
9. Salvage selected decorative or architectural elements of the adversely affected historic properties/resources, and retain and incorporate salvaged items into new construction where possible. If reuse is not possible, make salvaged items available for use in interpretive displays near the affected resources or in an appropriate museum.
10. Implement an agreement with appropriate bodies specifying procedures for addressing historic resources which may be affected by the HST system.
11. Evaluate the Keeling Shade Trees to determine if the resource is eligible for listing on the National Register of Historic Places. If eligible, determine whether the project would have an adverse effect under Section 106. If an adverse effect occurs, avoid the trees through project design or fill in existing gaps where specimens have died or are dying to offset removal of specimens by the project.
12. Include requirements in construction contracts to ensure appropriate preservation of cultural resources to minimize project impacts on historic properties/structures.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 3. Impacts to Paleontological Resources

The HST could impact paleontogical resources as a result of construction, including grading, cutting, tunneling, erecting pylons for elevated track, and due to station construction. The EIR identified the areas within the paleontological resources APE as having high, medium, or low sensitivity for paleontological resources based on the number of recorded resource localities and formations, as well as professional assessments of the significance of recovered resources from exposed rock units and the likelihood of recovering additional resources. While the majority of the HST alignment and stations would have low paleontological sensitivity, there are areas where there is the potential for high or undetermined sensitivity.

Alignment

From San Francisco to San Jose, the overall paleontological sensitivity is low. Nonsensitive Franciscan sandstone, Quaternary alluvium, and artificial bay fill would underlie the alignment.

The alignment from San Jose extends primarily through areas mapped as Franciscan ultramafic rocks and Quaternary terrace and alluvium, all ranking low in paleontological sensitivity. A portion of the alignment near Gilroy would have a high sensitivity since it passes through alluvial deposits similar to those which have yielded vertebrate fossils elsewhere. The remaining portion of the Pacheco alignment falls on nonsensitive lower and upper Cretaceous marine rocks. In the vicinity of San Luis Reservoir, the alignment crosses the Los Banos Alluvium, a sensitive unit that could include vertebrate fossils. The Pacheco and Modesto Formations along portions of the Henry Miller alignment have a moderate paleontological sensitivity. The remaining length of the Henry Miller alignment to the UPRR connection would not fall within fossil-bearing units and would not be sensitive for paleontological resources.

The UPRR alignment would have a low likelihood of encountering paleontological deposits.

Stations

The overall paleontological sensitivity for each of the station location options is low. Specific impacts to paleontologic resources associated with construction of the stations require additional information concerning exact locations and subsurface geology. Additional paleontological resources assessment would take place at the project level after the station designs are more fully defined.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Educate workers.
2. Recover fossils identified during the field reconnaissance.
3. Monitor construction.
4. Develop protocols for handling fossils discovered during construction, such as temporary diversion of construction equipment so that the fossils could be recovered, identified, and prepared for dating, interpreting, and preserving at an established, permanent, accredited research facility.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level.

4.12 Geology and Soils

Impact 1. Seismic Hazards

Seismic hazards evaluated for this EIR include ground shaking and ground failure. The HST could cause risks to workers and public safety due to the collapse or toppling of facilities, either during construction or after completion, due to strong earthquakes. The HST also could create risks to public safety from automobile accidents or the interruption of automobile circulation, if strong earthquakes cause a

derailment. HST facilities could sustain damage due to secondary hazards (settlement) over soft or filled ground. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Design structures to withstand anticipated ground motion, using design options such as redundancy and ductility.
2. Prevent liquefaction and resulting structural damage and traffic hazards using: (a) ground modification techniques such as soil densification; and (b) structural design, such as deep foundations.
3. Utilize motion sensing instruments to provide ground motion data and a control system to temporarily shut down HST operations during or after an earthquake to reduce risks.
4. Design and engineer all structures for earthquake activity using Caltrans Seismic design Criteria.
5. Design and install foundations resistant to soil liquefaction and settlement.
6. Identify potential serpentinite bedrock disturbance areas and implement a safety plan.
7. Apply Section 19 requirements from the most current Caltrans Standard Specifications to ensure geotechnically stable slopes are planned and created.
8. Install passive or active gas venting systems and gas collection systems in areas where subsurface gases are identified.
9. Remove corrosive soil and use corrosion protected materials in infrastructure.
10. Address erosive soils through soil removal and replacement, geosynthetics, vegetation, and or rip/rap, where warranted.
11. Remove or moisture condition shrink/swell soils.
12. Utilize stone columns, grouting, and deep dynamic compaction in areas of potential liquefaction.
13. Utilize buttress berms, flattened slopes, drains, and/or tie-backs in areas of slope instability.
14. Avoid settlement through preloading, use of stone columns, deep dynamic compaction, grouting, and/or special foundation designs.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 2. Surface Rupture Hazards

The HST could cause risks to workers and public safety due to ground rupture along active faults, either during construction or after completion. The HST also could create secondary public safety risks caused by damage to highways or airports, or interruption of these transportation services, in the event of train derailment caused by ground rupture along active faults. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Install early warning systems triggered by strong ground motion associated with ground rupture, such as linear monitoring systems (i.e., time domain reflectometers) along major highways and rail lines within the zone of potential rupture to provide early warnings and allow for temporary control of rail and automobile traffic to avoid and reduce risks.
2. Continue to modify alignments to avoid crossing known or mapped active faults within tunnels.
3. Avoid active faults to the extent possible. Where avoidance is not possible, cross active faults at grade and perpendicular to the fault line.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 3. Slope Instability

The HST could cause risks to workers and public safety due to the failure of natural or construction cut slopes or retention structures. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Install temporary and permanent slope reinforcement and protection, based on geotechnical investigations, and review of proposed earthwork and foundation excavation plans.
2. Conduct geotechnical inspections during construction to verify that no new, unanticipated conditions are encountered.
3. Incorporate slope monitoring in final design.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 4. Difficulty in Excavation

The HST alignment could cross areas with hard, unfractured bedrock that will be difficult to excavate using methods other than blasting, which may pose a safety risk. Faulted materials that may be present can result in instability in the face of a tunnel area, another hazard. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Identify areas of potentially difficult excavation to ensure safe practices.
2. Focus future geotechnical engineering and geologic investigations in areas of potentially difficult excavation.
3. Monitor conditions during and after construction.

4. Employ tunnel excavation and lining techniques to ensure safety.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 5. Hazards Related to Oil and Gas Fields

The HST could create the potential for migration of potentially explosive and/or toxic gases into subsurface facilities, such as tunnels or underground stations. Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, this impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Follow federal and state Occupational Safety and Health Administration regulatory requirements for excavations.
2. Consult with other agencies such as the Department of Conservation's Division of Oil and Gas, or the Department of Toxic Substances Control regarding known areas of concern.
3. Use safe and explosion-proof equipment during construction.
4. Test for gases regularly.
5. Install monitoring systems and alarms in underground construction areas and facilities where subsurface gases are present.
6. Install gas barrier systems.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant

4.13 Hydrology and Water Quality Impacts

For purposes of assessing the Bay Area to Central Valley HST impacts to water resources, a GIS analysis was completed for potential direct and indirect impacts. The potential direct impact study area is defined by the number of tracks of an HST Alignment Alternative and the presence of proposed new station facilities. This allowed for a larger area of analysis where the alignment would have a greater potential to affect the environment (i.e., is wider with more tracks). In locations where there would be two tracks, the area analyzed for direct impacts was 50 feet total width along the alignment both at-grade and on aerial structures. For alignments with four tracks and/or proposed new station facilities, the area analyzed for direct impact was 100 feet total width. Indirect impacts were evaluated for an area within 200 feet of all alignments and station location options. Potential tunnel impacts on hydrology/water resources were also considered using known information for groundwater and underground streams. Table 4-11 lists list the hydrology and water quality resources by alignment and station.

Table 4-11
Summary of Water Resource Impacts for Preferred Alternative Alignments and Station Location Options

Corridor	Preferred Alignment	100-Year Floodplain (Direct/ Indirect) in Acres	Streams (Direct/ Indirect) in Linear Feet	Lakes/ Bay (Direct/ Indirect) in Acres	Erosion (Direct/ Indirect) in Acres	Groundwater (Direct/ Indirect) in Acres	Section 303d Waters Affected
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	49.3 / 101	1,178 / 2,617	0 / 3.4	8.5 / 18	268 / 579	1
	Dumbarton to San Jose	46.5 / 74	1,435 / 2,649	-	-	239 / 518	6
San Jose to Central Valley: Pacheco Pass	Pacheco	103.4 / 304	2,674 / 9,215	-	41.8 / 146	451 / 1,031	5
	Henry Miller (UPRR Connection)	126.4 / 470	6,697 / 44,458	2.3 / 10	22.2 / 89	355 / 1,413	3
Central Valley	UPRR N/S	123.4 / 423	7,547 / 41,122	-	-	607 / 2,123	3
Station Location Options							
Transbay Transit Center		-	-	-	-	9 / 13	-
Millbrae/SFO		0 / 0.1	-	-	-	11 / 15	-
Potential Mid-Peninsula Station at Redwood City (Caltrain)		-	-	-	-	6.2 / 9.5	-
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		-	-	-	-	21 / 27	-
San Jose (Diridon)		-	-	-	-	19 / 25	-
Gilroy (Caltrain)		-	-	-	-	40 / 47	-
Modesto (Downtown)		-	-	-	-	9 / 13	-
Merced (Downtown)		11.7 / 15	-	-	-	12 /15	-

Impact 1. Impacts on Floodplains

The HST system would encroach on 100-year floodplains. Direct encroachment into the floodplain by the HST system is anticipated to be approximately 449 acres and indirectly affect 1,372 acres. Floodplain encroachment may result in increased flood height from earthen berms or linear barriers to surface water flow.

Alignment

From San Francisco to San Jose, the HST has the potential to directly impact 96 acres of 100-year floodplains, primarily along the segments south of SFO, in Palo Alto, and in Sunnyvale. Within this corridor, the 100-year floodplain is often confined by the embankments of the existing Caltrain or roadway facility.

The footprint of the alignment from San Jose to the Central Valley has the potential to have direct impacts of approximately 130 acres on the 100-year floodplain and indirect effects of 774 acres. The largest area of floodplain being crossed along the Pacheco segment would be between Gilroy and the Diablo Range. Across the Diablo Range, the amount of 100-year floodplain is minimal and confined to canyons and the alignment is primarily in tunnels or on structures over canyons and streams. The Henry Miller portion of the alignment is primarily at-grade and adjacent to Henry Miller Road, except for an approximate 3-mile long structure that would extend across the floodplain. Impacts on the floodplain from aerial structures would be limited to column footings.

The UPRR alignment through the Central Valley could have direct impacts on approximately 123 acres on the 100-year floodplain and indirectly affect 423 acres, primarily between Atwater and Chowchilla. The alignment would be constructed at-grad in this location.

Stations

The Millbrae/SFO station would have the potential to indirectly affect less than 0.1 acre of the 100-year floodplain, which is contained by channel embankments east of the station site. The Merced (Downtown) station is wholly within the 100-year floodplain and would directly impact 11.7 acres of the 100-year floodplain and indirectly affect 15 acres.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Avoid or minimize construction of facilities within floodplains where feasible.
2. Construct appropriately sized culverts under the trackway to convey anticipated storm flows and to minimize ponding.
3. Minimize the footprint of facilities within the floodplain, through design changes or the use of aerial structures and tunnels.
4. Restore the floodplain to be equivalent to its prior function in instances where the floodplain is impacted by construction.
5. Project-level design for the HST will adhere to NFIP floodplain management building requirements and the Authority will consult with local agencies as part of second-tier, project-level EIR/EIS analysis.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level.

Impact 2. Impacts on Surface Waters

The HST system could encroach on surface water resources. The direct encroachment onto streams would be approximately 19,531 linear feet, while encroachment onto lakes and waterbodies would be approximately 2.3 acres. Indirectly, the HST could affect over 100,000 linear feet of streams and 13.4 acres of waterbodies. The HST would be on structures over watercourses and waterbodies and impacts from aerial structures would be limited to column footings. The HST would also add impervious surface area, which can reduce water infiltration, contribute to runoff, and negatively affect surface water quality. The HST could cause erosion or be affected by erosive soils, which can negatively affect water quality, where the alignment options would extend to or along highly erodible slopes. Within the direct footprint there are approximately 72.5 acres of erodible soils, and in the larger indirect study area there are 253 acres.

The HST alignment traverses at least 18 total maximum daily loads (TMDLs) impaired segments of water resources. The construction and operation of the HST is an unlikely source of most of the contaminants that impair the water resources, but some of the water resources are impaired for sediment and siltation, and construction may affect the sediment/silt loads. In addition, the sediment runoff from construction could potentially mobilize and release additional pesticides into some impaired waters.

Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading activities could result in increased erosion and sedimentation to surface waters. Hazardous materials associated with construction equipment could also adversely affect water quality if spilled or stored improperly. In addition, construction in areas of high groundwater could require dewatering, with subsequent discharge to surface waters. This process could result in the release of sediment or other contaminants to surface waters. Water quality impacts from construction activities could violate water quality standards, exceed contaminant loadings in impaired waters, provide additional sources of polluted runoff, or otherwise degrade water quality.

Alignment

The San Francisco to San Jose alignment generally follows and is adjacent to the Caltrain corridor and minimizes impacts on water resources. At least 25 named and unnamed water resources in the area could be affected, including Oyster Point Channel, San Bruno Channel, San Bruno Canal, Colma Creek, Mills Creek, San Mateo Creek, Pulgas Creek, San Francisquito Creek, Matadero Creek, Barron Creek, Permenente Creek, Stevens Creek, Calabasas Creek, and Saratoga Creek. The HST has the potential to directly impact 2,613 linear feet of streams, creeks, and channels. The potential indirect impact to streams would be approximately 5,266 linear feet and the indirect impact to waterbodies would be 3.4 acres. Given the developed and urban area, the change in impervious surfaces would be minimal and impacts on surface water quality would be low. This alignment would extend through approximately 8.5 acres of erosive soil conditions and 18 acres in the larger indirect area in the area of Brisbane.

The San Jose to Central Valley alignment could potentially affect at least 57 unnamed and named water resources, including Los Gatos Creek, Guadalupe River, Little Llagas Creek, Llagas Creek, Miller Slough, Pajaro River, Pacheco Creek, Tequisquita Slough, Tule Lake, California Aqueduct, San Luis Creek, Mendota Canal, Main Canal, Los Banos Creek, Los Banos Wildlife Area, San Luis Wasteway, Mud Slough, Delta Canal, Santa Rita Slough/Salt Slough, San Joaquin River, Mariposa Slough, Chowchilla River, Ash Slough, and Berenda Slough.[1] The HST has the potential to directly impact

[1] Many of the water resources identified along the Henry Miller portion are manmade canals and ditches used to transport agricultural waters. It should be noted that the U.S. Army Corps of Engineers (USACE) or the California Department of Fish and Game (CDFG) do not consider all canals in the Central Valley to be jurisdictional waters. Certain canals that intercept natural

9,371 linear feet of streams, creeks, and channels and 2.3 acres of waterbodies. The potential indirect impact to streams would be approximately 53,674 linear feet, and the indirect impact to waterbodies would be 10 acres. The change in impervious surfaces within developed portions of the alignment between San Jose and Gilroy would be minimal since it would be adjacent to the existing Caltrain and roadway. South and east of Gilroy, the alignment extends through the Diablo Range and agricultural areas and would result in a slight increase in impervious surfaces; however, the HST would consist of permeable track-fill rather than impervious pavement resulting in a low runoff potential. Between Gilroy and the O'Neill Forebay, the alignment would extend through approximately 64 acres of erosive soil conditions and 235 acres in the larger indirect area. Much of the alignment through this area is within tunnel or on aerial structure.

The UPRR alignment through the Central Valley could potentially affect at least 35 unnamed and named streams, rivers, creeks, channels, and canals, including French Camp Slough/Littlejohns Creek; Stanislaus River; Lateral Numbers 8, 6, 7, 3, 4, and 1; Hetch Hetchy Aqueduct; Tuolumne River; Upper/Lower Lateral 3; Merced River; Bear Creek/Black Rascal/Hesse Lateral; Farmdale Lateral Miles Creek; Owens Creek; North Slough/Mariposa Creek; El Nido; South Slough; Deadman Creek; Dutchman Creek; Chowchilla River; and Ash Slough/Ash Slough Bypass.[1] The HST has the potential to directly impact 7,547 linear feet of streams, creeks, and channels, and have indirect effects on approximately 41,122 linear feet. The change in impervious surfaces within developed portions of the alignment would be minimal. In agricultural areas, there would be a slight increase in impervious surfaces; but, the HST would consist of permeable track-fill resulting in a low runoff potential. The alignment through the Central Valley would not encounter locations of erodible soils.

Stations

Given the urban settings for the station locations, none are anticipated to directly or indirectly affect streams, surface waterbodies, or be affected by erosive soils.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, these impacts are considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Use construction methods and facility designs to minimize the potential encroachments onto surface water resources.
2. Minimize sediment transport caused by construction by following best management practices (BMPs) as part of National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan requirements that will be included in construction permits. BMPs may include measures such as:
   - providing permeable surfaces where feasible;
   - retaining and treating stormwater onsite using catch basins and filtering wet basins;
   - minimizing the contact of construction materials, equipment, and maintenance supplies with stormwater;
   - reducing erosion through soil stabilization, watering for dust control, installing perimeter silt fences, placing rice straw bales, and installing sediment basins;

drainages/streams and divert the water to another water body such as a reservoir or river can be considered jurisdictional. The USACE makes those determinations on a case-by-case basis. This would occur as part as part of the project level analysis in close coordination with the USACE and CDFG.

- maintaining water quality by using infiltration systems, detention systems, retention systems, constructed wetland systems, filtration systems, biofiltration/bioretention systems, grass buffer strips, ponding areas, organic mulch layers, planting soil beds, sand beds, and vegetated systems such as swales and grass filter strips that are designed to convey and treat either fallow flow (swales) or sheetflow (filter strips) runoff.

3. Use methods such as habitat restoration, reconstruction of habitat onsite, and habitat replacement offsite to minimize surface water quality impacts.
4. Comply with mitigation measures included in permits issued under Sections 404 and 401 of the federal Clean Water Act.
5. Comply with requirements in the Storm Water Pollution Prevention Plan to reduce pollutants in storm water discharges and the potential for erosion and sedimentation.
6. Comply with requirements of Section 10 of the federal Rivers and Harbors Act for work required around a water body designated as navigable and applicable permit requirements.
7. Comply with the requirements of a state Streambed Alteration Agreement for work along the banks of various surface water bodies.
8. Implement a spill prevention and emergency response plan to handle potential fuel or other spills.
9. Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils or steep slopes.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level.

Impact 3. Impacts on Groundwater

The HST system may encounter groundwater during construction of at- and above-grade structures, tunnels and tunnel portals, and dewatering may be necessary. In addition, construction and operation of the HST system components may affect groundwater recharge. Similar to surface waters, groundwater could be affected by construction activities. Construction in areas of high groundwater could require dewatering, with subsequent discharge to surface waters. This process could result in the release of sediment or other contaminants to surface waters. Construction activities such as excavation, trenching, or tunneling that occur in areas of high groundwater could impact groundwater supplies. The HST system has the potential to directly impact approximately 1,920 acres of groundwater and indirectly affect 5,664 acres.

Alignment

From San Francisco to San Jose the alignment would cross several groundwater basins including the San Francisco Sand Dune Area, Islais Valley, Santa Clara Valley, and the Visitacion Valley groundwater basins. The alignment would primarily be at-grade except as it approaches San Francisco and San Jose where it would be in tunnel and have the potential to encounter groundwater and may require dewatering. The alignment has the potential to directly impact approximately 507 acres of groundwater and 1,097 acres indirectly.

The groundwater basins between San Jose and the Central Valley include Santa Clara Valley, Gilroy-Hollister Valley and the San Joaquin Valley groundwater basins. The potential to encounter groundwater from San Jose to Gilroy would be limited to where column support footings would be required for aerial structures. Between Gilroy and the Diablo Range, the impacts on groundwater recharge would be low. The potential to encounter groundwater along the Henry Miller portion would be limited to the area east of Interstate 5 and the impacts on groundwater recharge would be

low due to the overall footprint of the HST and permeable track-fill. The alignment has the potential to directly impact approximately 806 acres of groundwater and indirectly affect 2,444 acres.

The UPRR alignment through the Central Valley would have the potential to encounter groundwater because the whole Central Valley is underlain by groundwater. This alignment would be within the San Joaquin Valley groundwater basin. Through the Central Valley, this alignment would be constructed at-grade, on cut and fill, or on embankment with some aerial structures. The potential to encounter groundwater would be limited to locations where aerial structure column support footings would be required. Impacts on groundwater recharge would also be low due to the overall footprint of the HST and permeable track-fill. The UPRR alignment has the potential to directly impact approximately 607 acres of groundwater and indirectly affect 2,123 acres.

Stations

Each of the station location options would have the potential to encounter groundwater, in particular where stations are elevated on structures or in tunnel, such as the Transbay Transit Center. For elevated stations, the potential to encounter groundwater would be limited to locations where aerial structure column support footings would be required. Construction and operation of the Transbay Transit Center underground may require dewatering.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Minimize development of facilities in areas that may have substantial groundwater discharge or affect recharge.
2. Apply for, obtain, and comply with conditions of applicable waste discharge requirements as part of project-level review.
3. Develop facility designs that are elevated, or at a minimum are permeable, and would not affect recharge potential where construction is required in areas of potentially substantial groundwater discharge or recharge.
4. Apply for and obtain a Storm Water Pollution Prevention Plan for grading, with Best Management Practices that would control release of contaminants nears areas of surface water or groundwater recharge. Best Management Practices may include constraining fueling and other sensitive activities to alternative locations, providing drip plans under some equipment, and providing daily checks of vehicle condition.
5. Use and retain native materials with high infiltration potential at the ground surface in areas that are critical to infiltration for groundwater recharge.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level.

4.14 Biological Resources and Wetlands

For purposes of assessing the Bay Area to Central Valley HST direct impacts to biological resources, a GIS analysis was completed for the approximate footprint of the facilities, called the representative facility footprint. This was defined to be 100 feet total width along the alignment both at-grade and on aerial structures. To capture the HST system's potential for indirect effects on species and habitats due to

noise, light, or shadows, a larger area was evaluated. This larger area varied depending on the nature of the location. Sensitive habitat areas included a study envelope that was 2,000 feet in urban areas and 0.50 mile in rural areas and around station and facility areas in undeveloped areas, including biologically sensitive locations. Table 4-12 lists the biological resource and wetland impacts by alignment and station.

Impact 1. Impacts to Sensitive Habitat and Vegetation Communities

Sensitive vegetation communities are natural communities and wildlife habitat that are unique, of relatively limited distribution in a region, or of particularly high wildlife value. The HST system could directly impact approximately 254 acres of sensitive vegetation out of the approximately 1,450 acres of land affected. The HST system could also fragment existing habitats. Additionally, the HST system could indirectly impact approximately 15,755 acres of sensitive vegetation out of the approximately 72,900 acres of land affected. The sensitive vegetation acreage is based on the buffer areas included in the HST study area, which were designed to provide context to the impacts analysis.

Alignment

The area from San Francisco to San Jose is mostly urbanized with little sensitive habitat. This alignment could have direct impacts on 5 acres of sensitive vegetation communities including seasonal wetlands and indirectly affect 138 acres.

The footprint of the alignment from San Jose to the Central Valley could have direct impacts on 207 acres of sensitive vegetation communities including oak woodlands, grasslands, riparian habitat, and seasonal and permanent freshwater wetlands. The alignment could also adversely impact approximately 11,895 acres of these sensitive vegetation communities, primarily grasslands. The footprint of this alignment encompasses approximately 670 acres and the indirect study area includes 35,200 acres.

The UPRR alignment through the Central Valley could have direct impacts on 42 acres of sensitive vegetation communities and habitat including grasslands and permanent freshwater wetlands. Indirect impacts on sensitive vegetation communities and habitat could occur on 3,722 acres including grasslands, oak woodlands, riparian habitat, and seasonal and permanent freshwater wetlands. The footprint of this alignment encompasses approximately 530 acres and the indirect study area includes 26,680 acres.

Stations

Given the urban settings for the station locations, none are anticipated to directly or indirectly affect sensitive vegetation communities or habitats.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Use large diameter tunnels as part of the design to limit surface access needs in tunnels for ventilation or evacuation, as a method to avoid or limit impacts to vegetation and habitat above tunnels.

3. Use in-line construction (i.e., use new rail infrastructure as it is built) in ecological sensitive areas to transport equipment to/from the construction site and to transport excavated material away from the construction to appropriate re-use or disposal sites to minimize impacts from construction access roads on sensitive vegetation/habitat.
4. Accomplish necessary geologic exploration in sensitive areas by using helicopters to transport drilling equipment and for site restoration to minimize surface disruption.
5. Use and reuse excavated materials within the confines of the project.
6. Participate in or contribute to existing or proposed conservation banks or natural management areas, including possible acquisition, preservation, or restoration of habitats.
7. Revegetate/restore impacted areas, with a preference for on-site mitigation over off-site, and with a preference for off-site mitigation within the same watershed or in close proximity to the impact where feasible.
8. Comply with the Biological Resources Management Plan(s) developed or identified during project-level studies that specify the design and implementation of biological resources mitigation measures, including habitat replacement and revegetation, protection during construction, performance (growth) standards, maintenance criteria, and monitoring requirements, as reviewed by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and U.S. Army Corps of Engineers (USACE).
9. Conduct pre-construction focused biological surveys and map on construction drawings.
10. Conduct biological construction monitoring.
11. Undertake plant relocation, seed collection, plant propagation, and outplanting at suitable mitigation sites.
12. Prevent the spread of weeds and invasive species during construction and operation by identifying areas with existing weed/invasive species problems and measures to control traffic moving out of those areas such as cleaning construction vehicles or limiting the movement of fill.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 2. Impacts to Wildlife Movement Corridors

Wildlife movement/migration corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. These corridors are important for species survival. The HST system has the potential to affect wildlife movement/migration corridors where the alignment crosses wildlife movement corridors. In addition, fences that will be required for at-grade tracks will introduce a new barrier to animal movement. The actual impact will depend on the selection of final alignment and the final design of structures for the HST system.

Alignment

The area from San Francisco to San Jose is urbanized. All of the riparian and stream corridors between the Santa Cruz Mountains and the San Francisco Bay provide corridors for wildlife movement. There could be impacts on these streams and riparian corridors. The western shore of the San Francisco Bay provides a critical movement corridor for nesting and foraging birds and other wildlife, but impacts on the western side of the San Francisco Bay are expected to be minimal.

The streams, and associated riparian habitats, flowing from the Diablo Range and the Santa Cruz Mountains that would be crossed by the Pacheco alignment provide movement corridors for fish and wildlife species. The alignment would bisect movement corridors through the Diablo Range. Because the alignment would be elevated over drainages, it is not anticipated to impact the major drainages, such as Coyote Creek, the Pajaro River, Tres Pinos Creek, the Pacheco Creek, and other drainages, which provide wildlife movement corridors.

The Henry Miller alignment would bisect the major San Joaquin kit fox movement corridor between the southern portion of its range and the northern portion of its range along the west side of the San Joaquin Valley. This alignment also crosses the San Joaquin River, which is a movement corridor for fish and bird species.

The UPRR alignment alternative would bisect an east-west linkage corridor between the natural lands of the Central Valley (near the GEA and wildlife refuges) with the natural lands along the eastern side of the San Joaquin Valley.

Stations

None of the stations are anticipated to impact wildlife movement corridors

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Construct species specific appropriately sized wildlife underpasses, bridges, and/or large culverts, to facilitate known wildlife movement corridors.
2. Ensure that wildlife crossings are of a design, shape, and size to be sufficiently attractive to encourage wildlife use.
3. Provide appropriate vegetation to wildlife overcrossings and undercrossings to afford cover and meet other species requirements.
4. Establish functional corridors to provide connectivity to protected land zoned for uses that provide wildlife permeability.
5. Design protective measures for wildlife movement corridors using the following process in consultation with resource agencies:
   - Identify the habitat areas the corridor is designed to connect
   - Select several species of interest from the species present in the area
   - Evaluate the relevant needs of each selected species
   - For each potential corridor, evaluate how the area will accommodate movement by each species of interest
   - Draw the corridors on a map
   - Design a monitoring program
6. Utilize existing transportation corridors and rail lines to minimize potential impacts.
7. Use aerial structures or tunnels to allow for unhindered crossing by wildlife.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 3. Impacts to Non-wetland Jurisdictional Waters

The HST system has the potential to directly affect approximately 20,300 linear feet of non-wetland waters (lakes, rivers, streams, and other water bodies) and indirectly affect up to 100,000 linear feet of non-wetland waters.

Alignment

From San Francisco to San Jose the alignment has the potential to impact approximately 1,262 linear feet of non-wetland waters. This alignment is in proximity to the western shore of the San Francisco Bay and crosses several water resources, including Oyster Point Channel, San Mateo Creek, San Francisquito/Los Trancos Creek, Matadero Creek, Adobe Creek, and other small streams.

The San Jose to Central Valley alignment has the potential to directly impact approximately 2,548 linear feet of potential non-wetland waters. The Pacheco portion of the alignment would cross or be adjacent to a number of water resources, including Coyote Creek, Los Gatos Creek, Miller Slough, and the Pajaro River, and a number of other small streams. This Henry Miller portion of the alignment would cross the San Joaquin River, and a number of sloughs, and creeks.

The UPRR alignment through the Central Valley has the potential to directly impact approximately 7,161 linear feet of potential non-wetland waters which include the Stanislaus River, San Joaquin River, Tuolumne River, Merced River, Chowchilla River, and several other streams.

Stations

None of the stations are anticipated to non-wetland waters.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project level to reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Return degraded habitat to pre-existing conditions.
3. Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.
4. Enhance existing habitats by increasing one or more functions through activities such as plantings or non-native vegetation eradication.
5. Provide for passive revegetation by allowing a disturbed area to revegetate naturally.
6. Purchase credits in an existing wetlands or aquatic habitat mitigation banks.
7. Provide in-lieu fee payments to an agency or other entity that will provide aquatic habitat conservation or restoration.
8. Prefer on-site mitigation over off-site mitigation, and for off-site mitigation prefer that it be located within the same watershed or as close in proximity to the area of impact as possible.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level.

Impact 4. Impacts to Wetlands

The HST system could directly impact 14.8 acres of wetlands. The study area for the HST system indicates there are 1,518 acres of wetlands in the study area that may be indirectly affected by the HST system.

Alignment

From San Francisco to San Jose the alignment has the potential to directly impact approximately 0.08 acre of wetlands and indirectly affect 152 acres of wetlands. This alignment is in proximity to the western shore of the San Francisco Bay and crosses several water resources, including Oyster Point Channel, San Mateo Creek, San Francisquito/Los Trancos Creek, Matadero Creek, Adobe Creek, and other small streams.

The San Jose to Central Valley alignment has the potential to directly impact approximately 11.6 acres of wetlands and indirectly affect 1,230 acres of wetlands. The alignment would cross or be adjacent to Coyote Creek, Los Gatos Creek, Miller Slough, Pajaro River, San Joaquin River, and a number of sloughs, and creeks.

The UPRR alignment through the Central Valley has the potential to directly impact approximately 3.04 acres of wetlands and indirectly affect 136 acres of wetlands which include areas near rivers, streams, and vernal pools.

Stations

None of the stations are anticipated to wetlands.

Considering the thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project level to reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Return degraded habitat to pre-existing conditions.
3. Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.
4. Enhance existing habitats by increasing one or more functions through activities such as plantings or non-native vegetation eradication.
5. Provide for passive revegetation by allowing a disturbed area to revegetate naturally.
6. Purchase credits in an existing wetlands or aquatic habitat mitigation bank.
7. Provide in-lieu fee payments to an agency or other entity that will provide aquatic habitat conservation or restoration.
8. Develop and implement measures to address the “no net loss” policy for wetlands.

9. Prefer on-site mitigation over off-site mitigation, and for off-site mitigation prefer that it be located within the same watershed or as close in proximity to the area of impact as possible.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 5. Impacts to Marine and Anadromous Fishery Resources

The HST system has the potential to affect fishery resources during construction due to the need to cross streams and rivers. Construction activities could increase sediment loads in stormwater during rain, or be a source of chemicals, both of which could be released into creeks and harm aquatic resources.

Alignment

The San Francisco to San Jose, San Jose to Central Valley, and Central Valley alignments would each have the potential to impact marine/anadromous species.

Stations

None of the proposed stations for the Preferred Alternative would have the potential to impact marine/anadromous species.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Comply with the terms of a CDFG Streambed Alteration Agreement for work along banks of surface water bodies.
3. Implement a spill prevention and emergency response plan to handle potential fuel or other spills.
4. Incorporate bio-filtration swales to intercept runoff.
5. Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however sufficient information is not available at the programmatic level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 6. Impacts to Special-Status Species

The HST system could directly impact approximately 59 special-status plant species and 54 special-status wildlife species based on the representative facility footprint. Those species that are federally or state listed as threatened or endangered would be of special concern because of the protection afforded them under the federal Endangered Species Act and the California Endangered Species Act. The data in Table

4-12 identify species within the footprint of each alignment. However, species may occur in more than one alignment, therefore the data are not additive. The study area for the HST system indicates the possible presence of more than 130 special-status species that could be indirectly affected by the HST system. Some of these species could be affected by the construction and the operation of the HST system.

Alignment

From San Francisco to San Jose the alignment has the potential to affect 19 special-status plant species including the San Mateo thorn-mint, Tiburon Indian paintbrush, Marin western flax, Contra Costa goldfields, and the white-rayed pentachaeta. This alignment also has the potential to affect 31 special-status wildlife species including the Bay checkerspot butterfly, callippe silverspot butterfly, mission blue butterfly, Myrtle's silverspot butterfly, San Bruno elfin, California red-legged frog, California tiger salamander, San Francisco garter snake, Brown Pelican, California black rail, California clapper rail, California least tern, and the salt marsh harvest mouse. The alignment from San Francisco to San Jose could also adversely impact the South San Francisco Bay Core Area identified in the *Recovery Plan for the California Red-legged Frog* (U.S. Fish and Wildlife Service 2002).

The alignment from San Jose to the Central Valley could adversely affect the habitat of an additional 35 special-status plant species, including succulent owl's-clover, Coyote ceanothus Hoover's spurge, Santa Clara Valley dudleya, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Metcalf Canyon jewel-flower, showy Indian clover, and Greene's tuctoria. This alignment also has the potential to affect an additional 21 special-status wildlife species including the valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, blunt-nosed leopard lizard, giant garter snake, American peregrine falcon, least Bell's vireo, Swainson's hawk, willow flycatcher, riparian (San Joaquin Valley) woodrat, riparian brush rabbit, and the San Joaquin kit fox.

The UPRR alignment in the Central Valley could adversely affect an additional five special-status plant species including the palmate-bracted bird's beak and two additional special-status wildlife species including the conservancy fairy shrimp.

Stations

The Transbay Transit Center could adversely affect the habitat of one special-status plant species, the beach layia. A potential Mid-Peninsula station option at Palo Alto (Caltrain) and San Jose (Diridon) station option could adversely affect the habitat of the California tiger salamander. The San Jose (Diridon) station could also adversely affect the habitat of the robust spineflower. The Gilroy (Caltrain) station could adversely affect the habitat of the showy Indian clover. The Modesto (Downtown) station could adversely affect the valley elderberry longhorn beetle, and the Merced (Downtown) station could adversely affect the giant garter snake.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Relocate sensitive species.
3. Conduct seed collection and plant propagation for sensitive plant species.
4. Conduct pre-construction focused surveys and map on construction drawings.

5. Conduct biological construction monitoring.
6. Restore suitable breeding and foraging habitat.
7. Purchase credits from an existing mitigation bank.
8. Participate in an existing Habitat Conservation Plan.
9. Phase construction to avoid the breeding season for sensitive wildlife species.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 7. Impacts to Protected Habitats and Conservation Areas

The HST system could directly impact protected habitat areas and areas identified for conservation.

Alignment

The alignment from San Francisco to San Jose is not anticipated to impact protected habitat areas or areas identified for conservation.

The alignment from San Jose to the Central Valley would traverse lands that have been protected by the Nature Conservancy as part of its Mount Hamilton Project and could have adverse impacts on these lands. It would also extend through the CDFG-managed Upper Cottonwood Creek Wildlife Area resulting in adverse impacts where the alignment is not in tunnel. The Henry Miller portion of the alignment would adversely impact a portion of the 240,000 acre Grassland Ecological Area (GEA) which contains a unique assemblage of migratory birds, sensitive species, wetlands, and habitat values.

The UPRR alignment in the Central Valley is not anticipated to impact protected habitat areas or areas identified for conservation.

Stations

None of the station options are anticipated to impact protected habitat areas or areas identified for conservation.

Considering the CEQA thresholds of significance in the Partially Revised Final Program EIR, the impact is considered significant when viewed on a region-wide basis.

Mitigation Strategies

The Authority finds that the following mitigation strategies, identified for impacts to the GEA, can be refined and applied at the project-specific level to reduce this impact:

1. Conduct focused surveys within areas of the GEA directly affected by proposed HST tracks or facilities, including sensitive habitats, and special-status plant and wildlife species.
2. Conduct project-level evaluations of biological resources in the GEA to determine impacts from HST construction, operation and maintenance, including, but not limited to, ecosystem fragmentation impacts, impacts to wildlife movement corridors, impacts to waterfowl flight patterns, noise impacts, startle and vibration impacts, collision impacts, electrocution impacts, glare impacts, water quality and water flow impacts, impacts on waterfowl nesting and breeding areas, impacts on migratory habits, impacts from construction traffic, impacts of equipment

storage and laydown areas, impacts from blasting and pile-driving, and impacts from temporary disruption of water supply deliveries.

3. Minimize the footprint of necessary HST facilities to the extent feasible in the HST alignment crossing the GEA.
4. The Authority commits to construct an elevated structure along a three-mile portion of Henry Miller Road to minimize impacts on sensitive areas, including wetlands and habitat.
5. Consult with CDFG, USFWS, and the Grassland Water District, on the timing of construction activities within the GEA and in developing measures to minimize disturbance during nesting and flooding seasons.
6. Consult with CDFG, USFWS, and the Grassland Water District, on non-glare and directed lighting and appropriate measures to avoid disturbance impacts to sensitive species in areas of the GEA directly affected by proposed HST facilities.
7. The Authority, or other entities designated and supported by the Authority will acquire, from willing sellers, agricultural, conservation and/or open space easements encompassing at least 10,000 acres and generally located along or in the vicinity of the HST alignment and within or adjacent to the designated GEA. The focus for these easements will be in areas undergoing development pressures, such as the areas around Los Banos and Volta, and/or areas that would be most appropriate for ecological conservation or restoration. The eventual locations and total acreage for these easements would be determined in consultation with the CDFG, the USFWS, and the Grassland Water District and in conjunction with project-level decisions addressing the Gilroy to Merced portion of the HST system.

These specific measures were developed to address the following goals:

- Satisfy the future project level requirements of the resource agencies (e.g., CDFG, USFWS, and USACE) to offset impacts to wetlands, sensitive plant and wildlife species, and other biological resources in and around the GEA and other areas along the alignment (as indentified in Impacts 1 through 4, 6, and 7 above);

- Anticipate future pressures for growth in and around the GEA and provide a mechanism to prevent further impacts by forestalling that growth and preserving the habitat and scenic open space values in and around the GEA; and

- Provide assurance that project-level impacts will be evaluated at the appropriate level of detail.

Refer to Mitigation Strategies identified in section 4.15, Public Parks and Recreation Resources, regarding Upper Cottonwood Creek Wildlife Area.

The Authority finds that the mitigation strategies described above will be very likely to substantially lessen this impact. The Authority further finds that the mitigation strategies described above offer the added benefit of supporting conservation of wetlands and sensitive ecological areas and limiting urban encroachment in the vicinity of the HST through the GEA in a manner that would not be available through other foreseeable means. Sufficient information is not available at the program level, however, to conclude with certainty that mitigation will necessarily reduce this impact to a less-than-significant level. Project-level details are needed to reach this conclusion, such as the precise location of the HST tracks, precise species data to be gathered through site-specific surveys, and information about the willingness of land owners in different locations to participate in conservation easements. Accordingly, at the program level, and out of an abundance of caution, the Authority finds this impact remains significant at the programmatic level even with the adoption of mitigation strategies.

Table 4-12
Biological Resource Summary Data Table for Preferred Alternative Alignments and Station Location Options

Corridor	Preferred Alignment	Sensitive Vegetation Communities (Acres)	Number of Special-Status Plant Species*	Number of Special-Status Wildlife Species*	Wildlife Movement Corridor	Non-Wetland Waters (Linear Feet)	Wetlands (Acres)	Marine/ Anadromous Fish Resources	Protected Habitat / Areas of Conservation
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	5 direct 138 indirect	19	30	West side of San Francisco Bay and riparian and stream corridors	590	0.08 direct 148 indirect	Yes	-
	Dumbarton to San Jose	-	5	18		672	0 direct 4 indirect	Yes	
San Jose to Central Valley: Pacheco Pass	Pacheco	75 direct 4,895 indirect	23	24	Between Santa Clara Valley and San Joaquin Valley	1,960	0.11 direct 44 indirect	Yes	Mount Hamilton Project (TNC), Upper Cottonwood Creek Wildlife Area (CDFG)
	Henry Miller (UPRR Connection)	132 direct 7,000 indirect	25	33	Along west side of San Joaquin Valley and San Joaquin River	10,588	11.61 direct 1,186 indirect	No	Grassland Ecological Area
Central Valley	UPRR N/S	42 direct 3,722 indirect	22	22	East-west linkage between valley natural lands and natural lands along east side of San Joaquin valley	7,161	3.04 direct 136 indirect	Yes	-
Station Location Options									
Transbay Transit Center		-	1	-	West side of San Francisco Bay and riparian and stream corridors	-	-	No	-
Millbrae/SFO		-	-	-		-	-	No	-
Potential Mid-Peninsula Station at Redwood City (Caltrain)		-	-	-		-	-	No	-

Table 4-12
Biological Resource Summary Data Table for Preferred Alternative Alignments and Station Location Options

Corridor	Preferred Alignment	Sensitive Vegetation Communities (Acres)	Number of Special-Status Plant Species*	Number of Special-Status Wildlife Species*	Wildlife Movement Corridor	Non-Wetland Waters (Linear Feet)	Wetlands (Acres)	Marine/ Anadromous Fish Resources	Protected Habitat / Areas of Conservation
Potential Mid-Peninsula Station at Palo Alto (Caltrain)		-	-	1		-	-	No	-
San Jose (Diridon)		-	1	1	Between Santa Clara Valley and San Joaquin Valley	-	-	No	-
Gilroy (Caltrain)		-	1	-		-	-	No	-
Modesto (Downtown)		-	-	1	East-west linkage between valley natural lands and natural lands along east side of San Joaquin valley	-	-	No	-
Merced (Downtown)		-	-	1		-	-	No	-

Note: * Special-status species may occur in more than one alignment; therefore the data are not additive.

4.15 Public Parks and Recreation Resources

To analyze the potential for the HST system to result in impacts to parks and recreation resources, including publicly owned parks, wildlife and waterfowl refuges, historic sites of national, state or local significance, and other recreational resources, the EIR examined the occurrence of these resources within 900 feet from the location of proposed HST facilities and considered both direct and proximity (indirect) impacts. The recreation resources identified in the analysis are covered by either section 4(f) of the federal Transportation Act or section 6(f) of the federal Land and Water Conservation Fund Act. The two referenced federal statutes require special efforts to be made in planning proposed transportation projects to avoid using and limit adverse impacts to publicly owned park and recreation lands and will require findings to be made by FRA in future project-level reviews to address federal statutory requirements. Impacts to historic resources from the HST system are addressed in section 4.11, Cultural and Paleontological Resources.

Impact 1. Impacts to Parks and Recreational Resources

The HST system could result in direct impacts to lands containing publicly owned parks and recreational resources by causing use of such lands for the placement of HST facilities, and could result in indirect impacts to these resources due to construction activities or HST system operations which adversely affect the use of publicly owned parks and recreational resources. In addition to addressing noise, biology, and air quality impacts in other sections of these Findings, the EIR identifies the park and recreational resources located within 900 feet of the centerline of HST alignments or facilities.

The strategies of placing the proposed HST system in or along existing transportation corridors (existing railroad or highway rights of way) or in a tunnel and of requiring stations to be multi-modal transit hubs serve to reduce the extent of land acquisition needed for the proposed HST system, and has minimized the potential for the HST system impacts to parks and recreational resources. Nearly two thirds of the preferred alternative alignment identified in the Final EIR is either within or adjacent to existing transportation corridors or in tunnel.

Table 4-13 provides a listing by distance category of state, regional, county, and local parks, recreational areas, playgrounds, fairgrounds, and wildlife areas within 900 feet of the Preferred Alternative alignment. As shown, 51 of these resources are within 900 feet of the alignment, and 19 are within 150 feet of the HST system. At the program level it is not possible to know precisely the location, extent and particular characteristics of impacts to park resources. Due to this uncertainty, for the purposes of region-wide review at the programmatic level, this impact is considered significant, particularly for those resources within 150 feet. A discussion of these resources by corridor and alignment is provided below.

Table 4-13
State, Regional, County, and Local Parks, Recreational Areas, Playgrounds, Fairgrounds, and Wildlife Areas Within 900 Feet of the Preferred Alternative Alignment

Corridor	Alignment	Segment	Proximity and Distance from Centerline	Potential for Significant Impact
San Francisco to San Jose: Caltrain	San Francisco to Dumbarton	Transbay Transit Center to Millbrae/SFO	<150 feet – Herman Street Park	High
			<450 feet – Bayshore Circle Park, Forest Lane Park, Lions Field Park, Bayside Park	Medium
			<900 feet – Bayview Playground, Lomita Park, San Bruno Mountain State & County Park	Low

Table 4-13
State, Regional, County, and Local Parks, Recreational Areas, Playgrounds, Fairgrounds, and Wildlife Areas Within 900 Feet of the Preferred Alternative Alignment

Corridor	Alignment	Segment	Proximity and Distance from Centerline	Potential for Significant Impact
		Millbrae/SFO to Redwood City	< 150 feet – Washington Park, Trinta Park, San Mateo County Fairgrounds	High
			< 450 feet – Village Park, Laguna Park, Alexander Park, Laureola Park	Medium
			< 900 feet – Martin Luther King Park, Central Park, Mezes Park	Low
	Dumbarton to San Jose	Dumbarton to Palo Alto	< 150 feet – Holbrook Palmer Park, El Camino Park	High
			< 450 feet – Burgess Park	Medium
		Palo Alto to Santa Clara	< 150 feet – Peers Park, Bowden Park, Rengstorff Park, Bracher Park	High
			< 450 feet – Robles Park, Rex Manor Park, Lafayette Park	Medium
			< 900 feet – Boulware Park	Low
		Santa Clara to Diridon Station	< 900 feet – Guadalupe Gardens	Low
San Jose to Central Valley: Pacheco Pass	Pacheco	Diridon to Morgan Hill	< 150 feet – Edenvale Garden Park, Coyote Creek Park	High
			< 450 feet – Biebrach Park	Medium
			< 900 feet – Danna Rock Park	Low
		Morgan Hill to Gilroy	< 900 feet – Miller Park, Forest Street Park	Low
		Gilroy to San Luis Reservoir	< 150 feet – Upper Cottonwood Wildlife Area	High
	Henry Miller (UPRR Connection)	San Luis Reservoir to Valley Floor	No 4(f) or 6(f) resources within 900 feet of the segment.	Not Applicable
		Western Valley to Henry Miller UP Wye	< 150 feet – Los Banos Wildlife Area	High
Central Valley	UPRR	BNSF/UPRR South to Modesto	< 150 feet – County Park	High
			< 450 feet – Highway Village Park, JM Pike Park	Medium
			< 900 feet – Salida Park	Low
		UPRR Modesto South – Western Option	< 150 feet – Tuolumne River Regional Park	High
		South Modesto to BNSF Connection	< 150 feet – Stanislaus County Fairgrounds, Broadway Park, Central Park	High
			< 450 feet – Riverdale Fishing Access Park, Independence Park, Whitmore Park	Medium
			< 900 feet – Redwood Park	Low

Table 4-13
State, Regional, County, and Local Parks, Recreational Areas, Playgrounds, Fairgrounds, and Wildlife Areas Within 900 Feet of the Preferred Alternative Alignment

Corridor	Alignment	Segment	Proximity and Distance from Centerline	Potential for Significant Impact
		BNSF Connection South to Merced	No 4(f) or 6(f) resources within 900 feet of the segment.	Not Applicable
		Merced South to Henry Miller Wye	< 450 feet -- Joe Herb Park	Medium
Station Location Options				
Transbay Transit Center		No 4(f) or 6(f) resources within 900 feet		Not Applicable
Millbrae/SFO				
Potential Mid-Peninsula Station at Redwood City (Caltrain)				
Potential Mid-Peninsula Station at Palo Alto (Caltrain)				
San Jose (Diridon)				
Gilroy (Caltrain)				
Modesto (Downtown)				
Merced (Downtown)				

Alignment

For the Caltrain Corridor, the Preferred Alternative Alignment contains a variety of Section 4(f) and 6(f) resources between San Francisco and Dumbarton, including approximately 18 local parks within 900 feet that could be affected. This alignment alternative could directly affect up to four Section 4(f) and 6(f) resources within 150 feet. From Dumbarton to San Jose, there are a variety of Section 4(f) and 6(f) resources, including approximately 12 regional and local parks within 900 feet of the HST alignment. Approximately six 4(f) resources adjacent to the corridor could be directly affected by the Dumbarton to San Jose alignment alternative. This alignment would be in the existing railroad corridor as it passes most of these resources between the cities of San Francisco and San Jose, and it is not likely to have a significant impact on 4(f) or 6(f) resources.

For the San Jose to Central Valley Corridor, approximately seven Section 4(f) and 6(f) resources are within 900 feet of the alignment between San Jose and the Central Valley floor. Three of the resources (Edenvale Garden and Coyote Creek parks north of Gilroy and the Upper Cottonwood Wildlife Area west of Interstate 5) could be directly affected by the HST because they are within 150 feet. There would be no impacts to nearby Henry Coe State Park because it is not within 900 feet of the alignment alternative, with State Route 152 acting as a barrier between the HST alignment and the park.

East of the San Luis Reservoir, there is one Section 4(f) resources (San Luis Wildlife Refuge and Los Banos Wildlife Area) along the Henry Miller alignment alternative that begins just north of the San Luis Reservoir and traverses east to the City of Merced. The proposed alignment alternative would pass north of the O'Neil Forebay Wildlife Area and continue north and parallel of Henry Miller Road,

north of the City of Los Banos. There would be no impacts to Pacheco State Park, the San Luis Reservoir Wildlife Area, O'Neil Forebay Wildlife Area, the San Luis State Recreation Area, or the Lower Cottonwood Wildlife Area surrounding the San Luis Reservoir. The Volta Wildlife Area near Los Banos would also not be impacted because the alignment alternative would be beyond 900 feet of the wildlife area's southern boundary.

For the Central Valley Corridor, there are approximately 13 Section 4(f) and 6(f) resources within 900 feet of the UPRR alignment. The alignment has the potential to directly affect five Section 4(f) and one Section 6(f) resources, including the Tuolumne Regional Park, County Park in Salida, the Stanislaus County Fairgrounds, and Broadway and Central Parks in Turlock. Five additional resources have the potential to be indirectly affected by the alignment alternative.

Stations

None of the stations are anticipated to have an impact on Section 4(f) or Section 6(f) resources within 900 feet of the sites.

This impact is considered significant at the program level.

Mitigation Strategies

The Authority finds that the following mitigation strategies can be refined and applied at the project-specific level to reduce these impacts:

1. Continue to apply design practices to avoid impacts to park resources, and when avoidance cannot be accommodated, minimize the scale of the impact.
2. Apply measures at the project level to reduce and minimize indirect/proximity impacts as appropriate for the particular sites affected, while avoiding other adverse impacts (e.g., visual), such as noise barriers, visual buffers, and landscaping.
3. Apply measures to modify access to/egress from the recreational resource to reduce impacts to these resources.
4. Design and construct cuts, fill, and aerial structures to avoid and minimize visual impacts to units of the state park system.
5. Incorporate wildlife under or over crossings at appropriate intervals as necessary.
6. Where public parklands acquired with public funds would be acquired for nonpark use as part of the HST system, commit as required by law to providing funds for the acquisition of substantially equivalent substitute parkland or to acquiring/providing substitute parkland of comparable characteristics.
7. Restore affected parklands to natural state and replace or restore affected park facilities.
8. If park facilities must be relocated, provide planning studies as well as appropriate design and replacement with minimal impact on park use.
9. Use local native plants for revegetation.
10. Develop and implement construction practices, including scheduling, to limit impacts to wildlife, wildlife corridors, and visitor use areas within public parks.
11. For temporary unavoidable loss of park and recreation facility uses, consider providing compensation.

The mitigation strategies described above would substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation

would reduce this impact to a less-than-significant level in all circumstances. Therefore, at the programmatic level, the Authority finds that the potential for impacts to parks and recreational facilities remains significant even with application of mitigation strategies.

Planning efforts would be undertaken as a part of the project-level documentation phase to minimize harm to the Section 4(f) and 6(f) resources. This is anticipated to include measures that may be taken to mitigate potential adverse environmental impacts, such as beautification measures, replacement of land or structures or their equivalents on or near their existing site(s), tunneling, cut and cover, cut and fill, treatment of embankments, planting, screening, creating wildlife corridors, acquisition of land for preservation, installation of noise barriers, and establishment of pedestrian or bicycle paths. Other potential mitigation strategies could be identified during the project-level public review process.

4.16 Impacts to Freight Operations

In the San Francisco to San Jose Corridor, there are 19 freight leads and spurs. It is the intent of the Authority that UPRR would retain its current trackage rights in this corridor, and that the future use of the spurs would not be precluded. In areas such as South San Francisco where it may be necessary to relocate the UPRR's yard operations, additional right-of-way outside of the existing Caltrain corridor may be required. It is intended that the current utility would be maintained for freight operations. UPRR rail spurs would most likely be reconfigured to remain within the existing Caltrain or UPRR right-of-way on the corridor. Minor additional strips of right-of-way may be required to accommodate the freight spur moves.

In the San Jose to Central Valley Corridor, ten spurs were identified in this corridor, all located between Diridon Station in San Jose and just south of Gilroy, near Carnadero Junction. The HST alignment would run west of the existing Caltrain/UPRR tracks to the Caltrain Tamien Station, and east of the existing tracks to Lick, in the Caltrain/PCJPB-owned right-of-way from Diridon Station to Lick. In crossing over freight and passenger tracks the HST would be on an aerial alignment with no interference to the existing tracks. At Lick, which is the beginning of the UPRR ownership of the right-of-way, the HST alignment would run adjacent to the east side of the UPRR right-of-way. This alignment would be on aerial structure to pass over a spur in Morgan Hill and three in Gilroy, but run at grade across one spur north of Gilroy, severing it from the UPRR.

In the Central Valley Corridor, the UPRR N/S alignment alternative, from Stockton to Fresno County would follow the UPRR and SR-99 for its entire distance. It would generally run at grade on the west side of the UPRR, but crosses to the east side near the junction with the line running east-west in Chowchilla. There are about 35 locations where a junction or spur leaves the UPRR mainline. In about half the cases, the HST alignment would run on the same side of the UPRR, but in Keyes, Turlock, Atwater, Chowchilla and Madera, the HST would be elevated to alleviate conflicts with the freight operations, leaving only spurs in French Camp (1), Ripon (2), Salida, Downtown Modesto (3), the junction with a branch line just south of Modesto, an industrial spur in south Chowchilla, north Madera and south of downtown Madera in conflict with the HST. The remaining half of the spurs and junctions would be on the opposite side of the UPRR mainline from the HST alignment. Figure 4-6 shows a silo served by a spur from the UPRR. The HST alignment would be elevated to pass over the spur, allowing uninterrupted access from the mainline to the facility.

Based on the CEQA thresholds of significance in the Partially Revised Final Program EIR, the HST alignment alternatives are not expected to result in significant adverse effects to UPRR freight operations. At the program level, however, sufficient uncertainty exists about the precise design practices to avoid impacts and their effectiveness across all portions of the alignment alternatives that this impact must be considered potentially significant out of an abundance of caution.

Mitigation Strategies

The following mitigation strategies will ensure that the Authority avoids and/or minimizes creating impacts to UPRR freight operations:

- HST alignments will be designed so as not to be located on UPRR operating rights of way where feasible. HST alignments will be grade separated from UPRR rights-of-way at those locations where HST alignments would need to cross over or under UPRR operating rights-of-way.
- HST alignments will be designed to minimize impacts to existing UPRR business-serving spurs where feasible. The Authority will work with UPRR to identify those locations where design of the HST alignment may affect these business-serving spurs and evaluate with UPRR the following options, and other options that UPRR may present:
    - The HST alignment will be grade-separated (trench, tunnel, or aerial) from the UPRR spur.
    - If possible, the spur will be reconstructed so as to reduce or eliminate the impact of HST operations on existing freight service.
    - the Authority will negotiate with UPRR and consider such options as may be suggested by UPRR to accommodate individual freight customer needs.
- Construct grade separation in the form of an HST aerial flyover or underpass to preserve access to existing rail spurs and branch lines.
- Consolidate consecutive spur tracks that occur over a short distance to minimize the need for multiple grade separations.
- Relocate team tracks to the opposite side of the UPRR in locations where they conflict with HST.
- For silo or quarry operations, provide new loading/unloading facilities with augers and conveyors that pass over or under the HST alignment to a siding on the UPRR mainline that alleviates the need for a UPRR spur to cross the HST.
- To the extent possible, the schedule for construction will be coordinated with existing rail operators to minimize impacts to existing operations.

The Authority finds that the foregoing mitigation strategies will avoid or minimize adverse impacts to UPRR freight operations and that with mitigation, the impact is less than significant.

5 CUMULATIVE IMPACTS

Impact 1. Impacts on Traffic, Circulation, and Transit

- Implementation of the HST system could lead to a considerable contribution to the cumulative traffic and transit impact.
- Mitigation strategies described in section 4.1, Traffic, Circulation and Transit, will reduce this impact.
- The Authority finds that the mitigation strategies will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered cumulatively considerable.

Impact 2. Impacts on Air Quality

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to air quality within the two air basins in the study area. Local adverse air quality impacts related to traffic could occur near HST stations.
- Mitigation strategies described in section 4.2, Air Quality, will reduce this impact.
- The Authority finds that the mitigation strategies will reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 3. Impacts on Noise and Vibration

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to noise and vibration.
- Mitigation strategies described in section 4.3, Noise and Vibration, will reduce this impact.
- The Authority finds that the noise mitigation strategies will reduce the HST system's contribution to these noise impacts to less than cumulatively considerable.
- The Authority finds that the mitigation strategies will substantially lessen or avoid this vibration impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered cumulatively considerable.

Impact 4. Energy Impacts

- Construction of the HST system potentially would represent a significant use of nonrenewable resources and could lead to a considerable contribution to a cumulative impact related to energy.
- Mitigation strategies described in section 4.4, Energy, will reduce this impact.
- The Authority finds that the mitigation strategies will reduce the HST system's contribution to these impacts to less than cumulatively considerable.

Impact 5. Land Use Impacts

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to land use compatibility.
- Mitigation strategies described in section 4.6, Land Use, will reduce this impact.
- The Authority finds that the mitigation strategies will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. The Authority finds that to the extent that other projects contribute to this impact they are within the purview of local government agencies to address with local planning and additional mitigation measures, but at the program level, such additional measures and the process for their implementation cannot be determined. Therefore, for purposes of this programmatic EIR, the impact is considered cumulatively considerable.

Impact 6. Impacts on Agricultural Lands

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to the conversion of agricultural land to non-agricultural use and severance of agricultural land.
- Mitigation strategies described in section 4.7, Agricultural Lands, will reduce this impact.
- The Authority finds that the mitigation strategies will reduce the HST system's contribution to agricultural land conversion to less than cumulatively considerable. The Authority further finds that the mitigation strategies will substantially lessen or avoid severance impacts; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, the agricultural land severance impact is considered cumulatively considerable.

Impact 7. Impacts on Aesthetics and Visual Resources

- Implementation of the HST system could lead to a considerable contribution to the short- and long-term cumulative impact related to visual resources (particularly scenic resources, areas of historical interest, natural open space areas, and significant ecological areas).
- Mitigation strategies described in section 4.8, Aesthetics and Visual Resources, will reduce this impact.
- The Authority finds that the mitigation strategies will avoid or substantially lessen impacts; however, because of the size of the project and absence of site-specific information related to the types of terrain affected and facilities design, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 8. Impacts on Public Utilities

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to public utilities and future land use opportunities because of right-of-way needs, extensive utility relocation, and property restrictions associated with construction of multiple linear facilities and other reasonably foreseeable future projects.
- Mitigation strategies described in section 4.9, Public Utilities, will reduce this impact.

- The Authority finds that the mitigation strategies will avoid or reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 9. Impacts on Cultural and Paleontological Resources

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to cultural and paleontological resources.
- Mitigation strategies described in section 4.11, Cultural and Paleontological Resources, will reduce this impact.
- The Authority finds that the mitigation strategies will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 10. Impacts on Geology and Soils

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact to geology and soils related to slope stability in various proposed locations of cut-and-fill and areas susceptible to slope failure; and subsidence if other projects under construction in the area also needed to dewater from the same drainage basin.
- Mitigation strategies described in section 4.12, Geology and Soils, will reduce this impact.
- The Authority finds that the foregoing mitigation strategies will reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 11. Impacts on Hydrology and Water Resources

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to hydrology and water resources.
- Mitigation strategies described in section 4.13, Hydrology and Water Resources, will reduce this impact.
- The Authority finds that the foregoing mitigation strategies will reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 12. Impacts on Biological Resources and Wetlands

- Implementation of the HST Alternative could lead to a considerable contribution to the cumulative impact related to sensitive biological resources and wetlands.
- Mitigation strategies described in section 4.14, Biological Resources and Wetlands, will reduce this impact.
- The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 13. Impacts on Public Parks and Recreation Resources (Section 4(f) and 6(f) Resources)

- Implementation of the HST system could lead to a considerable contribution to the cumulative impact of indirect effects related to parklands and recreational resources.
- Mitigation strategies described in section 4.15, Public Parks and Recreation Resources, will reduce this impact.
- The Authority finds that the mitigation strategies will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 14 Impacts to Freight Operations

- The HST system will be designed to avoid and minimize effects on UPRR freight operations.
- Mitigation strategies are described in section 4.16, Freight Operations, to avoid and minimize any impact.
- The Authority finds that the foregoing mitigation strategies will reduce the HST system's contribution to this impact to less than cumulatively considerable.

6 GROWTH-INDUCING IMPACTS

Transportation investments can lead to reduced travel time or cost, improved accessibility to regions or parts of regions, and reduced accidents or air pollution. These effects contribute to economic growth by allowing time and money previously spent on travel to be used for other purposes, attracting businesses and residents to places with increased accessibility or improved quality of life, and reducing overall costs to society. The population and employment growth that result from economic growth comprise the growth-inducing effects of transportation investments such as the HST system. This growth can contribute additional effects on human and natural resources beyond those directly attributable to the changes in the transportation system, which the EIR refers to as growth-related indirect impacts.

6.1 Growth-Inducing Effects of the HST System Alternative

The EIR's discussion of growth-inducing impacts was based the TREDIS[2] macroeconomic simulation model, which estimates the economic impact of transportation investments on business output, business attraction, employment, and population. Transportation demand, travel times and costs by mode were assembled by the newly developed California Statewide High-Speed Rail Travel Demand Model, with additional transportation performance information. The analytical process considered the potential effects that changes in transportation congestion and delay between existing conditions and future years would have on the state's economic growth. The process also modeled several dimensions of growth and spatial reallocation that could occur under and considered possible impacts of the proposed HST system on jobs, population, and land development.

The following summarizes the analysis in the Partially Revised Final Program EIR:

- **Population Effects**: Statewide population is expected to grow by about 33% between 2005 and 2030 under the No Project Alternative. Compared to the No Project Alternative, population under the Preferred Pacheco Pass Network Alternative (statewide system) is projected grow by approximately an additional 1.4%. Within the 11 county core study area, population is expected to grow by 44% between 2005 and 2030 under the No Project Alternative and an additional 1.6% with the HST system. Compared to the No Project Alternative, the population growth rate equates to an additional 502,000 people with HST. The population growth with HST represents the increased accessibility provided by the transportation investment. An investment in HST is projected to lead to greater economic growth within the state and core study area than the No Project Alternative.
- **Employment Effects**: Statewide employment is expected to increase by about 37% between 2002 and 2030 under the No Project Alternative. Compared to the No Project Alternative, statewide employment growth is projected to be roughly 1.5% higher under the Preferred Pacheco Pass Network Alternative (statewide system). Within the 11 county core study area, employment is expected to grow by 37% between 2005 and 2030 under the No Project Alternative and an additional 2% with the HST system. Compared to the No Project Alternative, the employment growth rate equates to an additional 320,000 jobs with HST. Job growth with HST is expected in the FIRE (Finance, Insurance and Real Estate), services, TCU (transportation, communications, and utilities), wholesale trade, and retail trade categories. This is further broken out to job growth in the TCU and trade sectors in the Central Valley and in San Diego, and in the FIRE and services sectors in the "rest of California." The FIRE and services sectors tend to be the most compatible for location in higher density settings, such as near potential HST sites where offices and retail development could be expected.

[2] The Transportation Economic Development Impact System (TREDIS) model is designed specifically to evaluate the full economic development impacts of multimodal transportation investments. For this analysis, TREDIS was run in conjunction with the ReDYN economic modeling system to capture full dynamic economic feedback.

- **Urbanized and Non-urbanized Areas**: Urbanized areas in the core study area are expected to grow by about 40% between 2002 and 2030 under the No Project Alternative. This growth would represent an increase of about 400,000 acres over today's 1.0 million acres within the core analysis counties. Compared to urbanized area growth under the No Project Alternative, urbanized area growth is expected to be 0.9% (9,000 acres) higher under the Preferred Pacheco Pass Network Alternative. As with the population and employment growth, the level of difference for urbanized area size is small compared to the overall level of growth represented by the No Project Alternative relative to the 2002 existing conditions. Noticeable differences in these general patterns can be seen for Madera and Merced Counties, both of which are projected to have sizable urbanization increases with the HST system compared to the No Project Alternative.
- **Location of Growth**: The EIR provided county-level population growth rates for the No Project Alternative and the Preferred Pacheco Pass Network Alternative (statewide system). The results show that with the HST system, incremental population growth is highest in Madera County, followed by Merced County, San Diego County, and the Southern San Joaquin Valley; incremental growth rates are lowest in Southern California (except San Diego County) and areas from San Joaquin County northward. Incremental employment growth with HST is highest in Madera and Merced Counties, followed by Fresno and Stanislaus Counties and the Southern San Joaquin Valley. The incremental job growth in the Northern Central Valley region with the HST system is oriented much more heavily toward FIRE and services (about 62% of total), with trade, and TCU accounting for about 27% of incremental growth. This is the largest shift in the nature of employment for any region and suggests that the HST system could be a strong influence in attracting higher-wage jobs to the Central Valley. Taken together, these results suggest that additional population growth under the HST system is driven by internal job growth due to the initiation of HST service, rather than due to long-term population shifts from the Bay Area and Southern California based on long-distance commuting.

In summary, the Preferred Pacheco Pass Network Alternative would stimulate additional growth relative to the No Project Alternative in many Central Valley counties between Sacramento and Fresno. The incremental employment effect is much larger than the incremental population effect in all Central Valley counties, suggesting that the HST system might be more effective at distributing employment throughout the state. Also, this result suggests that the Preferred Pacheco Pass Network Alternative would not stimulate large shifts in residential location from the Bay Area into the Central Valley.

- **Effect of Authority Station Area Development Policies**: When making decisions regarding both the final selection of station locations and the timing of station development, the Authority would consider the extent to which appropriate Station Area Plans and development principles have been adopted by local authorities. In addition to potential benefits from minimizing land consumption needs for new growth, dense development near HST stations will concentrate activity in areas conveniently located near stations. This would increase the utilization of the HST system, generating additional HST ridership and revenue to benefit the entire state. Reducing the land needed for new growth should reduce pressure for new development on nearby habitat areas and agricultural lands.

Denser development allowances would also enhance joint development opportunities at and near the station, which in turn could increase the likelihood of private financial participation in construction related to the HST system. A dense development pattern can better support a comprehensive and extensive local transit and shuttle system, bike[3] and pedestrian paths, and related amenities that can serve the local communities as well as provide access and egress to HST stations. The Authority's adopted policies would ensure that implementation of the HST in California would maximize station

[3] HST will include facilities to accommodate bicycles.

area development that serves the local community and economy while increasing HST ridership. HST station area development principles draw upon transit-oriented development (TOD) strategies that have been successfully applied to focus compact growth within walking distance of rail stations and other transit facilities. Applying TOD measures around HST stations is a strategy that works for large, dense urban areas, as well as smaller central cities and suburban areas. TOD can produce a variety of other local and regional benefits by encouraging walkable, bikable compact and infill development. Local governments would play a significant role in implementing station area development by adopting plans, policies, zoning provisions, and incentives for higher densities, and by approving a mix of urban land uses. Almost all TOD measures adopted by public agencies involve some form of overlay zoning that designates a station area for development intensification, mixed land uses, and improvements to the pedestrian/bicycle environment. TOD measures are generally applied to areas within one-half mile of transit stations, and this principal would be followed for HST stations.

The responsibility and powers needed to focus growth and station area development guidelines in the areas around high-speed stations are likely to reside primarily with local government. The primary ways in which the Authority can help ensure that the HST system becomes an instrument for encouraging maximizing implementation of station area development principles include:

- Select station locations that are multi-modal transportation hubs with a preference for traditional city centers.

- Adopt HST station area development policies and principles that require TOD, and promote value-capture at and around station areas as a condition for selecting a HST station site.

- Provide incentives for local governments where potential HST stations may be located to prepare and adopt Station Area Plans and to amend City and County General Plans that incorporate station area development principles in the vicinity of HST stations.

Using the mitigation strategies listed under Impact 1 of Section 4.6 above, the Authority will work with local governments and local planning processes on these issues.

6.1.1 Indirect Effects Related to Growth from the HST Alternative

The Preferred Pacheco Pass Network Alternative may have a positive (i.e., result in an increase), but small, statewide effect on population and employment growth compared to the No Project Alternative. At the sub-state level, San Joaquin Valley counties are projected to experience population and employment growth rates that are noticeably higher than the statewide average. Despite the relatively small magnitude of the expected statewide growth, the growth could contribute to indirect impacts on the human and natural environment. Many of these indirect, growth-related impacts derive from increased urbanization needed to accommodate the additional population and employment. In 2030, the total size of urbanized areas in the study area would be virtually the same under the proposed Preferred Pacheco Pass Network Alternative as under the No Project Alternative, although the HST system will lead to increased urbanization in Fresno, Madera, Merced, and Santa Clara Counties. Much of the potential incremental growth associated with the HST system is likely to be focused around HST stations because these locations would receive the highest accessibility benefit with HST service.

The following summarizes the analysis in the 2008 Final Program EIR:

- No indirect, growth-related impacts from implementing the HST system are expected to the following resource areas: noise and vibration; exposure to EMF or EMI; public utilities; exposure to hazardous materials or wastes; cultural resources; geology and soils; and public parks and recreation. Indirect aesthetic impacts from induced growth under the Preferred Pacheco Pass Network Alternative are considered speculative at the programmatic level.

- Overall traffic conditions are expected to improve with the HST system, despite the estimated 1.2% increase in study area population and employment under the Preferred Pacheco Pass Network Alternative. Some increase in local traffic around urban HST stations, consistent with this increased growth, is expected to be concentrated.
- Air quality is expected to improve with the HST system, however, the increased population and employment growth may contribute to increased mobile-source air pollutants due to increased traffic around stations.
- There are no significant differences in energy consumption expected statewide between the Preferred Pacheco Pass Network Alternative and the No Project Alternative when considering growth. However, the HST system could result in less overall demand for transportation energy, despite the expected small increase in growth with the HST system. The potential increased density in the vicinity of proposed HST station sites would limit the amount of energy required for construction of and access to future infrastructure projects, reduce demand for large-volume transportation-related infrastructure projects, and result in savings in building-related energy use. The projected population and employment distributive effect of the project could create the need for some change in the incremental development of overall energy and electricity generation and/or transmission capacity among regions and potentially require development of more incremental production and/or transmission capacity.
- Socioeconomic changes from growth under the Preferred Pacheco Pass Network Alternative are expected to be small, and therefore indirect land use compatibility impacts from induced growth are also expected to be small. Growth associated with the HST system would be distributed across various communities, would be reflected in infill development and increased development densities around stations, and is not expected to result in a significant increase in demand for municipal services. Planning for such services is within the purview of local and regional agencies and expected growth in the future would be within typical planning horizons for such services.
- Growth under the Preferred Pacheco Pass Network Alternative is expected to impact 6,000 acres, or about 3%, more of important farmland within the 11 county study area than the No Project Alternative due to urbanization. Within the study area, projected farmland losses beyond the No Project Alternative would include 3,500 acres of prime farmland, 800 acres of farmland of statewide importance, 1,300 acres of unique farmland, and 500 acres of farmland of local importance.
- Growth under the Preferred Pacheco Pass Network Alternative is expected to impact about 22 miles more of waterways within the 11 county study area than the No Project Alternative, or about 2% more. The largest percentage of this increase is expected to occur in Merced and Fresno counties.
- Growth under the Preferred Pacheco Pass Network Alternative has the potential to affect up to 2,600 acres more of land which may contain some threatened and endangered species habitat within the 11 county study area than the No Project Alternative. The largest percentage increase is expected to occur in the Bay Area, about 4% or 1,300 acres. Growth with the project has the potential to affect about 72 acres more of areas containing wetlands than the No Project Alternative, or less than 1% more. The largest acreage and percentage increase, 49 acres, is projected to occur in the Bay Area due to future urbanization.
- At the program level it is not possible to predict the specific location(s) where the increment of future growth related to the Preferred Pacheco Pass Network Alternative may occur or is likely to occur in order to recommend mitigation strategies to other agencies; nor is it within the purview of the Authority to adopt such strategies. Additionally, the size, scope and attributes of specific projects that may be proposed in the future cannot be predicted, nor can the outcome of public agency approval processes and the ultimate configuration of any approved projects be predicted. However, in addition to the general and specific plans adopted by local governments which address community and growth expectations, the general requirements of CEQA, the Endangered

Species Act, other measures required by the Department of Fish and Game and the permit requirements of other regulatory agencies can be expected to apply to both public and private projects in the future and to require avoidance and minimization strategies to reduce potentially significant impacts to environmental resources. These strategies can be expected to substantially reduce and avoid adverse environmental impacts to these resources.

7 FINDINGS ON RIDERSHIP FORECASTS AND THE NEED FOR FURTHER REVISION AND RECIRCULATION OF THE PROGRAM EIR

The Partially Revised Final Program EIR impacts analysis is based on forecasts of ridership that were developed by Cambridge Systematics, under contract to the Metropolitan Transportation Commission, between 2005 and 2007. General information about ridership forecasts was included in the 2007 Draft Program EIR, with references to more detailed reports describing development of the ridership and revenue forecasting model (ridership model), data collection efforts, peer review, and model estimation, calibration, and validation. Comments regarding the ridership model were responded to in the 2008 Final Program EIR.

While the Authority was in the process of complying with the final judgment in the *Town of Atherton* litigation in 2010, questions arose about the ridership model and the resulting ridership forecasts. The Authority received many comments on the 2010 Revised Draft Program EIR asserting that the model was flawed. Some comments asserted that the ridership model was improperly manipulated and concealed from the public. Other comments suggested the Authority was required to revise the ridership model, prepare new forecasts, and further revise and recirculate its Program EIR.

At the request of the California Senate Transportation and Housing Committee, the Authority commissioned a review of the ridership model from U.C. Berkeley, Institute for Transportation Studies (ITS). In June 2010, the Authority received a final written critique of the ridership model by U.C. Berkeley ITS. The Authority has also received a written response by Cambridge Systematics, and input from the Metropolitan Transportation Commission. At its July 2010 Board Meeting, the Authority received a presentation on the U.C. Berkeley ridership critique from Professor David Brownstone, and a response by Dr. Lance Neumann and Dr. Kimon Proussaloglou of Cambridge Systematics. The Authority also received numerous public comments on the ridership model and forecasts from members of the public.

Based on the various issues that have been raised by members of the public and U.C. Berkeley ITS related to the ridership model and the resulting forecasts used in the Partially Revised Final Program EIR (including the 2008 Final Program and the 2010 Revised Final Program EIR), the Authority makes the following factual findings:

- The ridership model was developed through a process that incorporated expert peer review at three different stages between 2005 and 2007.
- The ridership model was developed using a process of model estimation, calibration, and validation that represents a standard practice in the industry.
- The final ridership model was used consistently to prepare all ridership forecasts utilized for the Program EIR.
- The development of the ridership model and the resulting forecasts were discussed in the 2007 and 2008 Draft and Final Program EIRs for the Bay Area to Central Valley High-Speed Train.
- The Program EIR has used the ridership forecasts for environmental assessment purposes, including a low forecast to evaluate project benefits and a high forecast to evaluate project impacts.
- Background reports about the ridership model and forecasts have been available on the Authority's website since 2007.
- The ridership model has been publicly available through the Metropolitan Transportation Commission.

- There are points of disagreement between Cambridge Systematics and U.C. Berkeley ITS regarding various aspects of the ridership model.
- U.C. Berkeley ITS's final conclusion is that the ridership model is unreliable for policy analysis. (Final Report, p. 2.)
- U.C. Berkeley stated that, based on certain problems it identified with the model, "the forecasts of high speed rail demand – and hence of the profitability of the proposed high speed rail system - have very large error bounds." (Final Report, p. 3.)
- U.C. Berkeley stated, "we believe that further work to both assess and reduce these bounds should be a high priority." (Final Report, p. 3.)
- U.C. Berkeley ITS stated that the type of information regarding "error bands" that it recommends be part of the ridership forecasts is not standard practice in the industry.
- U.C. Berkeley ITS identified an error in the process used by Cambridge Systematics for estimation and calibration based on papers published in 2008, after the ridership study was completed. (Final Report, pp.7-8.)
- Cambridge Systematics affirmed that the estimation and calibration process they used remains state of the practice.
- In its review of the model, U.C. Berkeley ITS originally identified 30 issues for Cambridge Systematics to respond to, and its final report focused on 7 issues. (Final Report and appendices.)
- UC Berkeley ITS stated, "we are, for the most part, satisfied with their responses and agree that their work on this project meets generally accepted standards for travel demand modeling. We are, however, concerned about the impact of some of Cambridge Systematics' modeling decisions on the reliability of the forecasts based upon these models." (Final Report, p. 5.)
- U.C. Berkeley ITS identified Cambridge Systematics as one of the best firms in the business.
- U.C. Berkeley ITS found no indication of bias or rigging of the ridership model or the forecasts.
- Cambridge Systematics has provided a thorough response to each of the technical issues raised in the U.C. Berkeley ITS Final Report.
- The Metropolitan Transportation Commission has affirmed its view that the ridership model served as an appropriate tool for the statewide and regional planning purposes for which it was developed, including MTC's own regional rail planning process.
- The Authority is faced with a difference of opinion between the authors of the U.C. Berkeley ITS report, who are academicians, and Cambridge Systematics, a leader in the field of transportation demand modeling with extensive experience working with public agencies.
- Cambridge Systematics, has more than 30 years of experience developing travel demand models for use at the local, regional, state, and national levels, including: statewide models for Indiana, Massachusetts, Florida, Wisconsin, New Mexico, New Hampshire, Georgia, as well as California; interregional models for the Colonia Bridge linking Argentina and Uruguay, and for the Illiana corridor linking Illinois and Indiana; and a national model in Italy to estimate high speed rail forecasts for the Torino-Milano-Napoli corridor proposal.

Based on the foregoing findings of fact, the Authority further finds that the ridership model and the resulting forecasts used in the Program EIR have been and continue to be appropriate for the broad, programmatic level of planning and environmental review for which they are being used in the Partially Revised Final Program EIR.

8 FEASIBILITY OF POTENTIAL ALTERNATIVES

The Partially Revised Final Program EIR describes and analyzes the network alternatives, alignment alternatives, and station location options considered for the proposed HST system in the Bay Area to Central Valley study region. Because the Partially Revised Final Program EIR builds from the Authority's prior Program EIR/EIS for the statewide HST system, the alternatives analysis does not revisit the Authority's prior decisions based on the prior EIR/EIS: (1) the decision to proceed with a statewide HST system; (2) decisions regarding HST system capabilities and technology; and (3) decisions regarding preferred alignments and station location options for geographic regions other than the Bay Area to Central Valley. (See § 2.3.2 of 2008 Final Program EIR.) The analysis instead focuses on the choices of an overall network to connect the Bay Area to the Central Valley, and preferred alignment alternatives and station location options.

The Partially Revised Final Program EIR and these findings conclude that the Preferred Pacheco Pass Network Alternative will have some significant adverse environmental impacts that cannot be avoided or substantially lessened with mitigation strategies. The following findings on alternatives explain why the alternatives not carried forward for evaluation and/or the alternatives studied but not selected are either: (1) infeasible, as defined in CEQA and the CEQA Guidelines; (2) not environmentally superior; and/or (3) fail to adequately meet the project purpose and project objectives. These findings also explain why the Preferred Pacheco Pass Network Alternative qualifies as the environmentally superior alternative as a whole.

8.1 Findings on Alternatives Considered but Not Carried Forward for Detailed Study in the Program EIR/EIS

The Authority and FRA conducted a screening evaluation process to identify potential alignment alternatives and station location options that were anticipated to be practicable, reasonable, and feasible for further consideration in the Bay Area to Central Valley Program EIR/EIS. The process incorporated the standardized criteria described in section 2.5.1 of the 2008 Final Program EIR: construction; environment; land use compatibility; right-of-way; connectivity/accessibility; and ridership/revenue. The objectives identified in Table 2.5-2 of the 2008 Final Program EIR also contributed to the evaluation process. The Bay Area to Central Valley study region was divided into six (6) corridors to facilitate the process: San Francisco to San Jose; Oakland to San Jose; San Jose to Central Valley; East Bay to Central Valley; San Francisco Bay Crossings; and Central Valley

The alternatives screening evaluation involved numerous steps and considerable consultation with other agencies and the public:

- Review of past alignment and station location options identified with viable corridors from previous studies, including the Statewide Program EIR/EIS
- Identification through the environmental scooping process of alignment alternatives and station location options not previously evaluation
- Evaluation of potential alignment alternatives and station location options using standardized engineering, environmental, and financial criteria and evaluation methodologies at a consistent level of analysis
- Identification of the ability of alignment alternatives and station location options to meet the defined project objectives.

The Authority received information on alignment alternatives and station location options to be eliminated from further consideration at its meetings on March 22, 2006, and on August 9, 2006.

Based on the alternatives screening evaluation process, the Authority finds that the potential alignment alternatives and station location options identified in Table 2.5-4 of the 2008 Final Program EIR were appropriately eliminated from detailed study for the reasons briefly explained in section 2.5.1 and Table 2.5-4 of the 2008 Final Program EIR, and as explained in more detail in Appendix 2-G of the 2008 Final Program EIR. The Authority finds that the potential alignment alternatives and station location options eliminated from detailed study are infeasible because:

- they fail to adequately meet the project purpose and objectives;
- they are impracticable in terms of cost, constructability, right-of-way constraints, and other technical/engineering issues;
- they include greater or more probably adverse environmental impacts than other practicable alternatives;
- The Authority therefore finds that the potential alignment alternatives and station location options identified in Table 2.5-4 of the 2008 Final Program EIR are not feasible alternatives that would avoid or minimize the significant and unavoidable environmental impacts of the Preferred Pacheco Pass Network Alternative and it component parts.

The Authority further finds that the proposals submitted by commenters to the 2010 Revised Draft Program EIR and the 2012 Partially Revised Draft Program EIR, including the "SETEC proposal" and a proposal to utilize an Altamont Corridor Rail Project alignment plus the Caltrain corridor from San Francisco to San Jose via a blended system, fail to adequately meet the project purpose and objectives and thus the proposals, if considered as alternatives, are infeasible. For this reason, the proposals are not feasible alternatives that would avoid or minimize the significant and unavoidable impacts of the Preferred Pacheco Pass Network Alternative and its component parts

8.2 Findings on Alternatives Studied in the Partially Revised Final Program EIR

The alternatives screening evaluation process resulted in a series of alignment alternatives and station location options that were studied in n the Program EIR. The alternatives are identified in the 2008 Final Program EIR at Table 2.5-3, shown on Figure 2.5-2, and described in section 2.5.1.A. The alignment alternatives for the six study corridors were combined into three basic conceptual approaches or networks for connecting the Bay Area to the Central Valley for the HST system, with variations among them that result in a total of 21 representative network alternatives evaluated in the Program EIR:

- Altamont Pass (11 network alternatives)
- Pacheco Pass (6 network alternatives)
- Pacheco Pass with Altamont Pass [local service] (4 network alternatives)

The 2008 Final Program EIR assessed the impacts of each alignment alternative and each station location option in Chapter 3, and summarized the impacts for the 21 representative network alternatives (combinations of alignment alternatives and station location options) in Chapter 7. Maps of the representative network alternatives are included in Chapter 7. Revisions and additions to this information are included in Chapter 6 of the 2010 Revised Final Program EIR, and in Chapters 2-4 of the 2012 Partially Revised Final Program EIR.

Overall, implementing the HST system would greatly increase the capacity for intercity and commuter travel and reduce existing automobile traffic in specific travel corridors. Full grade-separation along Bay Area rail corridors used by the HST would improve local traffic flow and reduce air pollution at existing rail crossings. The more extensive the HST system implemented in the Bay Area, the greater the travel

condition benefits, including increased connectivity to other transit systems, increased convenience, increased reliability, and improved travel times. In particular, more direct connections to the region's airports provide increased connectivity for air transportation system riders.

Recognizing the benefits described above, as well as other attributes, the cities of San Francisco, Oakland, and San Jose all strongly support direct HST service to their respective downtowns. This support was expressed as comments on the 2007 Draft Program EIR, and is consistent with comments/input provided by these cities over the ten years since the Authority was created. The Metropolitan Transportation Commission (MTC), the regional transportation planning and programming agency for the Bay Area, supports direct HST service to the downtowns of each of these three major Bay Area urban centers.

A number of network alternatives clearly do not fully meet the purpose and need for the HST system. The Altamont Pass network alternative that terminates in Union City meets the project purpose and need less well since it does not provide direct HST service to San Francisco, Oakland, or San Jose (the major Bay Area cities) nor does it provide interface with the major commercial airports. The same is true for the Pacheco Pass network alternative that terminates in San Jose and three Altamont Pass network alternatives that only serve one of the three major urban areas/centers. These four alternatives directly provide HST service to at most only one major Bay Area city and one of the region's major commercial airports.

8.2.1 Findings on the No Project Alternative

The Authority made a previous finding as part of the 2005 Program EIR/EIS for the Statewide HST system that the HST system would offer significant environmental benefits over the No Project Alternative evaluated at the year 2020 when viewed from a system-wide basis, including reduced highway VMT, improved air quality, and improved efficiency of transportation energy use for the HST system, compared to increased highway VMT, more traffic congestion, deteriorating air quality, and reduced transportation energy efficiency for No Project. (Resolution No. 05-01, Exhibit A, pp. 64-65.) The Authority also found that while the No Project Alternative statewide would result in adverse environmental impacts, it would not offer the benefits of the HST system for the environment or the State's economy. (*Ibid.*) The Authority therefore rejected the No Project Alternative in 2005 when it selected the HST system. (*Ibid.*)

The Bay Area to Central Valley Partially Revised Final Program EIR (including the full text of the 2008 Final Program EIR and 2010 Revised Final Program EIR) evaluates the various network alternatives against the No Project Alternative at year 2030, based on CEQA requirements to consider a no project alternative. (CEQA Guidelines, § 15126.6, subd. (e)). Considering the ridership forecasts developed for this Program EIR, the Authority finds that the HST system statewide, as well as within the Bay Area to Central Valley study region, offers environmental benefits in the area of traffic, air quality, and energy use, whereas the No Project Alternative would result in increased traffic congestion, deteriorating air quality, and reduced transportation energy efficiency. The Authority also finds that the Preferred Pacheco Pass Network Alternative has the benefit of minimizing land consumption needs by promoting dense development near HST stations, and providing permanent protection for agricultural lands, open space, and wildlife habitat through mitigation in the form of conservation easements that would not be available with certainty under the No Project Alternative. For these reasons, the Authority finds that the No Project Alternative, when viewed for all of its adverse impacts, is an infeasible alternative for avoiding or substantially lessening the significant unavoidable impacts of the Preferred Pacheco Pass Network Alternative

The Authority further finds that, in the context of the Authority's prior decision to proceed with a Statewide HST System, the No Project Alternative is not a feasible alternative for purposes of the Bay Area to Central Valley study region because it would not meet the project objectives or underlying project purpose.

8.2.2 Findings on Rejected Altamont Pass Network Alternatives

The Partially Revised Final Program EIR considered eleven representative Altamont Pass network alternatives. These 11 alternatives discussed in detail below encompass the range of different ways to combine HST alignment alternatives and station location options to implement the HST system via the Altamont Pass.

The Authority finds that there are constructability issues and logistical constraints for all HST alternatives. However, the Authority also finds that construction related issues and logistical constraints associated with the Altamont Pass alternatives are greater than those for the Pacheco Pass alternatives. All Altamont Pass alternatives have considerable constructability issues through the right-of-way constrained Tri-Valley area (Livermore and Pleasanton) and tunneling/seismic issues in the Pleasanton Ridge/Niles Canyon area. All Altamont Pass alternatives have tunneling/seismic issues (Calaveras Fault) in the Pleasanton Ridge as well as seismic issues in the East Bay (Hayward Fault). While solutions to these seismic issues have been identified for the separate Altamont Corridor Rail Project, these solutions involve a substantially slower commuter rail service that does not meet the design requirements for a high-speed train network alternative. For direct service to San Francisco, the most promising Altamont Pass alternatives require a new San Francisco Bay crossing at Dumbarton, which must also go through the Don Edwards San Francisco Bay National Wildlife Refuge. For the Altamont Pass alternative serving Oakland, the MTC concluded that "development of an East Bay option with direct service to San Jose and Oakland would include significant right-of-way risk gaining an agreement from UPRR to provide access to Oakland." This conclusion is supported by written comments received from UPRR. For the Altamont Pass East Bay link to San Jose, Caltrans District 4 has commented that use of the I-880 median would result in significant construction stage impacts between Fremont and San Jose.

ALTAMONT PASS NETWORK ALTERNATIVE WITH SAN FRANCISCO AND SAN JOSE TERMINI (DUMBARTON CROSSING)

The Partially Revised Final Program EIR evaluated an Altamont Pass Network Alternative with San Francisco and San Jose Termini. This network alternative is shown in Figure 7.2-1 and described in Table 7.2-1 of the 2008 Final Program EIR, volume 1 and the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative involves greater overall environmental impacts than the Preferred Pacheco Pass Network Alternative. This alternative involves constructing a new bridge or tube along the Dumbarton corridor across San Francisco Bay. This would involve major construction activities in sensitive wetlands, saltwater marshes, and aquatic habitat requiring special construction methods and mitigations. This alternative would also result in direct and indirect impacts to San Francisco Bay and the Don Edwards San Francisco Bay National Wildlife Refuge that would not occur with the Preferred Pacheco Pass Network Alternative.

The Authority further finds that the extensive agency coordination and permitting necessary to implement an alternative that includes a Dumbarton Bridge crossing (i.e., coordination/permitting with USACE, USFWS, California Coastal Commission, CDFG, and Bay Conservation and Development Commission [BCDC]) has the potential to create further costs, time delays, and other constructability issues. Scoping comments from the Bay Conservation and Development Commission noted that bridge alternatives that could have adverse impacts on Bay resources can only be approved by BCDC "if there is not an alternative upland location for the route and if the fill is the minimum necessary to achieve the purposes of the project" (BCDC scoping response, December 15, 2005). The Authority finds that these considerations render the alternative infeasible.

The MTC noted that there are right-of-way constraints within I-880. The East Bay segment south of Fremont would need to be constructed along I-880 south of Mission Boulevard towards San Jose with the potential for a long process with Caltrans to define and construct the elevated HST within the

freeway right-of-way. Caltrans has serious concerns about construction within the constrained median. In addition, the Tri-Valley PAC raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. For these reasons, the Authority finds that this alternative is not a feasible alternative that would substantially lessen the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH OAKLAND AND SAN JOSE TERMINI

The Partially Revised Final Program EIR evaluated an Altamont Pass Network Alternative with Oakland and San Jose Termini. This network alternative is shown in Figure 7.2-2 and described in Table 7.2-2 of the 2008 Final Program EIR, volume 1, and the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative involves considerable logistical constraints along the East Bay that render it infeasible. In its adopted Regional Rail Plan for the San Francisco Bay Area, the MTC raised certain issues associated with an East Bay HST alignment and did not recommend an East Bay alignment. The Authority and FRA examined these and other issues and concurred with MTC's evaluation.

- Right-of-Way Constraints and Duplicate Investment – Commitments have already been made to improve Capitol Corridor service and to extend BART to San Jose but these improvements would not be compatible with HST service, which would need to use separate tracks. Non-electric, conventional Capitol Corridor trains will continue to share track with standard freight services in the constrained UPRR owned right-of-way. When fully developed, BART and Capitol Corridor will provide complementary rail options with BART serving more local stops and Capitol Corridor primarily serving regional stops. The capital cost of the East Bay line segment is approximately $4.9 billion.

- Risk of UPRR Right-of-Way Agreement – The risk of reaching an agreement from UPRR to obtain the right to construct additional tracks for the HST along the constrained Niles Subdivision where the high-speed alignment is proposed between Mission Boulevard and Oakland remains high.

- Potential Environmental Justice Concerns – The environmental screening in the MTC Regional Rail Plan indicated potential concerns with construction of a new elevated alignment though existing urbanized areas especially in the East Bay between Fremont and Oakland.

- Right-of-Way Constraints within I-880 – The East Bay alignment segment south of Fremont would need to be constructed along I-880 freeway south of Mission Boulevard towards San Jose with the potential for a long process with Caltrans to define and construct the elevated HST trackway within the freeway right-of-way. Caltrans has serious concerns about construction within the constrained median.

The Tri-Valley Policy Advisory Committee (PAC) raised serious concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley.

The Authority finds that this alternative would be less capable of meeting the project purpose and project objectives because it does not provide direct HST service to SFO (northern California's major hub airport), the San Francisco Peninsula (Caltrain Corridor), and downtown San Francisco, the major transit, business, and tourism center of the region.

For these reasons, the Authority finds that this alternative is not a feasible alternative that would substantially lessen the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH SAN FRANCISCO, OAKLAND, AND SAN JOSE TERMINI (DUMBARTON CROSSING)

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with San Francisco, Oakland and San Jose Termini. This network alternative is shown in Figure 7.2-3 and described in Table 7.2-3 of the 2008 Final Program EIR, volume 1, and Chapter 6 in the 2010 Revised Final Program EIR, volume 1.

The Authority finds this alternative has greater environmental impacts than the Preferred Pacheco Pass Network Alternative because it would require nearly 38 additional miles of HST alignment along the East Bay and includes a Dumbarton Bridge crossing.

The Authority also finds that this alternative is economically infeasible in that it has greater costs (estimated at $2.5 billion more than the Preferred Pacheco Pass Network Alternative) due to the 38 additional miles of HST alignment in the East Bay.

The Authority finds that the extensive agency coordination and permitting necessary to implement an alternative that includes Dumbarton Bridge crossing (i.e., coordination/permitting with USACE, USFWS, California Coastal Commission, CDFG, and BCDC) has the potential to create further costs, time delays, and other constructability issues. The BCDC also noted that bridge alternatives that could have adverse impacts on Bay resources can only be approved if there is not an alternative upland location. The Authority finds that these considerations render the alternative infeasible.

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. The Tri-Valley PAC also raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley.

The Authority further finds that this alternative would be less capable of meeting the project purpose and need and project objectives due to the further split of the frequency of the HST services (express, suburban express, skip-stop, local, and regional) between San Francisco, San Jose, and Oakland (a three way split east of Niles Junction), which results in somewhat less ridership and revenue projected for this alternative as compared to the Preferred Pacheco Pass Network Alternative.

For these reasons, the Authority finds that this alternative is not a feasible alternative that would substantially lessen the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH SAN JOSE TERMINUS

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with San Jose Terminus. This network alternative is shown in Figure 7.2-4 and described in Table 7.2-4 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the Revised Final Program EIR, volume 1.

The Authority finds that this alternative fails to adequately meet the underling purpose and primary project objectives because it would service only one of the three major urban centers of the Bay Area (San Jose) and only one of the region's major commercial airports. For this reason, the Authority

finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH SAN FRANCISCO TERMINUS

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with San Francisco Terminus. This network alternative is shown in Figure 7.2-5 and described in Table 7.2-5 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative fails to adequately meet the underlying purpose and primary project objectives because it would service only one of the three major urban centers of the Bay Area (San Francisco) and only one of the region's major commercial airports. For this reason, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH OAKLAND TERMINUS

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with Oakland Terminus. This network alternative is shown in Figure 7.2-6 and described in Table 7.2-6 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative fails to adequately meet the underlying purpose and primary project objectives because it would service only one of the three major urban centers of the Bay Area (Oakland) and only one of the region's major commercial airports. For this reason, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH UNION CITY TERMINUS

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with Union City Terminus. This network alternative is shown in Figure 7.2-7 and described in Table 7.2-7 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative fails to adequately meet the underlying purpose and project objectives because it would not service any of the three major urban centers of the Bay Area and none of the region's major commercial airports. For this reason, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH SAN FRANCISCO AND SAN JOSE TERMINI VIA THE SAN FRANCISCO PENINSULA

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with San Francisco and San Jose Termini via the San Francisco Peninsula. This network alternative is shown in Figure 7.2-8 and described in Table 7.2-8 of the 2008 Final Program EIR, volume 1, and Chapter 6 in the Revised Final Program EIR, volume 1.

The Authority finds that this alternative involves greater overall environmental impacts than the Preferred Pacheco Pass Network Alternative. This alternative involves constructing a new bridge or tube along the Dumbarton corridor. This would involve major construction activities in sensitive wetlands, saltwater marshes, and aquatic habitat requiring special construction methods and mitigations. This alternative would also result in direct and indirect impacts to San Francisco Bay and

the Don Edwards San Francisco Bay National Wildlife Refuge that would not occur with the Preferred Pacheco Pass Network Alternative.

The Authority further finds that the extensive agency coordination and permitting necessary to implement an alternative that includes a Dumbarton Bridge crossing (i.e., coordination/permitting with USACE, USFWS, California Coastal Commission, CDFG, and BCDC) has the potential to create further costs, time delays, and other constructability issues. The Tri-Valley PAC also raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH SAN FRANCISCO, SAN JOSE, AND OAKLAND TERMINI WITH NO SAN FRANCISCO BAY CROSSING

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with San Francisco, San Jose, and Oakland Termini with no San Francisco Bay Crossing. This network alternative is shown in Figure 7.2-9 and described in Table 7.2-9 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative has greater environmental impacts than the Preferred Pacheco Pass Network Alternative with San Francisco and San Jose Termini because it would require nearly 62 additional miles of HST alignment along the San Francisco Peninsula. The Authority also finds that this alternative is economically infeasible in that it has greater costs (estimated at $1.95 billion more than the preferred alternative) due to the 62 additional miles of HST alignment in the San Francisco Peninsula. The segment from San Jose to San Francisco would cost about $72.6 million/mile to construct ($59.2 million/mile for network alternative), yet this alternative results in non-competitive travel times from San Francisco, SFO, or Palo Alto/Redwood City to the HST stations to the south including Bakersfield, Los Angeles, Anaheim, Riverside, and San Diego. The non-competitive travel times to San Francisco and the San Francisco Peninsula resulted in less projected ridership and revenue.

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. The Tri-Valley PAC also raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE WITH OAKLAND AND SAN FRANCISCO TERMINI VIA A TRANSBAY TUBE

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with Oakland and San Francisco Termini via a Transbay

Tube. This network alternative is shown in Figure 7.2-10 and described in Table 7.2-10 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative has greater environmental impacts than the Preferred Pacheco Pass Network Alternative due to a new transbay tube. For example, this alternative would have over 38.8 acres of potential direct impacts to waterbodies, which includes the San Francisco Bay, whereas the Preferred Pacheco Pass Network Alternative would have only 2.3 acres of potential direct impacts.

The Authority also finds that this alternative is economically infeasible in that the additional cost for the 8.8-mile segment needed to implement a new transbay tube is estimated at about $4.7 billion—over $500 million/mile as compared to the Altamont Pass Network Alternative with Oakland terminus. Moreover, there is only slightly higher ridership and revenue potential.

The Authority finds that the extensive agency coordination and permitting necessary to implement an alternative that includes a transbay tube has the potential to create further costs, time delays, and other constructability issues that render the alternatives infeasible. To construct a new transbay tube, coordination would be required with the USACE, USFWS, and the California Coastal Commission. Crossing the Bay would also be subject to the USACE, CDFG, and the BCDC permit process. The last transbay tube was constructed in 1969, prior to NEPA, and the potential issues and delays that could arise from permitting and constructing a new crossing are unknown but would likely result in considerable delays.

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, and potential Environmental Justice concerns through existing urbanized areas in the East Bay. The Tri-Valley PAC also raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

ALTAMONT PASS NETWORK ALTERNATIVE SAN JOSE, OAKLAND AND SAN FRANCISCO TERMINI VIA A TRANSBAY TUBE

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for an Altamont Pass Network Alternative with Oakland and San Francisco Termini via a Transbay Tube. This network alternative is shown in Figure 7.2-11 and described in Table 7.2-11 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative has greater environmental impacts than the Preferred Pacheco Pass Network Alternative due to a new transbay tube. For example, this alternative would have over 38.8 acres of potential direct impacts to waterbodies, which includes the San Francisco Bay, whereas the Preferred Pacheco Pass Network Alternative would have only 2.3 acres of potential direct impacts.

The Authority also finds that this alternative is economically infeasible in that the additional cost to implement a new transbay tube is estimated at about $4.4 billion as compared to the Altamont Pass Network Alternative with Oakland and San Jose termini. Moreover, there is only slightly higher ridership and revenue potential.

The Authority finds that the extensive agency coordination and permitting necessary to implement an alternative that includes a transbay tube has the potential to create further costs, time delays, and other constructability issues that render the alternatives infeasible. To construct a new transbay tube, coordination would be required with the USACE, USFWS, and the California Coastal Commission. Crossing the Bay would also be subject to the USACE, CDFG, and the BCDC permit process. The last transbay tube was constructed in 1969, prior to NEPA, and the potential issues and delays that could arise from permitting and constructing a new crossing are unknown but would likely result in considerable delays.

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. The Tri-Valley PAC also raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. In addition, the cities of Fremont and Pleasanton oppose Altamont Pass alignments. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

8.2.3 Findings on Rejected Pacheco Pass Network Alternatives

The Partially Revised Final Program EIR considered six representative Pacheco Pass network alternatives. These 6 alternatives encompass the range of different ways to combine HST alignment alternatives and station location options to implement the HST system via the Pacheco Pass and utilizing the BNSF-UPRR alignment in the Central Valley corridor. Five of the Pacheco Pass Network Alternatives are discussed below.

PACHECO PASS NETWORK ALTERNATIVE WITH OAKLAND AND SAN JOSE TERMINI

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass Network Alternative with Oakland and San Jose Termini. This network alternative is shown in Figure 7.2-13 and described in Table 7.2-13 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds this alternative would have greater environmental impacts overall than the Preferred Pacheco Pass Network Alternative, attributable to the HST alignment along the East Bay and impact wetlands and water resources.

This alternative is forecast to have about 2.1% (1.96 million riders per year by 2030) lower ridership potential than the Preferred Pacheco Pass Network Alternative, and is estimated to cost about 6.7% less ($840 million).

The Authority also finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. This network alternative is forecast to have lower ridership potential than the Preferred Pacheco Pass Network Alternative.

The Authority further finds that this alternative would be less capable of meeting the project purpose and need and project objectives because it would not provide direct HST service to SFO (northern California's major hub airport), the San Francisco Peninsula (Caltrain Corridor), and downtown San Francisco, the major transit, business, and tourism center of the region.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS NETWORK ALTERNATIVE WITH SAN FRANCISCO, OAKLAND, AND SAN JOSE TERMINI (NO TRANSBAY TUBE)

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass Network Alternative with San Francisco, Oakland, and San Jose Termini. This network alternative is shown in Figure 7.2-14 and described in Table 7.2-14 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds this alternative would have greater environmental impacts overall than the Preferred Pacheco Pass Network Alternative, attributable to the HST alignments along both the San Francisco Peninsula and the East Bay. These impacts include wetlands, water resources, and the 100-year floodplain.

The Authority also finds that this alternative is economically infeasible in that it has greater costs (estimated at $3.6 billion more than the Preferred Pacheco Pass Network Alternative) due to the 42 additional miles of HST alignment in the East Bay. In addition, because this alternative would split frequency of HST services (express, skip-stop, suburban express, local, and regional) between the San Francisco Peninsula and the East Bay, this resulted in considerably less ridership and revenue projected (7.8 million passengers a year by 2030).

The Authority also finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. In addition, because this alternative would split frequency of HST services (express, skip-stop, suburban express, local, and regional) between the San Francisco Peninsula and the East Bay, it resulted in considerably less ridership and revenue as compared to the Preferred Pacheco Pass Network Alternative.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS NETWORK ALTERNATIVE WITH SAN JOSE TERMINUS

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass Network Alternative with San Jose Terminus. This network alternative is shown in Figure 7.2-15 and described in Table 7.2-15 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative fails to adequately meet the underlying purpose and primary project objectives because it would service only one of the three major urban centers of the Bay Area (San Jose) and only one of the region's major commercial airports. For this reason, the Authority

finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS NETWORK ALTERNATIVE WITH SAN JOSE, SAN FRANCISCO, AND OAKLAND TERMINI VIA TRANSBAY TUBE

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass Network Alternative with San Jose, San Francisco, and Oakland Termini via Transbay Tube. This network alternative is shown in Figure 7.2-16 and described in Table 7.2-16 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative has greater environmental impacts than the Preferred Pacheco Pass Network Alternative due to a new transbay tube. For example, this alternative would have over 40.3 acres of potential direct impacts to waterbodies, which includes the San Francisco Bay, whereas the Preferred Pacheco Pass Network Alternative would have only 2.3 acres of potential direct impacts. This alternative would also have more than twice the potential impacts to wetlands.

The Authority also finds that this alternative is economically infeasible in that the additional cost for the 8.8-mile segment needed to implement a new transbay tube is estimated at about $4.6 billion—over $500 million/mile. Moreover, there is only slightly higher ridership and revenue potential.

The Authority further finds that the extensive agency coordination and permitting necessary to implement an alternative that includes a transbay tube has the potential to create further costs, time delays, and other constructability issues that render the alternatives infeasible. To construct a new transbay tube, coordination would be required with the USACE, USFWS, and the California Coastal Commission. Crossing the Bay would also be subject to the USACE, CDFG, and the BCDC permit process. The last transbay tube was constructed in 1969, prior to NEPA, and the potential issues and delays that could arise from permitting and constructing a new crossing are unknown but would likely result in considerable delays.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS NETWORK ALTERNATIVE WITH SAN JOSE, OAKLAND AND SAN FRANCISCO TERMINI VIA TRANSBAY TUBE

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass Network Alternative with San Jose, Oakland, and San Francisco Termini via Transbay Tube. This network alternative is shown in Figure 7.2-17 and described in Table 7.2-17 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative has greater environmental impacts than the Preferred Pacheco Pass Network Alternative due to a new transbay tube. For example, this alternative would have over 40.2 acres of potential direct impacts to waterbodies, which includes the San Francisco Bay, whereas the Preferred Pacheco Pass Network Alternative would have only 2.3 acres of potential direct impacts. This alternative would also have more than twice the potential impacts to wetlands.

The Authority also finds that this alternative is economically infeasible in that the additional cost for the 8.8-mile segment needed to implement a new transbay tube is estimated at about $4.7 billion—over $500 million/mile compared to the Pacheco Pass Network Alterative with Oakland and San Jose termini. Moreover, there is only slightly higher ridership and revenue potential.

The Authority finds that the extensive agency coordination and permitting necessary to implement an alternative that includes a transbay tube has the potential to create further costs, time delays, and other constructability issues that render the alternatives infeasible. To construct a new transbay tube, coordination would be required with the USACE, USFWS, and the California Coastal Commission. Crossing the Bay would also be subject to the USACE, CDFG, and the BCDC permit process. The last transbay tube was constructed in 1969, prior to NEPA, and the potential issues and delays that could arise from permitting and constructing a new crossing are unknown but would likely result in considerable delays.

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

8.2.4 Findings on Rejected Pacheco Pass with Altamont Pass (local service) Network Alternatives

The Partially Revised Final Program EIR considered four representative Pacheco Pass with Altamont Pass (local service) network alternatives. These four alternatives encompass the range of different ways to combine HST alignment alternatives and station location options to implement the HST system via the Pacheco Pass while also providing local HST service via the Altamont Pass.

The Pacheco Pass and Altamont Pass (local service) network alternative that would terminate in San Jose does not serve either San Francisco or Oakland directly and does not meet the purpose and need for the proposed HST system. The network alternative to Oakland and San Jose is estimated to be the least costly of the remaining three network alternatives serving both the Pacheco and Altamont passes ($2.4 billion less than the alternative serving San Francisco and San Jose), would have the least environmental impacts, and would have high ridership potential, but it would not provide direct HST service to downtown San Francisco, SFO, and the San Francisco Peninsula (Caltrain Corridor) between San Francisco and San Jose. The network alternative to San Francisco and San Jose is estimated to have the highest ridership potential (3.27 million passengers a year by 2030 higher than the Oakland and San Jose alternative) but is also estimated to have the highest environmental impacts since it would require a new crossing at Dumbarton. The network alternative to San Francisco, Oakland, and San Jose (without Dumbarton Bridge) would have the highest costs ($4.4 billion more than the Oakland and San Jose alternative), and the least ridership potential (8.34 million passenger a year by 2030 less than the San Francisco and San Jose alternative), but would provide direct HST service to Oakland, San Francisco, and San Jose and the region's three international airports without requiring a new bay crossing.

The Pacheco Pass with Altamont Pass (local service) network alternatives do not compare well against Preferred Pacheco Pass Network Alternative. These network alternatives resulted in similar ridership and revenue forecasts (with less revenue than comparable Pacheco Pass network alternatives) while having considerably higher capital costs ($4.4–6.1 billion more for comparable terminus station locations). Although the Pacheco Pass with Altamont Pass (local service) alternatives would increase connectivity and accessibility by potentially providing direct HST service to additional markets, these alternatives would have higher environmental impacts, construction issues, and logistical constraints than the Preferred Pacheco Pass Network Alternative. The U.S. EPA (USEPA) and USACE concluded that the Pacheco Pass with Altamont Pass (local service) network alternatives are not likely to contain the Least Environmentally Damaging Alternative (LEDPA).

PACHECO PASS WITH ALTAMONT PASS (LOCAL SERVICE) NETWORK ALTERNATIVE WITH SAN FRANCISCO AND SAN JOSE TERMINI (DUMBARTON CROSSING)

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass with Altamont Pass (local service) Network Alternative with San Francisco and San Jose Termini. This network alternative is shown in Figure 7.2-18 and described in Table 7.2-18 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds this alternative would have greater environmental impacts than the Preferred Pacheco Pass Network Alternative because it would involve a San Francisco Bay crossing via a Dumbarton Bridge and it would have two mountain crossings from the Central Valley.

The Authority finds that this alternative is economically infeasible in that the cost are considerably higher ($5.7 -$6.0 billion more for comparable terminus station locations).

The Authority finds that the extensive agency coordination and permitting necessary to implement an alternative that includes Dumbarton Bridge crossing (i.e., coordination/permitting with USACE, USFWS, California Coastal Commission, CDFG, and BCDC) has the potential to create further costs, time delays, and other constructability issues. The BCDC also noted that bridge alternatives that could have adverse impacts on Bay resources can only be approved if there is not an alternative upland location. The Authority finds that these considerations render the alternative infeasible.

The Authority further finds that this alternative presents logistical constraints that render it infeasible. As noted by MTC, there are right-of-way constraints within I-880, and Caltrans has serious concerns about construction within this constrained median. In addition, the Tri-Valley PAC raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS WITH ALTAMONT PASS (LOCAL SERVICE) NETWORK ALTERNATIVE WITH OAKLAND AND SAN JOSE TERMINI

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass with Altamont Pass (local service) Network Alternative with Oakland and San Jose Termini. This network alternative is shown in Figure 7.2-19 and described in Table 7.2-19 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds this alternative would have greater environmental impacts than the Preferred Pacheco Pass Network Alternative because it would involve two mountain crossings from the Central Valley.

The Authority also finds that this alternative is economically infeasible in that the cost are considerably higher ($4.4 -$6.1 billion more for comparable terminus station locations).

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. The Tri-Valley PAC also raised concerns regarding land

use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS WITH ALTAMONT PASS (LOCAL SERVICE) NETWORK ALTERNATIVE WITH SAN FRANCISCO, OAKLAND, AND SAN JOSE TERMINI (W/O DUMBARTON CROSSING)

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass with Altamont Pass (local service) Network Alternative with San Francisco, Oakland, and San Jose Termini, but without a Dumbarton Bridge crossing. This network alternative is shown in Figure 7.2-20 and described in Table 7.2-20 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds this alternative would have greater environmental impacts than the Preferred Pacheco Pass Network Alternative because it would involve two mountain crossings from the Central Valley and extend up both sides of San Francisco Bay.

The Authority finds that this alternative is economically infeasible in that the costs are considerably higher ($4.4 -$6.0 billion more for comparable terminus station locations).

The Authority further finds that this alternative presents logistical constraints that render it infeasible. This includes the concerns raised by the MTC associated with an East Bay HST alignment: right-of-way constraints and duplicate investment between Oakland and San Jose, risk of reaching agreement with UPRR along the Niles Subdivision, potential Environmental Justice concerns through existing urbanized areas in the East Bay, and right-of-way constraints within I-880 south of Fremont that could result in a long process with Caltrans. The Tri-Valley PAC also raised concerns regarding land use compatibility and right-of-way constraints and the need for aerial structures through the Tri-Valley. The Authority finds that these considerations render the alternative infeasible.

For these reasons, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

PACHECO PASS WITH ALTAMONT PASS (LOCAL SERVICE) NETWORK ALTERNATIVE WITH SAN JOSE TERMINUS

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass with Altamont Pass (local service) Network Alternative with San Jose Terminus. This network alternative is shown in Figure 7.2-21 and described in Table 7.2-21 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1.

The Authority finds that this alternative fails to adequately meet the purpose and need and primary project objectives because it would service only one of the three major urban centers of the Bay Area (San Jose) and only one of the region's major commercial airports. For this reason, the Authority finds that this alternative is not a feasible alternative for substantially lessening the significant environmental impacts of the Preferred Pacheco Pass Network Alternative.

8.2.5 Findings on Pacheco Pass Network Alternative with San Francisco and San Jose Termini, Central Valley alignments, and Modesto station location options

The Partially Revised Final Program EIR evaluated alignment alternatives and station location options for a Pacheco Pass Network Alternative with San Francisco and San Jose Termini. This network alternative is

shown in Figure 7.2-12 and its impacts are described in Table 7.2-12 of the 2008 Final Program EIR, volume 1, and Chapter 6 of the 2010 Revised Final Program EIR, volume 1. The difference between this network alternative and the Preferred Pacheco Pass Network Alternative described in Chapter 7 of the 2010 Revised Final Program EIR is that it utilizes the BNSF-UPRR alignment in the Central Valley rather than UPRR N/S alignment. This network alternative would therefore utilize the Amtrak Briggsmore station in Modesto rather than the Modesto downtown station included in the Preferred Alternative.

The Authority finds that the Pacheco Pass Network Alternative depicted in Figure 7.2-12 has similar environmental impacts overall as the Preferred Pacheco Pass Network Alternative that utilizes the UPRR N/S alignment in the Central Valley, but would result in slightly greater impacts in a number of resource areas. Compared to the Preferred Pacheco Pass Network Alternative, this alternative would result in an additional 744 linear feet of impact to streams, 1.5 acres of impact to waterbodies, 0.8 acre of impact to wetlands, 89 acres of impact to the 100-year floodplain, 100 acres of impact on groundwater, and 244 acres of impact on important farmland.

The Authority further finds that the Pacheco Pass Network Alternative depicted in Figure 7.2-12 has a similar potential to meet the purpose and need for the HST system as the Preferred Pacheco Pass Alternative. At the same time, the Authority finds that the use of the Amtrak Briggsmore station in Modesto for the Pacheco Pass Network Alternative depicted in Figure 7.2-12 is less consistent with the Authority's design practices than the use of the downtown Modesto station in the Preferred Pacheco Pass Network Alternative. These design practices emphasize the development of downtown station locations that can serve as multi-modal hubs, which are integral to achieving the Authority's smart-growth priorities.

Based on these facts, the Authority finds that, for programmatic planning purposes, the Preferred Pacheco Pass Network Alternative is superior to the Pacheco Pass Network Alternative depicted in Figure 7.2-12 and it is therefore selecting the Preferred Pacheco Pass Network Alternative to advance for further planning. Recognizing the potential uncertainty over the alignment for the HST system in the Central Valley, however, the Authority further finds that at the project level, it is necessary to continue to evaluate the BNSF alignment, or some combination of UPRR and BNSF. This is the case because of uncertainty over future negotiations with both the UPRR and the BNSF for use of some of their right-of-way, and due to the need to continue investigation of alignments/linkages to potential sites or maintenance facilities including Castle AFB.

8.2.6 Findings That the Preferred Pacheco Pass Network Alternative serving San Francisco via San Jose is the Environmentally Superior Alternative

The selection of the Preferred Pacheco Pass Network Alternative serving San Francisco via San Jose, utilizing the UPRR N/S alignment in the Central Valley (defined in Section 2.2 herein), over the other representative network alternatives involves a series of tradeoffs and balancing considerations. Each of the 21 representative network alternatives presents different types and degrees of environmental impacts, but at the same time each one involves some adverse impacts in the areas of biological resources and wetlands, waterbodies (San Francisco Bay and lakes), noise and vibration, cultural resources, farmland, and parks and recreational resources. Based on the information and analysis in the 2010 Revised Final Program EIR and the 2012 Partially Revised Final Program EIR, the Preferred Pacheco Pass Network Alternative also involves impacts on Monterey Highway that are unique to the Pacheco Pass network alternatives. Impacts on the San Francisco Peninsula in the areas of land use, traffic, and noise/vibration that are discussed in the 2010 Revised Final Program EIR and the 2012 Partially Revised Final Program EIR are not unique to the Pacheco Pass alternatives, but would occur for any network alternative utilizing the Caltrain Corridor. The basic choice of how to connect the Bay Area to the Central Valley (Pacheco, Altamont, or Pacheco with Altamont) involves creation of environmental impacts in different locations, rather than avoiding impacts altogether. The choice also has potential for environmental benefits, some of which would be created in different locations depending on the mountain pass alternative selected. Each of the 21 representative network alternatives also has varying

ability to meet the project purpose and objectives, and varying challenges in terms of constructability. The selection of an overall network therefore involves a weighing of different types and amounts of impacts and benefits in different locations, along with the ability of the alternatives to meet the purpose and objectives and be feasibly constructed.

The Authority finds that Preferred Pacheco Pass Network Alternative is the environmentally superior alternative overall among those representative network alternatives that meet the project purpose and need by providing service to at least two major urban centers of the Bay Area (eliminating alternatives shown in Figures 7.2.4, 7.2.5, 7.2.6, 7.2.7, 7.2.15, and 7.2-21 of the 2008 Final Program EIR). Among the reasons for this conclusion are the following points:

Avoids adverse environmental impacts to the San Francisco Bay and its resources

The Preferred Pacheco Pass Network Alternative would serve two major urban centers, and provide connectivity to the San Francisco Airport, but would avoid the adverse impacts to the San Francisco Bay associated with the nine representative network alternatives that involve either a new transbay tube or bridge/tube at the Dumbarton Crossing (e.g., alternatives shown in 7.2-1. 7.2-3, 7.2-5, 7.2-8, 7.2-10, 7.2-11, 7.2-16, 7.2-17, and 7.2-18 of the 2008 Final Program EIR). These avoided impacts include impacts to Bay wetlands and non-wetland waters, and the Bay's species and habitats.

Avoids conflicts with the Don Edwards San Francisco Bay National Wildlife Refuge

The Preferred Pacheco Pass Network Alternative would avoid crossing through the Don Edwards San Francisco Bay National Wildlife Refuge, eliminating the potential conflict with this nationally designated wildlife refuge associated with alternatives that would involve a bridge/tube at the Dumbarton Crossing (e.g., alternatives shown in Figures 7.2-1, 7.2-3, 7.2-5, 7.2-8, and 7.2-18 of the 2008 Final Program EIR).

Avoids adverse environmental impacts of additional track associated with serving three termini

The Preferred Pacheco Pass Network Alternative would avoid the adverse environmental impacts associated with the representative network alternatives that would serve three termini using additional track along the East Bay or the San Francisco Peninsula (e.g., alternatives shown in Figures 7.2-9, 7.2-14, and 7.2-20 of the 2008 Final Program EIR). These alternatives had generally greater impacts in the areas of noise and vibration, farmlands, cultural resources, hydrology and water resources, biology and wetlands, and parks and recreation resources based on the additional mileage of track.

Results in fewer impacts on parks/recreation resources

The Preferred Pacheco Pass Network Alternative would affect a fewer number of 4(f) and 6(f) resources (19 vs. 20–22) than the Altamont Pass alternatives shown in Figures 7.2-1, and 7.2-2 of the 2008 Final Program EIR.

Results in fewer total impacts on waterbodies and wetlands

The Preferred Pacheco Pass Network Alternative would have fewer total impacts on waterbodies and wetlands than the Altamont Pass Alternatives shown in Figures 7.2-1, 7.2-5, and 7.2-8 of the 2008 Final Program EIR. The two Altamont Pass alternatives providing direct service to San Francisco would include a new Bay crossing at Dumbarton and would cross areas within the Don Edwards San Francisco Bay National Wildlife Refuge (wetlands and sensitive habitat) and therefore would have considerably higher impacts on waters, wetlands, and 4(f) resources than the Preferred Pacheco Pass Network Alternative. In comparison to these Altamont Pass alternatives, the Preferred Pacheco Pass Network Alternative would have considerably less potential impacts on waterbodies (2.3 acres vs. 39.6 acres), considerably less potential impacts on wetlands (14.8 acres vs. 44.4–45.9 acres), while having relatively similar potential impacts on the number of special status plant species (59 vs. 56),

special status wildlife species (54 vs. 49-50), and cultural resources (168 vs. 149-180), but slightly more impacts on non-wetland waters (20,300 linear feet. vs. 15,947–16,773 linear feet),

Results in fewer community cohesion impacts

The Preferred Pacheco Pass Network Alternative would have fewer potential impacts on minority and/or low-income populations than those extending up the East Bay to Oakland (e.g., alternatives shown in Figures 7.2-2, 7.2-3, 7.2-6, 7.2-9, 7.2-11, 7.2-13, 7.2-14, 7.2-17, 7.2-19 and 7.2-20 of the 2008 Final Program EIR). In its adopted Regional Rail Plan for the San Francisco Bay Area, the MTC raised certain issues associated with an East Bay HST alignment related to potential Environmental Justice concerns. The environmental screening in the MTC Regional Rail Plan indicated potential concerns with construction of a new elevated alignment though existing urbanized areas especially in the East Bay between Fremont and Oakland where improvements to the corridor pass through minority and/or low-income neighborhoods.

Involves impacts to farmlands, wildlife movement, and the Grasslands Ecological Area that have a higher likelihood of being fully mitigated at the project level

The Preferred Pacheco Pass Network Alternative would have greater impacts on important farmland than the Altamont Pass alternatives (1,128 acres vs. 758 – 764 acres). It would also result in impacts on resources within the area generally designated as the GEA, resulting in greater potential impacts to wildlife movement. These types of impacts can be mitigated at the project level through the purchase of conservation easements, to which the Authority has committed (see 4.7 and 4.14 of these Findings of Fact above), to permanently protect the highest quality farmlands, preserve open space and sensitive habitat, and protect wildlife movement corridors in a manner that is consistent with, supportive of, and contributes to the GEA.

The USEPA and USACE have concurred that the Preferred Pacheco Pass Network Alternative serving San Francisco via San Jose is most likely to yield the LEDPA for purposes of their regulatory needs under Section 404 of the federal Clean Water Act.

CONCLUSION ON ALTERNATIVES

In summary, the Authority finds that there are no feasible alternatives that would avoid or substantially lessen the significant adverse impacts of the Preferred Pacheco Pass Network Alternative serving San Francisco via San Jose that would remain following the application of mitigation strategies discussed in these findings, while still meeting the project's underlying purpose and project objectives. Because adverse impacts remain, the Authority will adopt a Statement of Overriding Considerations as discussed in the following chapter.

9 STATEMENT OF OVERRIDING CONSIDERATIONS - *revised*

The Partially Revised Final Program EIR and the CEQA Findings of Fact conclude that implementing the Preferred Pacheco Pass Network Alternative will result in significant impacts to the environment that cannot be avoided or substantially lessened with the application of feasible mitigation strategies or feasible alternatives. This Statement of Overriding Considerations is therefore necessary to comply with CEQA (Pub. Resources Code, § 21081) and the State CEQA Guidelines (§ 15093). The significant and unavoidable impacts and the benefits related to implementing the HST system in the Bay Area to Central Valley study region via the Preferred Pacheco Pass Network Alternative are described below. The Authority Board has carefully weighed these impacts and benefits of the Preferred Pacheco Pass Network Alternative. As described below, the Authority finds that the benefits of the Preferred Pacheco Pass Network Alternative outweigh the significant and unavoidable environmental impacts.

This Statement of Overriding Considerations must be understood in its programmatic context. The level of analysis provided in the Partially Revised Final Program EIR is less detailed than that typically provided in a project-level EIR, such as for approval of a development project at a particular location. Because a program EIR necessarily provides less detailed analysis and less detail concerning mitigation, it is not always possible to conclude with certainty that the adoption of the identified mitigation strategies at the program level will reduce adverse impacts to a less-than-significant level. In some instances, although the Authority is confident that its range of mitigation will avoid or substantially lessen adverse impacts, it cannot conclude with certainty that this will be the case until project-level data is available. This is particularly true for certain terrestrial impacts, where the precise scope of the impact and the adequacy of the adopted mitigation strategies cannot be determined until the Authority selects a specific alignment. For these areas of uncertainty, the Authority is choosing to override the adverse impacts even though at the project level it may conclude that an impact can in fact be mitigated to a less-than-significant level.

9.1 General Findings on Significant and Unavoidable Impacts Associated with the Preferred Pacheco Pass Network Alternative

Based on the Partially Revised Final Program EIR and the CEQA Findings of Fact contained herein, as well as the evidentiary materials supporting these documents, the Authority finds that implementing the Preferred Pacheco Pass Network Alternative could result in the following list of significant and unavoidable impacts to the environment:

Traffic, Circulation, and Transit

- Increased station area traffic (including impacts on San Jose station related to phased implementation)
- Increased traffic related to Monterey Highway narrowing
- Increased traffic related to potential lane closures on the San Francisco Peninsula
- Impacts to connecting commuter rail services

Noise and Vibration

- Exposure to ground-borne vibration from operations and construction, including potential for movement of freight to outside tracks on San Francisco Peninsula

Land Use Impacts and Station Area Development

- Long-term land use compatibility impacts with HST operations
- Impacts to neighborhoods during construction

Agricultural Lands

- Severance of Prime, Statewide Important, and Unique Farmlands, and Farmlands of Local Importance, due to project uses

Aesthetics and Visual Resources

- Long-term aesthetic impacts from introduction of a new visual feature
- Short-term visual quality impacts due to construction

Cultural and Paleontological Resources

- Impacts to archaeological resources and traditional cultural properties
- Impacts to historic properties/resources
- Impacts to paleontological resources

Biological Resources and Wetlands

- Impacts to sensitive habitats and sensitive vegetation communities
- Impacts to wildlife movement corridors
- Impacts to non-wetland jurisdictional waters
- Impacts to wetlands
- Impacts to marine and anadromous fisheries
- Impacts to special status species
- Impacts to protected habitats and conservation areas

Public Parks and Recreation

- Impacts to parks and recreation resources

Cumulative Impacts

- Cumulative traffic impacts
- Cumulative vibration impacts
- Cumulative land use compatibility impacts
- Cumulative impacts associated with agricultural land severance
- Cumulative aesthetic impacts
- Cumulative impacts to cultural resources
- Cumulative impacts to biological resources
- Cumulative impacts to parks and recreation

The Authority further finds that the while the mitigation strategies it adopts as part of the CEQA Findings of Fact are very likely to avoid or substantially lessen many of the foregoing environmental impacts, and mitigation adopted to address one subject area may result in beneficial effects in other subject areas, it cannot find with certainty that these impacts will be fully mitigated absent the more detailed information that will be available at the project-level. For this reason, and out of an abundance of caution, the Authority chooses to make a statement of overriding considerations that encompasses all of the foregoing at the program level. It is the Authority's intent that the mitigation strategies will be refined and applied at the project level, and augmented to the degree necessary, to ensure that impacts are fully mitigated to the extent feasible.

9.2 Overriding Considerations for the HST System and for the Preferred Pacheco Pass Network Alternative

There are numerous benefits of the HST system as a whole, and of the Preferred Pacheco Pass Network Alternative, which outweigh the significant and unavoidable adverse effects of implementing the Preferred Pacheco Pass Network Alternative in the Bay Area to Central Valley study region. These benefits are in the areas of transportation, the environment, land-use planning, economics, and social considerations. Many of these benefits are documented in the 2012 Partially Revised Final Program EIR, which considered a scenario in which the entire 800-mile high-speed train system would be operating and generating benefits in 2030. The following identified benefits include information consistent with the Program EIR to represent the high end of the range of benefits. Additional information on the lower end of the range of benefits anticipated in 2030 is also provided, based on the scenarios and information in the Revised 2012 Business Plan. This information illustrates that while benefits would be lower in 2030 under the Revised 2012 Business Plan scenarios, benefits remain and would still accrue over time for many decades into the future.

9.2.1 Benefits of the Statewide High-Speed Train System

Transportation Benefits

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 transportation conditions, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population, economic activity, and tourism in California. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 20 years and beyond. Moreover, the ability to expand major highways and key airports is uncertain; some needed expansions may be impractical or may be constrained by physical, political, or other factors.

The HST system will provide a solution to many of the State's existing and looming transportation problems. It will meet the State's need for a safe and reliable mode of travel linking the major metropolitan areas of the state and deliver predictable, consistent travel times sustainable over time. The HST system will provide quick, competitive travel times between California's major intercity markets. The passenger cost for travel via the HST service will be lower than for travel by automobile or air for the same intercity markets.

By providing a new intercity, interregional, and regional passenger mode, the HST system will improve connectivity and accessibility to other existing transit modes and airports. Travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips will be improved. The HST system also provides system redundancy in cases of extreme events such as adverse weather or petroleum shortages (HST trains are powered by electricity which can be generated from non-petroleum or petroleum-fueled sources; automobiles and airplanes currently require petroleum). The HST system will provide a predominantly separate transportation system that will be less susceptible to many factors influencing reliability, such as capacity constraints, congestion, and incidents that disrupt service.

The HST system will add capacity to the state's transportation infrastructure and reduce traffic on certain intercity highways and around airports to the extent that intercity trips are diverted to the HST system. Diversions from the automobile to HST could lead to a projected 2.3% statewide reduction in vehicles miles traveled on the highway system, or 9.74 billion vehicle miles traveled annually. An estimate of automobile VMT reductions for the Phase I Blended System identified in the Revised 2012 Business Plan yielded reductions in the range of 3-4 billion fewer vehicle miles traveled annually in 2030. Though benefits would accrue more slowly under the Revised 2012 Business Plan

scenarios than under the Program EIR assumptions, there are still substantial benefits in early years associated with VMT reductions under this lower range of benefits, and the benefits would continue to accrue for decades. It also will eliminate delays at existing at-grade crossings where the HST system will provide grade separation. The HST system also will decrease injuries and fatalities due to diversion of trips from highways, will improve connectivity, and will add a variety of connections to existing modes, additional frequencies, and greater flexibility.

Benefits to the Environment

In addition to reducing highway congestion, the HST system as a whole will provide substantial improvements in air quality, transportation energy efficiency, and noise. The HST system will decrease air pollutants statewide and in all air basins analyzed by reducing pollution generated by automobile combustion engines, as a result of decreased vehicle miles traveled by automobiles and decreased automobile congestion. Compared to the No Project scenario, the HST system will result in a reduction of 5.8 million barrels of oil and 3.4 million metric tons (6.8 billion pounds) of CO2 emissions annually by 2030, consistent with ~~helping~~ the State's ~~meet the~~ CO_2 emissions reductions target in Assembly Bill 32. An estimate of CO_2 emissions reductions for the Phase I Blended System identified in the Revised 2012 Business Plan yielded emissions reductions in the range of 0.8 to 1.4 million metric tons annually in the year 2030. Though benefits would accrue more slowly under the Revised 2012 Business Plan scenarios than under the Program EIR scenario, there are still substantial benefits in early years associated with greenhouse gas emissions reductions, and the benefits will continue to accrue and build for decades. The HST system will also increase energy efficiency in transportation use because HST uses less energy to move passengers than either airplanes or automobiles: the HST system will use about one-third the energy needed by an airplane, about one-half the energy needed by an automobile for an intercity automobile trip, and one-fifth the energy needed by an automobile for a commuter automobile trip. In addition, noise reduction will occur in locations where grade separations eliminate horn and crossing gate noise at existing grade crossings.

The statewide HST system has minimized environmental impacts by utilizing existing transportation corridors. The preferred alignment alternatives and station location options for the system as a whole have been crafted to avoid and/or minimize the potential impacts to cultural, park, recreational and wildlife refuges to the greatest extent practicable. In this way, the HST system meets the purpose and need and project objectives for improving the State's transportation options, while doing so in an environmentally sensitive way.

Land Use Planning Benefits

The HST system will be highly compatible with local, regional, and state plans and policies that support rail systems and TOD and will offer opportunities for increased land use efficiency (i.e., higher density development and reduced rate of farmland loss). The HST system will promote transit-oriented, higher-density development around transit nodes as the key to stimulate in-fill development that makes more efficient use of land and resources and can better sustain population growth. The increased density of development in and around HST stations yields the additional public benefit of making public infrastructure improvements more cost-effective. Additionally, the HST system is expected to be a catalyst for wider adoption of smart growth principles in communities near HST stations.

The HST system will also meet the need for improved inter-modal connectivity with existing local and commuter transit systems. HST stations in California will be multi-modal transportation hubs. All the selected high-speed rail station locations will provide linkage with local and regional transit, airports, and highways. In particular, convenient links to other rail services (heavy rail, commuter rail, light rail, and conventional intercity) will promote TOD at stations by increasing ridership and pedestrian activity at these "hub" stations. A high level of accessibility and activity at the stations can make the nearby area more attractive for additional economic activity. Most of the potential stations identified for further evaluation at the project level are located in heart of the downtown/central city area of

California's major cities, minimizing potential impacts on the environment and maximizing connectivity with other modes of transportation.

Economic Benefits

The HST system will generate economic benefits related to revenue generated by the system, economic growth and jobs generated by construction and operation of the system, benefits from reduced delays to air and auto travelers, and economic advantages related to proximity to the HST system.

As noted in Chapter 1 of the 2008 Final Program EIR, the market for intercity travel in California is projected to grow substantially over the next 20 years. By 2030, the HST system is forecast to carry up to approximately 100 million intercity passengers and is expected to generate revenues that would substantially exceed operations and maintenance costs.

~~Construction of the HST system will generate the equivalent of almost 160,000 construction related jobs statewide. Operations and maintenance of the HST system would generate approximately 450,000 permanent jobs statewide.~~ The Revised 2012 Business Plan estimates that building Phase 1 of the high-speed train system would generate between 990,000 and 1.25 million job-years of employment, approximately 33% of which are direct construction jobs and the remaining jobs resulting from the multiplier effect of the project. Operations and maintenance jobs for Phase 1 of the high-speed train system range from 2,900 to 3,500. In addition, the HST system would improve the economic productivity of workers engaging in intercity travel by providing an option to avoid the delays and unpredictability associated with air and highway travel. These economic benefits are in marked contrast to the cost of expanding airports and highways, which would be two to three times the cost of the HST system to meet the demand for 2030, even assuming this type of expansion is even feasible.

Finally, experiences in other countries have shown that an HST system can provide a location advantage to those areas in proximity to an HST station because an HST system would improve accessibility to labor and customer markets, potentially improving the competitiveness of the state's industries and the overall economy. Businesses that locate in proximity to an HST station could operate more efficiently than businesses that locate elsewhere. This competitive advantage may be quite pronounced in high-wage employment sectors that are frequently in high demand in many communities.

Social Benefits

The HST system would provide a new intercity, interregional, and regional passenger mode that would improve connectivity and accessibility to other existing transit modes and airports. The HST system would improve the travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips and the passenger cost for travel via the HST system would be lower than for travel by automobile or air for the same intercity markets.

The HST system would provide an opportunity for some people who would not otherwise make trips to do so, e.g., where travel options are currently limited. In addition, HST is a mode of transportation that can enhance and strengthen urban centers. In combination with appropriate local land use policies, the increased accessibility afforded by the high-speed service could encourage more intensive development and may lead to higher property values around stations.

9.2.2 Benefits of the Preferred Pacheco Pass Network Alternative in the Bay Area to Central Valley Region

The benefits of the HST system as a whole are also benefits of the Preferred Pacheco Pass Network Alternative in the Bay Area to Central Valley study region. The Preferred Pacheco Pass Network Alternative also involves some benefits unique to the Bay Area to Central Valley study region that further

support the Authority's conclusion that the project's benefits outweigh its significant and unavoidable environmental impacts.

- The Preferred Pacheco Pass Network Alternative best serves the connection between northern and southern California with the greatest potential frequency and capacity, superior connectivity between the South Bay and Southern California, and fewer potential intermediate stops. Of the network alternatives examined, it is therefore best able to meet the purpose and need of the statewide HST system.
- The Preferred Pacheco Pass Network Alternative would result in a reduction in vehicle miles traveled (annual) of about 1.75%, or 716 million VMT, in the Bay Area (Alameda, Contra Costa, San Francisco, San Mateo and Santa Clara Counties) and 8.0%, or 3.69 billion VMT, in the Central Valley (San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, Kern and Kings Counties), creating improvements in highway congestion and reductions in air pollutant emissions.
- The Preferred Pacheco Pass Network Alternative is the network alternative could enable the early implementation of the HST/Caltrain section between San Francisco, San Jose, and Gilroy.
- The Preferred Pacheco Pass Network Alternative achieves the project purpose and objectives while minimizing the public safety concerns and technological challenges associated with known faults and other seismic hazards.
- The Preferred Pacheco Pass Network Alternative achieves the project purpose and objectives while minimizing environmental impacts and avoiding impacts on the San Francisco Bay.
- The Preferred Pacheco Pass Network Alternative has the advantage of fewer stops through the high-speed trunk of the system between San Francisco or San Jose and Southern California, thereby minimizing the potential for urban sprawl and resulting in fewer community impacts than other network alternatives that were studied.
- The U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency have concurred that the Preferred Pacheco Pass Network Alternative would most likely contain the least environmentally damaging practicable alternative (LEDPA). For this reason, the Preferred Pacheco Pass Network Alternative is the network alternative in the Bay Area to Central Valley study region that will have the highest likelihood of being efficiently planned, reviewed, and constructed.

9.3 Conclusion

Implementing the HST system in the Bay Area to Central Valley study region will result in significant environmental impacts, regardless of which network alternative is selected. The decision of how to implement the HST system in the Bay Area to Central Valley study region therefore involves a balancing of different types and degrees of environmental impacts in different locations. The Preferred Pacheco Pass Network Alternative will contribute to achieving the distinct benefits of the HST system as a whole, including improved transportation and reduced congestion, improved air quality, energy savings, and greater opportunities for smart-growth land use planning. At the same time, the Preferred Pacheco Pass Network Alternative minimizes adverse impacts on the environment and qualifies as the environmentally preferable alternative. The Authority therefore finds that the transportation, environmental, land use, economic, and social benefits of the Preferred Pacheco Pass Network Alternative outweigh the adverse environmental impacts that will remain after adoption and application of all mitigation strategies listed in this document.