2013 California State Rail Plan

Appendices

California TRANSPORTATION PLAN 2040

Integrating California's Transportation Future

RAIL PLAN

California State Rail Plan

Caltrans

May 2013

2013 CALIFORNIA STATE RAIL PLAN
APPENDICES

May 2013

Prepared for

California Department of Transportation

1120 N Street

P.O. Box 942874

Sacramento, CA 95814

Prepared by

AECOM

2101 Webster Street #1900

Oakland, CA 94612

with Cambridge Systematics, Inc.

Arellano Associates

[This page intentionally blank]

Contents

[This page intentionally blank]

Appendix A

COUNTY POPULATION AND EMPLOYMENT

[This page intentionally blank]

Table A.1: County 2011 to 2040 Population and Non-Farm Employment Growth

County	2011 Population	2040 Population	2011-2040 Population Growth	2011-2040 Average Annual Population Growth	2011 Employment	2040 Employment	2011-2040 Employment Growth	2011-2040 Average Annual Employment Growth
Alameda	1,517,641	2,037,903	520,262	1.02%	628,555	802,319	173,764	0.84%
Alpine	1,016	756	-260	-1.02%	701	499	-202	-1.17%
Amador	38,496	46,139	7,643	0.62%	13,135	15,070	1,935	0.47%
Butte	222,357	285,043	62,686	0.86%	71,260	95,392	24,132	1.01%
Calaveras	48,020	65,132	17,112	1.05%	8,169	10,606	2,437	0.90%
Colusa	21,859	29,430	7,571	1.03%	8,676	11,181	2,505	0.87%
Contra Costa	1,069,666	1,534,806	465,140	1.25%	319,316	435,527	116,211	1.07%
Del Norte	29,273	33,058	3,785	0.42%	8,761	9,471	710	0.27%
El Dorado	182,871	261,569	78,698	1.23%	43,836	58,210	14,374	0.98%
Fresno	941,375	1,312,941	371,566	1.15%	284,584	416,983	132,399	1.32%
Glenn	28,628	34,075	5,447	0.60%	8,126	9,259	1,133	0.45%
Humboldt	130,270	138,404	8,134	0.21%	46,350	47,139	789	0.06%
Imperial	172,369	245,844	73,475	1.22%	45,252	71,070	25,818	1.56%
Inyo	17,142	16,236	-906	-0.19%	7,643	6,929	-714	-0.34%
Kern	831,111	1,155,657	324,546	1.14%	226,522	280,168	53,646	0.73%
Kings	152,959	216,591	63,632	1.20%	35,512	47,521	12,009	1.00%
Lake	66,533	85,072	18,539	0.85%	15,071	18,446	3,375	0.70%
Lassen	35,271	39,960	4,689	0.43%	11,464	12,433	969	0.28%
Los Angeles	10,048,450	13,317,360	3,268,910	0.97%	3,808,198	4,924,370	1,116,172	0.89%
Madera	154,957	279,177	124,220	2.03%	32,684	51,049	18,365	1.54%
Marin	253,792	295,499	41,707	0.52%	98,656	123,637	24,981	0.78%
Mariposa	17,998	20,138	2,140	0.39%	5,436	5,822	386	0.24%
Mendocino	86,481	88,372	1,891	0.07%	29,862	29,211	-651	-0.08%
Merced	253,633	367,413	113,780	1.28%	56,149	69,235	13,086	0.72%

Table A.1: County 2011 to 2040 Population and Employment Growth (continued)

County	2011 Population	2040 Population	2011-2040 Population Growth	2011-2040 Average Annual Population Growth	2011 Employment	2040 Employment	2011-2040 Employment Growth	2011-2040 Average Annual Employment Growth
Modoc	9,013	8,349	-664	-0.26%	2,839	2,518	-321	-0.41%
Mono	13,117	14,495	1,378	0.34%	6,839	7,234	395	0.19%
Monterey	414,492	533,337	118,845	0.87%	121,436	157,127	35,691	0.89%
Napa	137,124	175,218	38,094	0.85%	58,610	70,887	12,277	0.66%
Nevada	99,393	118,286	18,893	0.60%	28,081	31,991	3,910	0.45%
Orange	3,101,101	4,160,218	1,059,117	1.01%	1,368,994	1,780,376	411,382	0.91%
Placer	369,410	720,696	351,286	2.30%	115,626	209,420	93,794	2.05%
Plumas	20,028	18,188	-1,840	-0.33%	6,249	5,432	-817	-0.48%
Riverside	2,198,632	3,350,870	1,152,238	1.45%	546,817	815,405	268,588	1.38%
Sacramento	1,433,151	2,057,343	624,192	1.25%	550,714	733,944	183,230	0.99%
San Benito	55,012	55,809	797	0.05%	15,058	14,578	-480	-0.11%
San Bernardino	2,030,501	2,411,909	381,408	0.59%	569,048	661,353	92,305	0.52%
San Diego	3,123,356	4,618,560	1,495,204	1.35%	1,243,455	1,659,369	415,914	0.99%
San Francisco	831,934	1,060,064	228,130	0.84%	534,804	733,472	198,668	1.09%
San Joaquin	700,704	983,635	282,931	1.17%	189,297	246,353	57,056	0.91%
San Luis Obispo	279,276	419,253	139,977	1.40%	98,031	105,092	7,061	0.24%
San Mateo	730,077	901,666	171,589	0.73%	308,458	410,033	101,575	0.98%
Santa Barbara	415,936	536,647	120,711	0.88%	163,419	237,246	73,827	1.29%
Santa Clara	1,820,416	2,453,918	633,502	1.03%	857,394	1,102,954	245,560	0.87%
Santa Cruz	259,270	341,483	82,213	0.95%	87,550	127,486	39,936	1.30%
Shasta	183,115	218,904	35,789	0.62%	57,944	78,657	20,713	1.05%
Sierra	3,139	2,715	-424	-0.50%	904	748	-156	-0.65%
Siskiyou	44,642	45,393	751	0.06%	13,485	13,126	-359	-0.09%
Solano	409,023	462,390	53,367	0.42%	119,691	177,182	57,491	1.35%

Table A.1: County 2011 to 2040 Population and Employment Growth (continued)

County	2011 Population	2040 Population	2011-2040 Population Growth	2011-2040 Average Annual Population Growth	2011 Employment	2040 Employment	2011-2040 Employment Growth	2011-2040 Average Annual Employment Growth
Sonoma	482,117	652,643	170,526	1.04%	172,278	229,890	57,612	0.99%
Stanislaus	514,035	734,212	220,177	1.23%	147,145	212,213	65,068	1.26%
Sutter	95,799	114,183	18,384	0.61%	22,135	31,320	9,185	1.20%
Tehama	62,099	76,624	14,525	0.72%	16,134	19,057	2,923	0.57%
Trinity	14,251	16,930	2,679	0.59%	2,739	3,114	375	0.44%
Tulare	450,356	738,786	288,430	1.71%	105,952	158,376	52,424	1.39%
Tuolumne	55,620	58,387	2,767	0.17%	16,700	16,781	81	0.02%
Ventura	823,648	1,132,282	308,634	1.10%	275,559	437,550	161,991	1.59%
Yolo	205,583	331,563	125,980	1.65%	91,902	137,602	45,700	1.39%
Yuba	76,149	99,989	23,840	0.94%	14,174	22,094	7,920	1.53%
Total	**37,783,690**	**51,531,516**	**13,747,826**	**1.07%**	**13,743,379**	**18,201,526**	**4,458,147**	**0.97%**

Source: Moody's Economy.com, 2011.

[This page intentionally blank]

Appendix B

PUBLIC OUTREACH AND STAKEHOLDER INVOLVEMENT DETAILS

[This page intentionally blank]

B.1 California State Rail Plan Public Outreach Coordination

The purpose of the *California State Rail Plan* (CSRP) public outreach effort is to engage the general public and interested and affected stakeholders in the CSRP process. The following list summarizes the number and type of outreach activities conducted between December 2011 and June 2013:

- Stakeholder Briefings:
  - 30 Internal/Organizational California Department of Transportation (Caltrans) Coordination Briefings.
  - 17 State and Regional Agency Briefings.
  - 21 Rail Corridor Organization Briefings.
  - 5 Freight Railroad Briefings.
  - 6 CSRP Advisory Committee Meetings.
- Public Meetings:
  - 5 CSRP Public Open House Meetings.
  - 1 CSRP Public Webinar.
  - 505 Registered Open House and Webinar Participants.
- Public Comments:
  - 216 Comments or sets of comments Received.
  - 929 separate comments recorded.

B.2 Summary of Public Outreach Plan Support Activities

This section provides specific details on the stakeholder meetings listed above, including when the meeting was held, the organization/agency that hosted the meeting, and the purpose of the meeting. The meeting details are presented in Tables B.1 through B.5, which are grouped by the type of stakeholder.

Table B.1: Caltrans Internal Coordination and Organization Briefings

No.	Date	Organization/Agency	Purpose
1	Thursday, January 19, 2012	Caltrans District PIO Briefing	Coordination Meeting
2	Wednesday, March 7, 2012	Planning Horizons	General Presentation
3	Thursday, March 15, 2012	Caltrans District Directors Meeting	Update to District Directors
4	Thursday, April 14, 2012	Caltrans Management Briefing	Update to Planning/Modal Deputy Director
5	Tuesday, May 15, 2012	Caltrans California Interregional Blueprint (CIB) Headquarters	Update to CIB Team
6	Thursday, June 14, 2012	Caltrans CIB Headquarters	Update to CIB Team
7	Thursday, July 12, 2012	Caltrans CIB Headquarters	Update to CIB Team
8	Wednesday, September 5, 2012	Caltrans Management Briefing	Update to Planning/Modal Deputy Director
9	Thursday, September 13, 2012	California Transportation Commission (CTC)	Briefing
10	Friday, September 14, 2012	Caltrans Management Briefing	Update to Planning/Modal Deputy Director
11	Friday, September 14, 2012	Business, Transportation, and Housing Agency (BTH)	Briefing
12	Monday, September 17, 2012	Caltrans CIB Headquarters	Update to CIB Team
13	Monday, September 17, 2012	Caltrans Freight/California Transportation Plan (CTP) Staff	Briefing Update
14	Thursday, September 20, 2012	CIB Outreach Coordinators Meeting	Update to CIB Coordinators
15	Thursday, October 11, 2012	Caltrans District Directors Meeting	Update to District Directors
16	Thursday, October 11, 2012	Caltrans CIB Headquarters	Update to CIB Team
17	Monday, October 22, 2012	Caltrans Management Briefing	Update to Planning/Modal Deputy Director
18	Thursday, October 25, 2012	Planning Local Assistance (PLAN)	Briefing
19	Wednesday, October 31, 2012	CTC	Staff Briefing
20	Thursday, November 28, 2012	Caltrans District PIO Meeting	Coordination Meeting
21	Tuesday, December 4, 2012	CIB Outreach Coordinators Meeting	Outreach coordination meeting
22	Friday, December 14, 2012	Caltrans Management Briefing	Update to Planning/Modal Deputy Director
23	Tuesday, January 8, 2013	CTC	Staff Briefing
24	Wednesday, January 9, 2013	CTC	Staff Briefing
25	Thursday, January 10, 2013	Caltrans CIB/CTP District Teleconference	Briefing/Update to CIB/CTP Team
26	Thursday, January 31, 2013	PLAN	Briefing Update
27	Friday, March 1, 2013	CTC	Staff Briefing
28	Tuesday, March 5, 2013	CTC	Commission Briefing
29	Thursday, March 14, 2013	Caltrans CIB Headquarters	Update to CIB Team
30	Thursday, April 11, 2013	Caltrans CIB Headquarters	Update to CIB Team

Source: Arellano Associates Inc., 2013.

Table B.2: State and Regional Agencies

No.	Date	Organization/Agency	Purpose
1	Friday, March 16, 2012	Rural County Task Force (RCTF)	Briefing
2	Tuesday, May 8, 2012	Active Transportation and Livable Communities (ATLC)	Briefing
3	Friday, September 28, 2012	Native American Day	CSRP Exhibit Booth at Event
4	Tuesday, October 30, 2012	California Association of Council of Governments (CALCOG)	Update Briefing
5	Friday, November 9, 2012	Southern California Association of Governments (SCAG)–High-Speed Rail (HSR) and Transit Committee	Status Briefing
6	Friday, November 16, 2012	Rural County Task Force	Update Briefing
7	Friday, November 30, 2012	Southern California Association of Governments–CEO Committee	Status Briefing
8	Wednesday, December 5, 2012	Native American Advisory Council	Informational Briefing
9	Friday, December 7, 2012	California Air Resources Board (ARB)	Briefing to Staff
10	Thursday, January 3, 2013	Valley Council of Governments	Briefing
11	Friday, January 18, 2013	Rural Counties Task Force (RCTF)	Informational
12	Tuesday, January, 22, 2013	California Energy Commission	Informational
13	January 28, 2013	CALCOG	Update Briefing
14	Thursday, February 21, 2013	ATLC	Update Briefing
15	Friday, March 1, 2013	Caltrans Tribal Liaison Office	Tribal Informational Meeting
16	Thursday, March 7, 2013	SCAG	Status Briefing
17	Tuesday, March 19, 2013	California Passenger Rail Partners Forum	Briefing

Source: Arellano Associates Inc., 2013.

Table B.3: Rail Corridor Organizations

No.	Date	Organization/Agency	Purpose
1	Friday, April 20, 2012	Coast Rail Coordinating Council (CRCC)	Briefing
2	Thursday, May 10, 2012	Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency (LOSSAN) TAC	Update Briefing
3	Friday, June 29, 2012	LOSSAN TAC	Update Briefing
4	Friday, July 13, 2012	CRCC	Update Briefing
5	Thursday, August 9, 2012	LOSSAN TAC	Update Briefing
6	Thursday, August 30, 2012	LOSSAN/CRCC Joint Meeting	Update Briefing
7	Thursday, September 6, 2012	LOSSAN TAC	Update Briefing
8	Wednesday, September 26, 2012	Southern California Rail Partners Working Group (SCRPWG)	Briefing
9	Thursday, October 4, 2012	LOSSAN TAC	Update Briefing
10	Monday, October 29, 2012	SCRPWG	Briefing
11	Wednesday, November 14, 2012	Capitol Corridor Joint Powers Authority (CCJPA)	Briefing
12	Monday, November 19, 2012	LOSSAN Board	Update Briefing
13	Thursday, November 29, 2012	California High-Speed Rail Authority (Authority)	Briefing
14	Friday, November 30, 2012	San Joaquin Valley Rail Committee (SJVRC)	CSRP/Service Development Plan SDP Updates
15	Thursday, December 6, 2012	LOSSAN TAC	Update Briefing
16	Thursday, January 10, 2013	CRCC	Briefing to Policy Committee
17	Thursday, February 7, 2013	LOSSAN TAC	Update Briefing
18	Thursday, February 14, 2013	Authority	Update Briefing
19	Friday, February 15, 2013	HSR CEOs	Briefing to CEOs
20	Wednesday, February 20, 2013	LOSSAN Board	Briefing
21	Thursday, February 28, 2013	SJVRC	CSRP/SDP Updates

Source: Arellano Associates Inc., 2013.

Table B.4: Freight Railroads

No.	Date	Organization/Individual	Purpose
1	Tuesday, September 25, 2012	BNSF Railway (BNSF)	Meeting to Review discuss CSRP/SDP content
2	Thursday, September 27, 2012	Union Pacific Railroad (UPRR)	Meeting to Review discuss CSRP/SDP content
3	Tuesday, October 2, 2012	California Short line Rail Association	Meeting to Review discuss CSRP/SDP content
4	Monday, February 4, 2013	UPRR	Meeting to Review discuss CSRP/SDP content
5	Thursday, March 7, 2013	UPRR	Meeting to Review discuss CSRP/SDP content

Source: Arellano Associates Inc., 2013.

Table B.5: CSRP Advisory Committee Meetings

No.	Date	Organization/Individual	Purpose
1	Wednesday, February 15, 2012	CSRP Advisory Committee	Committee Meeting
2	Wednesday, June 6, 2012	CSRP Advisory Committee	Committee Meeting
3	Wednesday, September 19, 2012	CSRP Advisory Committee	Committee Meeting
4	Wednesday, December 19, 2012	CSRP Advisory Committee	Committee Meeting
5	Wednesday, March 6, 2013	CSRP Advisory Committee	Committee Meeting
6	Wednesday, June 26, 2013	CSRP Advisory Committee	Committee Meeting

Source: Arellano Associates Inc., 2013.

B.3 Summary of Public Meetings

Five CSRP public open houses and a webinar were held between February 12 and February 26, 2013. A total of **354** attendees registered at the open houses and **151** individuals participated in the on-line webinar, for a total of **505** participants. Caltrans received a total of **216** comments or sets of comments from agencies, organizations, and individuals regarding the CSRP. Major issues identified as a result of the public open houses are highlighted below.

- Air quality–greenhouse gas emissions.
- Support of the CSRP.
- Opportunities for local businesses and employment with HSR project.
- Benefits of a Joint Powers Authority (JPA) versus Caltrans management approach.
- Complete the Xpress West rail project to Las Vegas.
- Extend rail service to rural areas to the north, Las Vegas, and many other areas.
- Congestion relief and economic development opportunities.
- Elimination of grade crossings.
- More public involvement in the study process.

- Complete rail gap between Los Angeles and Bakersfield.
- Extending Metrolink service beyond Riverside.
- Economic growth issues.
- Employment opportunities.
- Train ridership and frequencies.
- Increased train service from Los Angeles to San Francisco.
- Alternatives to proposed HSR routes.
- Support for HSR.
- Opposition to HSR.
- Short haul rail assistance.
- Alternatives to the UPRR.
- Funding concerns.
- Public safety.

Summary of complete comments are located in Section B.4.

B.3.1 Notification of Public Meetings

Invitations to the public meetings were distributed to stakeholders asking them to attend the public meetings and provide input on the CSRP. Notification of the public meetings included:

- A public open house meeting announcement postcard.
- Select display ad publications in Spanish.
- Public open house meeting notice with dates and locations posted on the Caltrans CSRP website and postings in regional and local agency webpages and social media sites.
- Electronic notifications to CSRP stakeholders.
- Press releases to local newspapers.
- Public meeting announcement posters placed in several key Amtrak stations in California.

Table B.6 provides meeting location and attendance details for the five public open houses and webinar: Table B.7 lists the Spanish-language publications that received public meeting notices in various key areas, where the public meetings were being held.

Table B.6: Summary Table of Public Open Houses and Webinar

Date	Meeting Type	Location	Number of Registered Attendees	Written Comments	Verbal Comments
February 12, 2013	Public Open House	California State Railroad Museum, Sacramento, CA 95814	79	5	–
February 14, 2013	Public Open House	Elihu M. Harris State Building, Oakland, CA 94612	72	5	–
February 19, 2013	Public Open House	Caltrans District 11 San Diego Office Building, San Diego, CA 92110	76	8	–
February 20, 2013	Public Open House	Los Angeles County Metropolitan Transportation Authority (LACMTA), Los Angeles, CA 90012	80	6	–
February 21, 2013	Public Open House	Hugh M. Burns Building, Fresno, CA 93721	47	8	–
February 22, 2013	Public Webinar	Webinar	151	--	22
Total			**505**	**32**	**22**

Source: Arellano Associates Inc., 2013.

Table B.7: List of Select Spanish Publications and Circulation

No.	Publication	Areas Covered	Notice Date	Circulation
1	Vida En El Valle	Sacramento	02/06/13	32,900
2	El Mensajero	East Bay–Oakland	02/10/13	103,810
3	Vida En El Valle	Fresno	02/13/13	47,200
4	Enlace	San Diego	02/16/13	115,000
5	La Opinion	Los Angeles	02/15/13	124,990
Total				**391,000**

Source: Arellano Associates Inc., 2013.

Public Meeting Format

All open houses generally followed the same format. Meetings took place between 4:30 p.m. and 7:30 p.m. with the exception of the Oakland meeting which took place between 3:00 p.m. and 6:00 p.m. Project staff set up each venue in an open house format with eight information stations including presentation boards set up around the room on easels and staffed by CSRP project team members. Meeting participants viewed project displays and asked questions from project staff.

Materials used for the public open houses included:

- Informational Display Boards.
- PowerPoint Presentation.
- Public Meeting Guide.
- CSRP Fact Sheet.
- CSRP Frequently Asked Questions (FAQ).
- Copies of the Draft CSRP.
- HSR Fact Sheets.
- Freight Mobility Facts Sheets.
- Comment Cards.

The following information stations were set up at each open house:

- **Overview Presentation.** This station included a seating area where participants sat and watched a 20-minute PowerPoint presentation. The presentation looped continuously and communicated CSRP information and information on HSR, Freight Mobility, the CTP and CIB. The PowerPoint presentation also incorporated a video highlighting the CTP and CIB statewide efforts.
- **Station 1: Welcome/Sign-In.** Located at the entrance to the open house, this station functioned as the welcome table and sign-in area. Project staff greeted participants and explained the meeting format and how to submit comments.
- **Stations 2 and 3: California State Rail Plan.** This station included seven display boards describing the vision and purpose of the CSRP, as well as maps with information on current commuter, intercity passenger rail routes, and an overview map showing the integrated passenger rail system. Boards outlined the CSRP Chapters and the CSRP development process. Attendees could review a copy of the Draft CSRP and request a copy.
- **Station 4: California High-Speed Rail Authority.** This station provided two informational boards describing the HSR system, information about the Initial Operating Section (IOS), early investments, statewide benefits, rail connectivity, and Bookend projects.
- **Station 5: Freight Mobility.** This station included three boards on the Freight Mobility Plan, showing information on the purpose and components of the freight plan, Class I freight rail maps and regional and short line freight rail maps.
- **Station 6: California Transportation Plan and CIB.** This station provided two information boards about two statewide plans: the CIB and the CTP. These boards provided information about the effort to integrate statewide modal plans, programs and California's climate change goals.
- **Station 7: Comments.** This station included a seating area for participants to provide their input by filling out comment forms. Participants could also submit their comments online by using the available computers at the station.

Table B.8 shows the demographic profiles of participants at each of the five CSRP Public Open Houses.

Table B.8: Summary of Demographic Characteristics of Public Open House Attendees

Characteristic	Percentage
Sex	
Male	72%
Female	28%
Race	
African-American	4%
American Indian/Alaskan Native	1%
Asian/Pacific Islander	3%
Hispanic	9%
Caucasian	48%
Undetermined	35%
Disability	
Visibly Disabled	1%
Age	
Under 40	34%
Over 40	66%

Source: Arellano Associates Inc., 2013.

This exercise assists Caltrans in identifying impacted residents and communities affected by the Federal-Aid Highway Program and comply with Title VI of the Civil Rights Act of 1964, Non-Discrimination in Federally Assisted Programs. The methodology was limited to staff members making visual observations of the participants while filling out the demographic profile form. Income was not considered a characteristic that was observable; therefore it was excluded from the survey. The webinar was also excluded due to the nature of the meeting, which was limited to on-line participation. Generally, the number of participants observed does not coincide with the official number of attendees who registered.

Observations made were categorized by sex, race, disability and age. Overall the majority of participants were male (72 percent) and the majority of participants were Caucasian (48 percent). Race of participants also included 4 percent African-American, 1 percent American Indian/Alaskan Native, 3 percent Asian/Pacific Islander, and 9 percent Hispanic. Sixty-six percent of participants were over the age of 40.

The comments received during the comment period are summarized in Section B.4.

The following materials are included after the public meeting summaries:

- Display Boards.
- CSRP Fact Sheet.
- CSRP FAQ.

Sacramento, February 12, 2013
California State Railroad Museum

On February 12, 2013, Caltrans held a public open house at the California State Railroad Museum in Sacramento. Photos from the public open house are shown in Exhibits B.1A and B.1B. Approximately 79 people signed in at the meeting. Some of the agencies and organizations that participated in the open house covered the following topics:

- California Air Quality Management District.
- California ARB.
- California Department of Fish and Game.
- California Department of Forestry and Fire Protection.
- California Department of General Services.
- California State University Sacramento.
- Caltrans.
- CTC.
- City of Elk Grove.
- City of Sacramento.
- Nevada Department of Transportation.
- Next Generation.
- Northern Sierra Railway.
- Rail Passenger Association of California and Nevada.
- Rural County Representatives of California.
- Sacramento Area Bicycle Advocates.
- Sacramento Regional Transit District (RT).
- San Joaquin Regional Rail Committee (SJRRC).
- Stanislaus County Council of Governments.
- State Water Board.
- Senate Transit and Housing Committee.
- Think Big Sacramento.
- Transportation and Housing Agency.
- Willden Engineering.
- Train Riders Association of California.

A total of five written comments were submitted during the public open house. In general, comments and questions pertaining to the CSRP are summarized below:

- Cities need to be included in the long-term transportation plans.
- Include more routes from Eureka to Redding.
- Make these electrified trains that run daily and multiple times per day.
- CCJPA management is more efficient than management by Caltrans.
- Caltrans must work “with” regional entities so that “all” Amtrak California routes have service frequency expansions.
- Will diesel trucks be forced to purchase new trucks?
- Why does California want to run private industry namely, trains?

Media coverage was not present at the public meeting.

Exhibits B.1A and B.1B: Sacramento Public Meeting Photos

Oakland, February 14, 2013
Elihu M. Harris State Building

On February 14, 2013, Caltrans held a public open house at the Elihu M. Harris State Building in Oakland. Photos from the public open house are shown in Exhibits B.2A and B.2B. Approximately 72 people signed in at the meeting. Some of the agencies and organizations that participated in the open house covered the following topics:

- Alameda County Board of Supervisors.
- Association of Bay Area Governments.
- California Department of Corrections and Rehabilitation.
- California Department of General Services.
- City of Hercules.
- City of Livermore.
- City of Richmond.
- Contra Costa Transportation Authority.
- California Department of Social Services.
- CCJPA.
- Caltrans District 4.
- Consulate General of Japan.
- Department of Corrections and Rehabilitation.
- Ditching Dirty Diesel Collaborative.
- Friends of Caltrain.
- Metropolitan Transportation Commission.
- Natural Resources Defense Council.
- North Coast Railroad Authority.
- Office of Congressman Swalwell.
- State Water Resources Control Board.
- Train Riders Association of California.
- Transportation Agency for Monterey County (TAMC).
- University of California Berkeley.
- US Maritime Administration.


Exhibits B.2A and B.2B: Oakland Public Meeting Photos

Five written comments were submitted during the public open house. In general, comments pertaining to the CSRP are summarized below:

- More detailed information on the plan.
- Look to SFBARTC 1957 Report for HSR guidance.
- Make sure right-of-way is secured for safety and security.
- Comment period should be extended.
- HSR needs better than blended rail in the Bay Area
- Drop Blended Rail.
- Show a connection of Altamont Corridor Express (ACE) to Bay Area Rapid Transit (BART) in eastern Livermore.
- Draft plan makes no mention of the loss of the Rail Service north of Willits.
- Public notification should occur early in the CSRP development process.
- Projects need to be union and hire within the county.
- Show wage and affordability data in report.
- Purchasing power has decreased. We have all had to subsidize our riding of the rails.
- Stakeholder committees need to have union representation.

Media coverage was not present at the public meeting.

San Diego, February 19, 2013
Caltrans District 11 San Diego Office Building

On February 19, 2013, Caltrans held a public open house at the Caltrans District 11 San Diego Office Building in San Diego. Photos from the public open house are shown in Exhibits B.3A and B.3B. Approximately 76 people signed in at the meeting. Some of the agencies and organizations that participated in the open house are listed below:

- Amtrak.
- Caltrans District 11.
- City of Encinitas.
- City of Imperial Beach.
- Claremont Community Planning Group.
- Friends of Rose Creek.
- San Diego Association of Governments.
- California Coastal Commission.
- Train Riders Association of California.
- Pechanga Band of Luiseño Indians.
- Ferrocarrilera Peninsula del Norte.
- University California San Diego.


Exhibits B.3A and B.3B: San Diego Public Meeting Photos

A total of eight written comments were submitted during the public open house. In general, comments pertaining to the CSRP covered the following topics:

- Prioritize projects in southern California.
- Complete the rail gap between Los Angeles and Bakersfield.
- Double track through the entire corridor with triple track in strategic areas.
- Complete the "run through" tracks at Los Angeles Union Station (LAUS).
- Extend Metrolink service beyond Riverside.
- Complete the Xpress West rail project to Las Vegas.
- Include a rail stop at Camp Pendleton and San Diego Convention Center.
- Enhance Sprinter light rail service in preparation of HSR project.
- HSR should stop at Qualcomm Stadium.
- Consider Mexico in your stakeholder involvement.
- Place HSR along the coast.
- Integrate Rail Plan with California ARB's upcoming freight initiative.
- Rail Plan should note the communities that currently experience high levels of diesel exhaust and noise.
- The rail plan should clearly prioritize on-terminal intermodal yards over off-terminal yards.
- Improve service for north-south flow through project at LAUS.

Media coverage was not present at the public meeting.

Los Angeles, February 20, 2013
LACMTA

On February 20, 2013, Caltrans held a public open house at the LACMTA Headquarters in Los Angeles. Photos from the public open house are shown in Exhibits B.4A and B.4B. Approximately 80 people signed in at the meeting. Some of the agencies and organizations that participated in the open house are listed below:

Exhibits B.4A and B.4B: Los Angeles Public Meeting Photos

- Alameda Corridor Construction Authority.
- Coastal Band of the Chumash Nation.
- Authority.
- Caltrans District 7.
- City of Azusa.
- City of Fullerton, City of Burbank.
- City of South El Monte.
- Citizens for Better Mobility.
- Coalition for Clean Air.
- Council for Watershed Health.
- Crenshaw Subway Coalition.
- Friends of Expo Line.
- International Brotherhood of Teamsters Rail Committee.
- Los Angeles County Department of Engineering.
- Los Angeles County Fire Department.
- Los Angeles Department of Transportation.
- LACMTA.
- No 710 Action Committee.
- Orange County Transportation Authority (OCTA).
- Port of Hueneme.
- Port of Long Beach.
- Rail Passenger Association of California and Nevada.
- Riverside County Transportation Commission.
- San Diego Association of Governments.
- San Diego Metropolitan Transit System.
- South Bay Cities Council of Governments.
- South Coast Air Quality Management District.
- SCAG.
- Southern California Regional Rail Authority (Metrolink).
- Transit Coalition.
- United States Army Corps of Engineers.
- Van Nuys Neighborhood Council.
- Western Center on Law and Poverty.
- Wetto Bicycle Coalition.

A total of six written comments were submitted during the public open house meeting. In general, comments pertaining to the CSRP covered the following topics:

- Add new *Coast Daylight* service.
- Recommend California HSR System along a straight route (close to I-5).
- Connect Los Angeles and San Diego, as well as San Francisco to HSR.
- Los Angeles–Palm Springs should be a priority corridor to consider.
- Improve and increase train service between Los Angeles and Palm Springs.
- Build a train station in downtown Palm Springs.
- Provide shuttle service between Palm Springs train station and downtown Palm Springs.

Fresno, February 21, 2013

On February 21, 2013, Caltrans held a public open house at the Hugh M. Burns State Building in Fresno. Photos from the public open house are shown in Exhibits B.5A and B.5B. Approximately 47 people signed in at the meeting. Some of the agencies and organizations that participated in the open house are listed below:

- ABC 30.
- Carpenters Local 701.
- Citizens for California High-Speed Rail Accountability.
- City of Fresno.
- City of King.
- Coalition for Clean Air.
- Fresno Bee.
- Fresno Council of Governments.
- Kern County Council of Governments.
- Madera County Transportation Commission.
- Mental Health Systems.
- Authority.
- Office of Assembly Member Patterson.
- Office of Assembly Member Perea.
- San Joaquin Council of Governments.
- San Jose State University.
- Tulare County.
- Train Riders Association of California.
- Tulare County Association of Governments.
- Valley Area Strategic Team.

A total of eight written comments were submitted during the public open house meeting. In general, comments pertaining to the CSRP covered the following topics:

- Safety concerns regarding HSR and Amtrak sharing tracks.
- *San Joaquin* line funding.
- Will there be a downtown Hanford station once HSR is built?
- Will the State still fund the *San Joaquin* line?
- Add a rail connection to southern California for our produce and farm goods beside the UPRR.
- Fund rail from Bakersfield to southern California that could work in a track for Amtrak.
- Resolve bus rides for train riders using Amtrak.
- XpressWest and HSR should work together.
- Recommend light cargo at the end of passenger car.
- Support of HSR.
- The San Joaquin Valley needs short haul rail assistance.

Media coverage from Fresno Bee and Channel 30 (ABC affiliate–KSFN) covered the meeting.


Exhibits B.5A and B.5B: Fresno Public Meeting Photos

Online Public Webinar, February 26, 2013

On February 26, 2013, Caltrans held a public on-line webinar. Approximately 151 people participated in the webinar. A total of 22 comments/questions were submitted during the public online webinar. Some of the agencies and organizations that participated in the on-line webinar are listed below:

- City of Fullerton.
- City of St. Helena.
- County of Mendocino.
- County of Tuolumne.
- Fresno Bee.
- Fresno Metro Ministry.
- Northern California Carpenters Regional Council.
- University of California Santa Cruz.
- Transportation Agency for Monterey County.
- Office of Congressman Eric Swalwell.

Due to this being a webinar not all participants listed the organization or agency they represented. In general, comments pertaining to the CSRP covered the following topics:

- Cities need to be included in long-term transportation plans.
- Any potential loss of service to smaller cities without HSR?
- What are the sources of funding?
- Consider HSR service to Marin and Sonoma counties via the Highway 101 corridor?
- Fuel price data in the study uses today's prices; however fuel prices will increase. How do you reconcile that discrepancy?
- Need for a workable integrated fare system.
- How does one create an integrated HSR, intercity, and commuter rail system?
- The Authority should look into funds through sales of private stock ownership.
- What is the realistic plan of building HSR within the major metropolitan areas without altering eminent domain laws?

- Who are we buying the train sets from?
- What will be Transportation Security Administration's (TSA) involvement in HSR?
- What is the status of the Xpress West extension between Palmdale and Victorville?
- Will any funds for the HSR system be taken out of the Highway Trust Fund?
- Is there any discussion of an Amtrak line connecting from Bakersfield to Los Angeles?
- Any plans for Smart-train through Marin up to Cloverdale?
- How do we get a project listed in the plan?
- Does the Rail Plan include potential skip-stop locations for HSR?
- Is the Dumbarton Corridor rail project included in Northern California Unified Service plans?
- When is the San Joaquin SDP due to be published?
- Will Caltrans be consulting with tribes outside of this public process?
- Is there any provision for future funding to look at re opening rail service to the Port of Humboldt Bay and the surrounding area?
- Is there a plan to link Sonoma County's Sonoma-Marin Area Rail Transit (SMART) Rail to other passenger service in the Bay Area or statewide rail networks?
- Service expansion for the proposed Northern California Unified Service.
- Extend service in the San Joaquin Valley.
- Reconnect the short lines on the west side of the San Joaquin Valley between Fresno and Tracy for commuter, intercity passenger, or freight service.
- When will the project development begin in the San Francisco Bay Area?
- And how does California Senate Bill 557 affect the timeline of the modernizing of the Caltrain tracks?
- Include "Wharf-to-Wharf" Santa Cruz–Monterey service in Rail Plan.

For a full list of agencies or organizations who commented please refer to Table B.10 and Table B.11.

A Fresno Bee representative participated in the on-line webinar.

Exhibits B.6 through B.20 include images of the display boards shown at the public meetings.
Exhibit B.21 shows the CSRP Factsheet and Exhibit B.22 shows the CSRP FAQ.

Exhibit B.6 Public Meeting Board: Welcome

Exhibit B.7 Public Meeting Board: Vision Statement

Exhibit B.8 Public Meeting Board: CSRP Overview

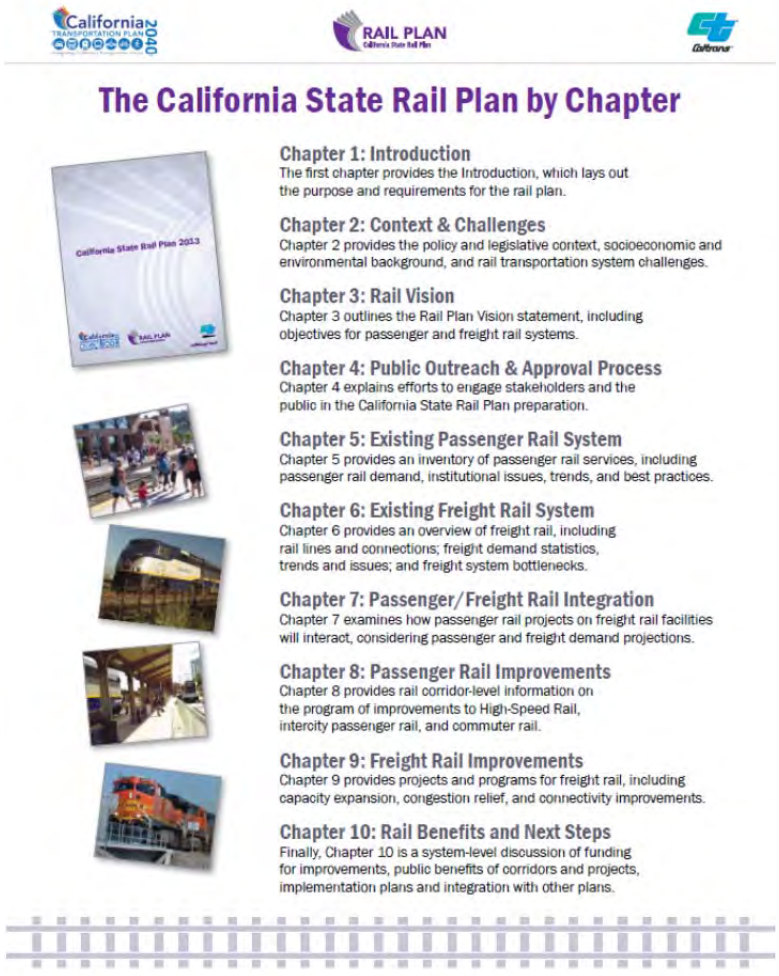

Exhibit B.9 Public Meeting Board: CSRP Chapters

Exhibit B.10 Public Meeting Board: Integrated Passenger Rail Map

Exhibit B.11 Public Meeting Board: Intercity Passenger Rail Routes

Exhibit B.12 Public Meeting Board: Commuter Rail Map

Exhibit B.13 Public Meeting Board: Authority Map

Exhibit B.14 Public Meeting Board: Authority Planning

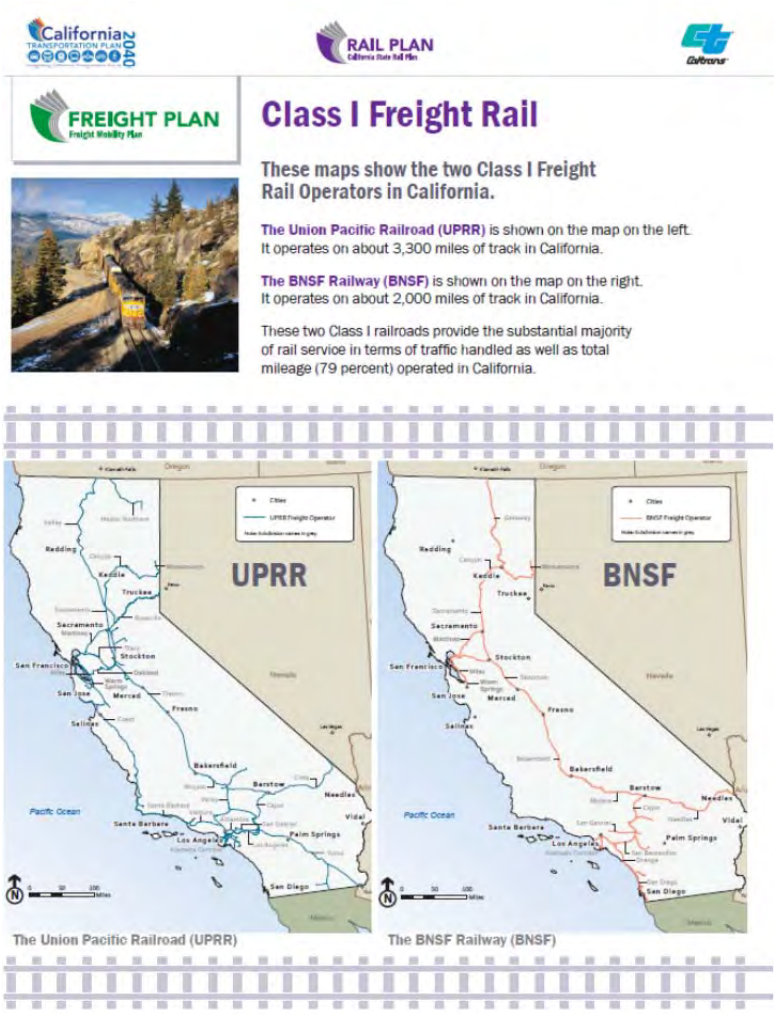

Exhibit B.15 Public Meeting Board: Class I Freight Rail Map

Exhibit B.16 Public Meeting Board: Short Line Freight Rail Map

Exhibit B.17 Public Meeting Board: Freight Mobility Plan Overview

Exhibit B.18 Public Meeting Board: CTP 2015 Overview

Exhibit B.19 Public Meeting Board: CTP 2015 Plans

Exhibit B.20 Public Meeting Board: CSRP Input Invitation

Exhibit B.21 CSRP Fact Sheet

Source: Caltrans CSRP website, 2013.

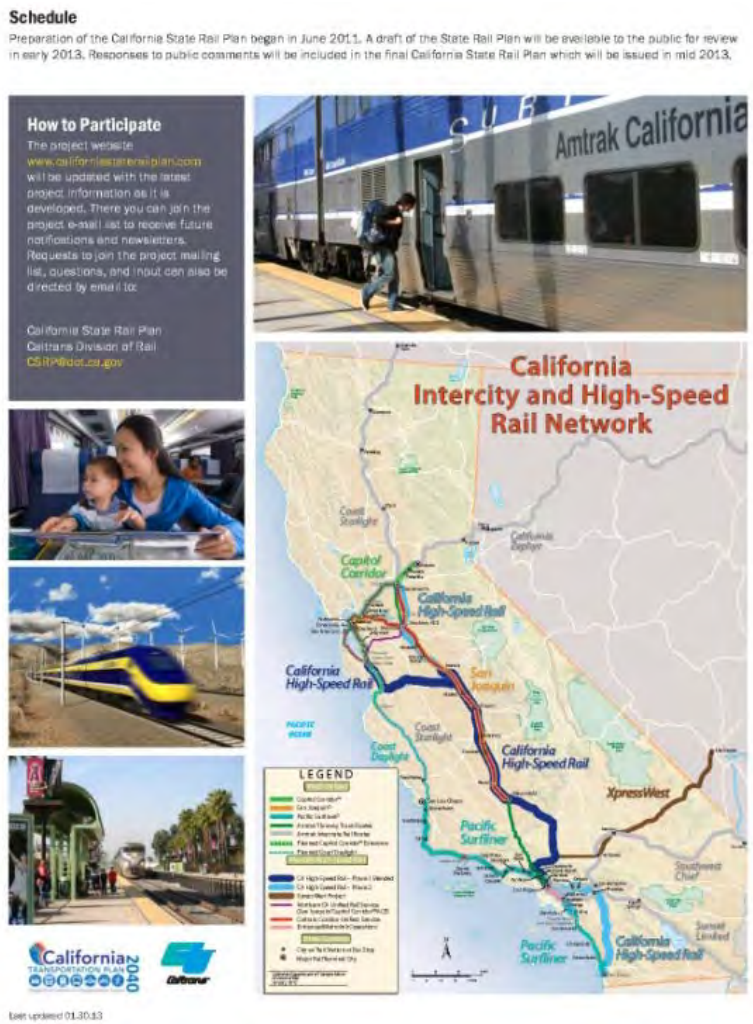

Exhibit B.21 CSRP Fact Sheet (continued)

Source: Caltrans CSRP website, 2013.

RAIL PLAN
California State Rail Plan

Caltrans

CALIFORNIA STATE RAIL PLAN

FREQUENTLY ASKED QUESTIONS

What is the California State Rail Plan?

The California State Rail Plan establishes a statewide vision, sets priorities, and develops implementation strategies to enhance passenger and freight rail service in the public interest. It will serve as a basis for federal and state rail investments within the state for high-speed and conventional intercity passenger rail. The vision, priorities, and implementation strategies will support the State's goals of an integrated multimodal transportation network consisting of highway, freight, rail, transit, and aviation systems. This will be the first planning document that fully integrates the planned California High-Speed Rail system with the existing and proposed conventional rail network.

How does this relate to the California Interregional Blueprint?

The California State Rail Plan will complement and be prepared in parallel with the California Interregional Blueprint. The California Interregional Blueprint is a larger, more comprehensive planning effort to articulate the State's vision for an integrated multimodal interregional transportation system, one that reflects land use and transportation plans developed at the local level. The California Interregional Blueprint will be a foundation for the California Transportation Plan 2040, which is required by federal and state law. Release of the draft California State Rail Plan is scheduled for early 2013, just after the release of the California Interregional Blueprint Interim Report in December 2012. Responses to public comments will be included in the final State Rail Plan which will be issued in mid 2013.

What are the legal requirements of the California State Rail Plan?

California Government Code Section 14036 requires the California Department of Transportation (Caltrans) to prepare a 10-year rail planning document, for both passenger and freight rail, and to update it every two years. The Passenger Rail Investment and Improvement Act of 2008 is a federal law requiring state rail plans to be developed and updated every five years in order to be eligible for federal passenger rail funding. The Act requires state rail plans to be more comprehensive and to include high-speed rail, ridership and capacity modeling, corridor improvement plans, as well as projects funded by the Federal Railroad Administration.

The California Interregional Blueprint will position Caltrans to respond to legislative requirements of Senate Bill 391. This bill requires that the California Transportation Plan meet the State's climate change goals under Assembly Bill 32 and Senate Bill 375. Key strategies for achieving maximum feasible emissions reduction to attain California's greenhouse gas goals include the construction of high-speed rail and expansion of public transit, commuter rail, and intercity rail systems. Thus, the California State Rail Plan will be developed with the express intent of creating a direct link with California Transportation Plan 2040 to address how the State's future rail system will meet the requirements of Senate Bill 391 and provide an assessment of greenhouse gas emissions for the existing and future systems.

Last updated 01.30.13

Exhibit B.22 CSRP FAQ

Source: Caltrans CSRP website, 2013.

Why is the California State Rail Plan important at this time and what outcomes will it produce?

California's rapid population growth continues to put pressure on the State's aging infrastructure. To meet the challenges of this growth and avoid the negative ramifications, the California State Rail Plan will help define a more sustainable transportation system for the future. The California State Rail Plan will identify rail transportation alternatives that can provide relief to highway and air transportation congestion. Rail ridership in California has increased by 43.3 percent from 2001 to 2007, which is even more impressive when compared to the State's population growth (6.6 percent). Maintenance and expansion of California's rail system will have a positive effect on the future mobility and environmental quality of the state. It is envisioned that greater use of the rail system will take millions of cars and trucks off the road that would otherwise be additional contributors to air pollution. Ridership numbers continue to grow each year and greater use of rail will contribute to improved air quality by reducing vehicle miles traveled and vehicle emissions. It will also reduce fuel consumption and can reduce the need for highway construction.

What is the schedule?

Preparation of the California State Rail Plan began in June 2011. A draft of the State Rail Plan will be available to the public for review in early 2013. Responses to public comments will be included in the final California State Rail Plan which will be issued in mid 2013.

Who is developing the California State Rail Plan?

Caltrans Division of Rail is the lead agency preparing the California State Rail Plan, and successfully attracted federal funding for rail planning studies in a highly competitive grant process. Caltrans has entered into a consultant contract with AECOM and Cambridge Systematics to help develop the California State Rail Plan, as well as Service Development Plans for the San Joaquin, Pacific Surfliner North, Pacific Surfliner South, and Coast Daylight Amtrak train routes.

What are the California State Rail Plan objectives?

The objectives of the California State Rail Plan are to:

- Support the State's goal of an integrated, multimodal transportation system;
- Provide rail transportation alternatives to other travel modes;
- Provide relief to highway and air travel congestion;
- Improve air quality, conserve fuel, and contribute to efficient and environmentally superior land use;
- Integrate the planned California High-Speed Rail system with existing and proposed conventional train systems;
- Prepare Service Development Plans for the San Joaquin, Pacific Surfliner North, Pacific Surfliner South, and Coast Daylight Amtrak routes; and
- Consider freight rail needs and benefits as part of the State's investments in rail facilities.

What are the major components of the California State Rail Plan?

The California State Rail Plan will contain the following major components:

- Establish the overall vision for the state rail system
- Describe how different rail components (those managed by Caltrans and those managed by other entities) will work together to deliver a comprehensive set of rail services that are well integrated in the State's multimodal transportation system;
- Provide a current system inventory identifying needs and deficiencies;
- Identify improvements and a detailed investment strategy;
- Assess funding options;
- Describe how these improvements would support and reflect other state, regional and local planning activities throughout California.

Last updated 01.30.13

Exhibit B.22 CSRP FAQ (continued)

Source: Caltrans CSRP website, 2013.

How can stakeholders participate in this process?

Federal, state, and regional agencies, as well as freight and commuter rail agencies have been invited to participate in the California State Rail Plan Advisory Committee to ensure that a broad and diverse group of stakeholders are represented. Interested parties and individuals also can participate in the process through the public meetings beginning in early 2013.

What are the expectations for participation in the California State Rail Plan Advisory Committee?

The Advisory Committee was initiated by the Caltrans Division of Rail in 2012 to provide input and expertise in the development of the California State Rail Plan and individual Service Development Plans. The purpose of the Advisory Committee is to provide Caltrans with technical information and policy guidance on all aspects of the plan, including the various types of rail service (e.g., intercity passenger rail, commuter rail, high-speed rail, and freight rail), policies, system operations, environmental considerations and funding strategies. The Advisory Committee membership consists of representatives from:

- Amtrak
- BNSF Railway Company
- California High-Speed Rail Authority
- California Short Line Rail Association
- California Transportation Commission
- Capitol Corridor Joint Powers Authority
- Coast Rail Coordinating Council
- Federal Railroad Administration
- Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency (LOSSAN) North and South
- San Joaquin Valley Rail Committee
- State of California Business, Transportation and Housing Agency
- Union Pacific Railroad

The Advisory Committee is not a formal voting body; however, all input and dialogue will be documented for Caltrans and the consultant team to consider. The Advisory Committee participants will be able to attend quarterly meetings to provide continuity and insight on the California State Rail Plan.

What are Service Development Plans?

Service Development Plans will formalize the State's short, medium, and long-term visions for the following Amtrak corridors: the San Joaquin, Pacific Surfliner North, Pacific Surfliner South, and Coast Daylight Route. These plans will take into consideration anticipated population growth, the need to address high-speed rail and intercity passenger rail as future transportation options, multimodal connectivity with other transportation modes, and funding availability to meet projected needs.

The Service Development Plan process includes identifying project alternatives for the four corridors through a public outreach process. Alternatives will be screened by evaluating the construction feasibility, service performance improvements, community benefits and impacts, and environmental benefits and impacts of each alternative. Implementation plans for each of the corridors will be developed, including timeframes of recommended projects based on the screening effort. The Service Development Plans will identify capital needs, proposed funding sources, and potential phasing of improvements.

The Capital Corridor and California High-Speed Rail systems each have their own plans that have been developed by the Capital Corridor Joint Powers Authority and the California High-Speed Rail Authority respectively, which will be included in the State Rail Plan. The Service Development Plans and Business Plans are an integral part of the planning process and will provide criteria for corridor improvements and evaluation of intercity rail operational and capital improvements that are proposed in the California State Rail Plan.

Last updated 04.30.13

Exhibit B.22 CSRP FAQ (continued)

Source: Caltrans CSRP website, 2013.

How will the California State Rail Plan be implemented?

The California State Rail Plan will be used as a planning tool for improving the overall state rail system. It will provide a long-term strategy that will enable Caltrans, the California High-Speed Rail Authority, commuter rail operators, freight railroads, and communities to plan for the future. The State Rail Plan is intended to prioritize actions to facilitate the delivery of cost-effective rail services in California that promote climate stabilization, job access, environmental improvements, and improved mobility. Each of the rail operators would be responsible for implementing the improvements identified in the State Rail Plan based on demonstrated market demand, availability of capital and operating funding, and completion of related planned projects. In addition, these improvements may be subject to applicable environmental review and permitting prior to construction.

What is a "blended system"?

Plans are in the works to integrate or "blend" the California High-Speed Rail system with existing intercity and regional commuter rail systems via coordinated infrastructure, schedules, ticketing, and other means. With this blended approach, early improvements can be made to existing train systems like Altamont Commuter Express (ACE), State supported intercity rail service, Caltrain and Metrolink, while at the same time building the foundation for future California High-Speed Rail service. Passengers will benefit from early investments in these existing train systems, which will eventually provide important feeder service to the statewide California High-Speed Rail system once it starts operating.

What kinds of early improvements are envisioned? The California High-Speed Rail Authority will fund early improvements to the "bookends" of the California High-Speed Rail system in the San Francisco Bay Area and Los Angeles Basin. These improvements would consist of upgrading existing rail systems, such as electrification of the Caltrain corridor on the San Francisco peninsula and upgrades to Metrolink in the Los Angeles/Anaheim area. Improving the reliability, safety, and efficiency of these rail systems would benefit current riders and attract new ridership.

Construction of the initial operating section of High-Speed Rail is planned to be completed in 2018. This initial section of tracks will be put to use immediately upon completion and deliver early benefits by allowing the existing San Joaquin route to operate on the new tracks until the initiation of full High-Speed Rail service. With creation of the "Northern California Unified Service," the San Joaquin route, ACE, and Capitol Corridor trains will be enhanced and operated in a more integrated manner, creating an improved network reaching from Bakersfield to the San Francisco Bay Area and Sacramento.

The California High-Speed Rail Authority's plan would connect the major metropolitan areas of Northern and Southern California by leveraging existing systems and tying them together with a high-speed rail backbone in the Central Valley. Phase 1 of the High-Speed Rail system would connect San Francisco, the Central Valley, and Los Angeles/Anaheim through a combination of dedicated high-speed rail infrastructure blended with existing urban train systems. Ultimately, with Phase 2 expansion, California High-Speed Rail is planned to extend all the way from Sacramento to San Diego.

The California State Rail Plan lays out the vision, strategies and investments for California's rail system, which is based upon the future High-Speed Rail system. With connections at all new high-speed train stations to existing regional and local transit systems, High-Speed Rail will significantly enhance the passenger transportation across the state.

When can I provide input?

Public meetings on the California State Rail Plan will be held beginning in early 2013. The project website www.californiastaterailplan.com will be updated with the latest project information as it is developed. There you can join the project e-mail list to receive future notifications and updates. Requests to join the project mailing list, questions, and input can also be directed by email to:

How to contact us:
California State Rail Plan
Caltrans, Division of Rail
Office of Planning and Policy
1120 N Street, MS 74
Sacramento, CA 95814

CSRP@dot.ca.gov
www.californiastaterailplan.com

Last updated 04.30.13

Exhibit B.22 CSRP FAQ (continued)

Source: Caltrans CSRP website, 2013.

B.4 Comment Documentation, Analysis, and Synthesis

Members of the public, affected federal, state, and local agencies, interest groups and other interested parties participated in the public process by attending the meetings and/or providing written and verbal comments regarding the CSRP and other related matters. The comments received were submitted from various sources and are listed in Tables B.9, B.10, and Table B.11:

Table B.9: Summary Table of Public Comments Received

No.	Date	No. of Commenters	No. of Recorded Comments
1	Comment Cards	32	32
2	Letters	49	511
3	Emails	53	295
4	Website	59	68
5	Webinar	22	22
6	Verbal	1	1
Total		**216**	**929**

Source: Arellano Associates Inc., 2013.

Table B.10: Summary of Number of Comments by Public Agency

No.	Agency	No. of Recorded Comments
1	ARB	1
2	Alameda East Construction Authority	6
3	Burbank-Glendale-Pasadena Airport Authority	11
4	California Clean Energy Committee	1
5	California Coastal Commission	15
6	California Department of Veterans Affairs	1
7	California Department of Aging–Long-Term Care and Aging Services Division	1
8	CTC	18
9	Caltrans	7
10	Caltrans–District 10 Planning and Local Assistance	12
11	Caltrans–District 2 Native American Liaison Office of Advance Planning	1
12	Caltrans–Division of Transportation Planning	73
13	Caltrans–Office of System and Freight Planning	2
14	Central Valley Rail Working Group	3
15	City of Anaheim	3
16	City of Coachella	1
17	City of Paso Robles	4
18	City of Encinitas	9
19	City of Fullerton	7
20	City of Indio	1
21	City of Livermore	1

Table B.10: Summary of Number of Comments by Public Agency (continued)

No.	Agency	No. of Recorded Comments
22	City of Modesto	1
23	City of Palmdale	1
24	City of Palo Alto	15
25	City of Rio Vista	13
26	Coachella Valley Association of Governments	2
27	Coast Rail Coordinating Council	3
28	County of Tuolumne Board of Supervisors	4
29	Eco-Rapid Transit	1
30	Federal Railroad Administration	67
31	Federated Indians of Graton Rancheria	2
32	Fort Mojave Indian Tribe	1
33	Gabrielino Tongva Nation	2
34	Humboldt Bay Harbor Working Group	1
35	Kern Council of Governments	17
36	LACMTA	22
37	LOSSAN	115
38	Marian Bear Natural Park Recreation	1
39	North County Transit District	16
40	OCTA	19
41	Pechanga Band of Luiseno Mission Indians	7
42	Port of Hueneme Oxnard Harbor District	4
43	Regional Governance Working Group for the San Joaquin Rail Service	1
44	Riverside County Transportation Commission	13
45	Rural County Representatives of California	3
46	SJRRC	12
47	San Joaquin Valley Regional Planning Agencies	1
48	San Luis Obispo Council of Governments	9
49	Santa Barbara County Association of Governments	9
50	Santa Cruz County Regional Transportation Commission	6
51	Santa Rosa Rancheria Tachi Yokut	1
52	Sonoma-Marin Area Rail Transit District	14
53	South Coast Air Quality Management District	10
54	SCAG	36
55	Southern California National Freight Gateway Collaboration Working Group	8
56	Southern California Regional Rail Authority	6
57	TAMC	20
58	Tuolumne County Transportation Council	3
59	U.S. Environmental Protection Agency (EPA) Region IX, Pacific Southwest	11

Source: Arellano Associates Inc., 2013.

Table B.11: Summary of Number of Comment by Organizations, Associations, Businesses

No.	Organizations, Associations, Businesses	No. of Recorded Comments
1	AJF & Associates	2
2	California Walks	1
3	Chowchilla District Chamber of Commerce	1
4	Citizens for Better Mobility	1
5	Citizens for California High-Speed Rail Accountability	4
6	CSU Sacramento, Institute of Transportation Engineers	1
7	Environmental Health Coalition	1
8	Fehr & Peers	1
9	Friends 4 Expo Rail	1
10	Friends of Rose Creek	1
11	Genesee & Wyoming Inc.	20
12	Land Bridge Alliance	7
13	Knowledge Art	1
14	Natural Resources Defense Council	7
15	Northern Sierra Railway	1
16	National Association of Rail Passengers	
17	RAILPAC	1
18	R.L Banks & Associates	1
19	Redwood Empire Services	1
20	Sacramento Area Bicycle Advocates	7
21	Santa Cruz County Friends of the Rail &Trail	1
22	Sierra Club California	23
23	The Fresno Bee	1
24	The Friends of Caltrain	9
25	Think BIG Sacramento	1
26	Throughput Dynamics	1
27	Train Riders Association of California	27
28	Trainweb	1
29	Transportation Solutions Defense and Education Fund	11
30	Washington CORE	1
31	XRT, Inc.	1

Source: Arellano Associates Inc., 2013.

Exhibit B.23 is a word cloud created from a text file containing all 929 recorded comments on the Draft Rail Plan, received during public meetings and afterwards during the public comment period. This shows the most frequently repeated words in the comments and illustrates major themes of commenters.

Caltrans retains a copy of a spreadsheet database of all commenters (including names, addresses and organizations) and in cases in which communication from commenters included separate suggestions, corrections, additions, opinions, observations or requests, project staff separated larger submissions into distinct comments for record-keeping purposes. These specific comments formed the basis for revisions incorporated in the Final CSRP.

Exhibit B.23: Frequently Used Words in Public Comments on Draft California State Rail Plan

Source: Arellano Associates Inc., 2013.

Appendix C

SECTION 6.1 SUPPLEMENTAL INFORMATION:

RAIL NETWORK ATTRIBUTES AND BASE YEAR DATA

[This page intentionally blank]

C.1 Regional and Local Railroads

C.1.1 Arizona & California Railroad Co.

A Genesee & Wyoming property, the Arizona & California Railroad (ARZC) consists of a former Santa Fe secondary line between Cadiz in California, and Matthie and Phoenix in Arizona. Based in Parker, Arizona, ARZC operates 84 miles of tracks in California. From a junction with the BNSF Railway (BNSF) in Cadiz, the ARZC line extends 190 miles eastward through Rice; crosses the Colorado River at Parker, Arizona; and links with BNSF's Phoenix line at Matthie. ARZC holds trackage rights into Phoenix over BNSF's Phoenix Branch. The major commodities moved on the ARZC include petroleum gasses, steel and lumber totaling approximately 12,000 railcars yearly. Located on the line are multiple petroleum facilities.

C.1.2 California Northern Railroad

The California Northern Railroad (CFNR) is a 218-mile short line railroad operated by Genesee & Wyoming. The CFNR interchanges with Union Pacific Railroad (UPRR) at Davis, Suisun-Fairfield, Tehama, and Tracy; with the Napa Valley Railroad at Rocktram; and with the Northwestern Pacific Railroad at Brazos Junction. The CFNR handles about 25,000 carloads per year, consisting primarily of food products (such as processed tomatoes, olives, rice, cheese, beer, wine, and wheat), along with some stone, petroleum products, and chemicals.

C.1.3 Central Oregon and Pacific Railroad

The Central Oregon and Pacific Railroad (CORP), operates the former Southern Pacific (SP) Siskiyou line between Black Butte, California and Eugene, Oregon. Only 59 of its 389 miles of line are located within California. CORP interchanges with the UPRR at its northern and southern termini, as well as CBRL, WCTR, and YW. Lumber and related wood products are the mainstay of the railroad, which has handled approximately 17,000 cars annually in recent years.

Since 2008, the northern and southern sections of the line are out of service across 80 miles of difficult terrain around Siskiyou Summit. However, efforts to secure sufficient funding to restore operation of the line as a through route have recently succeeded, with the railroad receiving a $7 million Transportation Investment Generating Economic Recovery (TIGER) 4 grant, matching $7 million in other public and private funding commitments. The combined $14 million investment will permit the resumption of regular operations over Siskiyou Summit by 2014.

C.1.4 Northwestern Pacific Railroad

The Northwestern Pacific Railroad (NWP) is a 271-mile regional railroad that serves the north coast of California. It has a long history dating back to the 1800s, with several ownership changes resulting from a changing economy and severe weather events. Following a period of dormancy, the NWP resumed freight operations in 2011 over a 60-mile stretch between Brazos and Windsor. Within these 60 miles, about 28 miles of tracks are leased from Sonoma-Marin Area Rail Transit (SMART) between Santa Rosa and Ignacio junction, with the rest of the tracks leased from the North Coast Railroad Authority (NCRA).

The railroad is a handling carrier, connecting with UPRR at Suisun-Fairfield, California via the California Northern Railway at Brazos (American Canyon, California). Almost all of the NWP's 1,000 annual carloads are inbound, with grain and lumber the dominant commodities.

C.1.5 San Diego and Imperial Valley Railroad

The Genesee & Wyoming-owned San Diego and Imperial Valley Railroad (SDIY) is located in San Diego and operates over three lines owned by the San Diego Metropolitan Transit System (SDMTS or San Diego Trolley). In addition to its primary route linking BNSF in downtown San Diego with the Baja California Railroad (BJRR) at San Ysidro/Tijuana on the Mexican border, SDIY also has two branches: the La Mesa Branch (downtown San Diego east to Santee) and the Coronado Branch (National City south to Imperial Beach).[1] The SDIY operates primarily during nighttime hours when the San Diego Trolley is not in operation. The SDIY handles approximately 5,000 carloads annually, with major commodities including propane, petroleum gases, corn syrup, malt, and wood pulp.

C.1.6 San Joaquin Valley Railroad Co.

California's longest short line from the standpoint of route-miles, the San Joaquin Valley Railroad (SJVR) operates 286.7 miles of mainline track in the Central Valley. Operated by Genesee & Wyoming, SJVR interchanges with the UPRR at Fresno, Goshen Junction, and Bakersfield, and with the BNSF at Fresno and Bakersfield. Reflective of its location in the Central Valley (the nation's top agricultural region and the State's largest oil producer), the SJVR service primarily carries petroleum products, cattle feed, building materials, food products, and dry and liquid fertilizer. Traffic on the SJVR amounts to approximately 40,000 carloads annually.

C.1.7 Santa Cruz and Monterey Bay Railway Company

With start-up in the fall of 2012, the Santa Cruz and Monterey Bay Railway Company (SCMB) is California's newest short line. The SCMB, an Iowa Pacific Holdings property, is the new operator of a 31 mile Union Pacific branch line a branch line between Watsonville Junction and Davenport. In Santa Cruz, the line connects with tourist operator Santa Cruz, Big Trees Pacific Railway Company. SCMB expects to provide both freight and passenger service along the route. Traffic will be a mix of agricultural, bio fuels, building products and other bulk commodities. Recent volumes along the branch have been around 300 carloads annually. What was once the primary source of freight on the line, a CEMEX cement plant in Davenport that closed in 2010, is not expected to resume.[2]

C.1.8 Santa Maria Valley Railroad

Santa Maria Valley Railroad (SMV) has 14.7 miles of mainline track between Guadalupe and Santa Maria in California. SMV serves freight customers in the Santa Maria Valley, and also maintains many sidings and spurs with capacity to store rail cars. The railroad handles fresh and frozen vegetables, lumber, building material, steel, machinery, asphalt, aluminum, fertilizer, propane, and other industrial products.

[1] Metropolitan Transit System, *Metropolitan Transit System: San Diego & Arizona Eastern (SD&AE) Railway*, February 2011.

[2] http://www.santacruzsentinel.com/localnews/ci_22886474/cemex-environmental-study-get-under-way.

C.1.9 Sierra Northern Railway

The August 2003 merger of the Sierra Railroad Company and the Yolo Shortline Railroad resulted in the present-day Sierra Northern Railway (SERA). The railroad operates about 117 miles of track in northern California, interchanging with UPRR and BNSF at three locations:

- West Sacramento, which serves customers between West Sacramento and Woodland, including the Port of Sacramento.
- Oakdale, which serves customers between Oakdale and Sonora.
- Riverbank, which serves customers between Riverbank and Sonora, as well as the 170-acre Riverbank Industrial Complex.

SERA also provides switching services for the Department of Defense at the Naval Weapons Station in Concord, California.

The SERA primarily carries lumber, particle board, and other wood and building products, along with grains, fruits, and vegetables. The railroad has an annual volume of approximately 6,000 carloads.

C.1.10 Stockton Terminal & Eastern Railroad

The Stockton Terminal & Eastern Railroad (STE) provides rail freight service in the greater Stockton area of the Central Valley. Owned by the Denver-based short line holding company OmniTrax, STE operates on 25 miles of its own track and connects to the BNSF, UPRR, and the Central California Traction Company, a switching railroad jointly owned by UPRR and BNSF. The STE railroad primarily serves customers in agriculture, livestock, steel, chemical transportation, and food processing.

C.1.11 Trona Railway Company

The Trona Railway Company (TRC) provides freight service on 31 miles of mainline from Trona to a UPRR connection at Searles, California. Traffic includes sulfuric acid, soda ash, salt cake, coal, military equipment, and minerals, primarily on behalf of its owner, Searles Valley Minerals. While the railway is important for product delivery, it is also a critical means of transporting fuel and process chemicals to Searles Valley. Utilizing its own fleet of locomotives and railcars, TRC transports two million tons, or about 20,000 carloads, of freight annually. The railroad's remote location dictates that its 28 employees must perform all necessary operations and maintenance functions.

At present, most soda ash hauled by the railroad is exported to Asia through the ports of Long Beach and San Diego. The railroad serves the Altamont Corridor Express (ACE) Cogeneration Plant, which burns Utah coal to produce electricity and process steam for the Searles Valley Mineral Company's production facilities at Trona, Westend, and Argus.

C.1.12 Ventura County Railroad Company

The Ventura County Railroad (VCRR), operates over a 13-mile route in southwest Ventura County from an interchange with UPRR at Oxnard. The railroad, part of the Genesee & Wyoming empire, transports goods in the industrial areas of south of Oxnard, the Port of Hueneme, and the U.S. Naval Base Ventura County. Approximately 3,000 cars traveled over the VCRR in 2010, carrying automobiles, paper, petroleum, wood pulp, and frozen foods.

C.2 Switching and Terminal Railroads

Currently, there are nine switching and terminal railroads in California, a combined 345.5 miles of track. Even though these railroads have short or nonexistent mainlines, many of them handle significant volumes of freight. Notably, the Pacific Harbor Line, which serves the twin Ports of Los Angeles and Long Beach, handles more volume than all of California's railroads but BNSF and UPRR.

C.2.1 Central California Traction

The Central California Traction Company (CCT) operates two segments of track in northern California: the 20-mile Central Valley Branch between Stockton and Lodi (including a one-mile industrial lead into Lodi) and the Stockton Public Belt Railroad at the Port of Stockton. CCT provides switching service to Penny Newman Grain and Duraflame Products as the result of a lease of the UPRR Scotts Street lead. At the Port of Stockton, CCT serves as the switching carrier for the BNSF and UPRR over 76 miles of track, where it serves 55 customers. The primary commodities handled by the railroad at the port consist of export coal and iron ore. Service between Lodi and Sacramento was suspended in August of 1998, with the tracks still in place for potential future use. In recent years, CCT has handled approximately 55,000 carloads annually, with a work force of 27 people.

C.2.2 Los Angeles Junction Railway Company

The Los Angeles Junction Railway Company (LAJ) is a wholly-owned subsidiary of BNSF and provides switching service on 64 miles of track in the industrial areas around Vernon, California, southeast of Los Angeles. The LAJ was built in the early 1920s as the switching railroad for the Central Manufacturing District in the cities of Vernon, Maywood, Bell, and Commerce.

C.2.3 Modesto & Empire Traction Co.

Modesto & Empire Traction Company (M&ET) is a short line railroad situated in the 2,000-acre Beard Industrial District in Modesto, California. The M&ET operates freight and switching services from a connection with UPRR at Modesto to a connection with BNSF at Empire. Additionally, M&ET has a 70-acre rail/truck transload facility encompassing 6,000 feet of unloading/loading tracks. The railroad primarily handles commodities such as wine, canned goods, paper products, corn syrup, cooking oil, feed and grain, lumber, and packaging materials.

C.2.4 Oakland Terminal Railway

The Oakland Terminal Railway (OTR) is a terminal railroad associated with the Port of Oakland. It operates 10 miles of switching track in West Oakland, performing switching activities for both UPRR and BNSF.

C.2.5 Pacific Harbor Line, Inc.

Pacific Harbor Line, Inc. (PHL) provides rail transportation, maintenance, and dispatching services to the Ports of Los Angeles and Long Beach. With a staff of 145, PHL handles a high volume of both intermodal and carload traffic on behalf of BNSF and UPRR. The railroad switches over 40,000 units of carload freight annually, with commodities including automobiles, bulk minerals, lumber, scrap, food products, cotton, chemicals, steel, petroleum products, and heavy equipment. Major customers include Amerigas, California Cartage, CertainTeed Roofing, ConocoPhillips, Del Monte, Fremont Forest Products, Hugo Neu, LA Grain, Toyota, Nissan, Pacific Coast Recycling, Potential Industries, Tesoro, U.S. Borax, and Westway Terminals.

PHL also provides rail switching services for nine on-dock intermodal terminals and provides dispatching services for about 90 intermodal or unit trains per day. Major customers include American President Lines, Cosco, Evergreen, America, Hanjin, K-Line, Maersk Sealand, Mediterranean Shipping, Nippon Yusen Kaisha Line, and Yang Ming.

C.2.6 Richmond Pacific Railroad Corp.

The Richmond Pacific Railroad Corporation (RPRC) is a terminal railroad owned by the Levin-Richmond Terminal Corporation. Located at the Port of Richmond, the railroad serves industries on 10 miles of track in the port area, handling approximately 17,200 carloads per year, 15,000 inbound and 2,200 outbound. Commodities include ores, cement, food products, petroleum products, stone, and lumber.

The customers include Levin-Richmond Terminal Corporation's cargo marine terminals, Cemex, Plains Marketing, Sims Metal Management, Chevron Products Co., Oxbow Carbon & Minerals, California Oils, Sasol Wax, General Chemical, Channel Lumber, Conoco Phillips, and others. RPRC interchanges with both UPRR and BNSF.

C.3 Geographic Region Definitions

C.3.1 Central Coast

The Central Coast region refers to the area inland from the Pacific Coast, from San Jose to the north and Los Angeles to the south. This region is served by the UPRR and the short line railroads SMV, SCMB, and VCRR as shown in Table C.1. Class I mainline subdivisions located in the region include the Ventura subdivision of the Southern California Regional Rail Authority (SCRRA) and UPRR's Santa Barbara and Coast subdivisions. UPRR's Niles subdivision and the SCRRA's Valley subdivision act as end connectors at the northern and southern ends of the region, respectively.

Originally constructed to provide faster passenger service between San Francisco and Los Angeles than was possible through the Central Valley, the Coast Line was absorbed by the UPRR through its 1996 acquisition of the SP. Today, the corridor is traversed by a mix of UPRR freight services, intercity passenger services (*Pacific Surfliner* and *Coast Starlight*), and Metrolink commuter rail. UPRR operates through and local freight services along the route, providing connections to the VCRR (serving Port Hueneme, industrial areas south of Oxnard, and the Naval Base Ventura County Port Hueneme Division) and the SMV in Guadalupe.

The Coast Line also connects at Montalvo with the Santa Paula branch, a line that once connected with SCRRA's Lancaster line at Santa Clarita. The Southern California Association of Governments and the Ventura County Transportation Commission have examined the potential for reestablishing this connection for potential passenger and freight services.[3]

[3] Sharon Green & Associates, PB, and InfraConsult LLC, *Ventura/Santa Barbara Rail Study–Final Report*, prepared for the Southern California Association of Governments, March 2008.

Table C.1: Central Coast Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Central Coast	Ventura, Santa Barbara, Coast	Santa Maria Valley Railroad, Ventura County Railroad Company

Source: Cambridge Systematics, Inc., 2012.

C.3.2 San Joaquin Valley

The San Joaquin Valley comprises the eight counties between Bakersfield and Sacramento. It is the fastest growing region in California, and produces billions of dollars of agricultural product annually. The region is served by BNSF and UPRR and several short lines, including SJVR, SERA, Modesto & Empire Traction (MET), Central California Traction (CCT), and STE, as shown in Table C.2.

The Class I railroad operating subdivisions of the region include BNSF's Bakersfield and Stockton subdivisions and UPRR's Fresno and Sacramento (partial) subdivisions. The rail corridors make end connections to the cities of Bakersfield, Fresno, Sacramento, and Richmond, and to the Mojave, Martinez, Niles, and Roseville subdivisions.

San Joaquin trains utilize BNSF tracks between Bakersfield and Port Chicago, and UPRR tracks between Port Chicago and Oakland (Oakland–Bakersfield trains) and between Stockton and Sacramento via Lodi (Sacramento–Bakersfield trains).

C.3.3 Northern California

At its north end, the northern California region is bounded by the Oregon state line, and at its south end by a line roughly paralleling the I-80 and I-5 corridors between Truckee and San Jose. It includes the entire San Francisco Bay Area, the Port of Stockton and the UPRR Roseville rail yard. Both BNSF and UPRR operate in the region, with a majority of tracks owned by UPRR. The region is also served by OTR, RPRC, NWP, CFNR, SERA, and CORP, as shown in Table C.3.

This region includes UPRR's Martinez, Niles, Oakland, Tracy, Sacramento (partial), Roseville, Valley, Black Butte, Canyon, and Winnemucca subdivisions and BNSF's Gateway subdivision.

Multiple commuter and intercity rail passenger services operate in a shared-use environment. These include state-supported and long-distance Amtrak routes such as the *San Joaquin*, *Capitol Corridor*, *Coast Starlight*, and *California Zephyr*; Caltrain, which provides commuter service between Gilroy, San Jose, and San Francisco; and the ACE from San Jose to Stockton. In addition, SMART is expected to initiate passenger operations in 2016 between San Rafael and Santa Rosa. SMART has engaged in a cooperative agreement with the NCRA for a freight operations easement on SMART trackage. NCRA, in turn, has contracted with short line railroad NWP for freight services.

Table C.2: Central Valley Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Central Valley	Bakersfield, Part of Stockton, Fresno, Part of Sacramento	California Northern Railroad (partial), Central California Traction, Modesto & Empire Traction Co., San Joaquin Valley Railroad Co., Sierra Northern Railway–Oakdale, Southwest Portland Cement Railroad, Stockton Terminal & Eastern Railroad, West Isle Line, Inc.

Source: Cambridge Systematics, Inc., 2012.

Table C.3: Northern California Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Northern California	Martinez, Roseville, Canyon, Winnemucca, Part of Sacramento, Part of Stockton, Niles, Valley, Oakland, Gateway, Tracy, Black Butte	California Northern Railroad (partial), Central Oregon & Pacific Railroad, Lake County Railway, Napa Valley Railroad, Northwestern Pacific Railroad, Oakland Terminal Railway, Quincy Railroad, Richmond Pacific Railroad Corp., Sacramento Valley Railroad, Sierra Northern Railway–California Western Railroad, Sierra Northern Railway–Western Sacramento/Woodland

Source: Cambridge Systematics, Inc., 2012.

C.3.4 Southern California

Southern California consists of the entire area southeast of Bakersfield, California and includes the Ports of Los Angeles and Long Beach, as well as the Los Angeles metropolitan region. This region includes BNSF and UPRR, and PHL, TRC, ARZC, SDIY, and LAJ.

Class I railroad operating subdivisions located in the region include UPRR's Alhambra, Los Angeles, Mojave, Cima, and Yuma subdivisions, and BNSF's San Bernardino, Cajon, Mojave, and Needle subdivisions. In addition, the SCRRA operates three divisions–Valley, San Gabriel, and Orange–and the North County Transit District one (San Diego) as shown in Table C.4.

The Alameda Corridor, a 20-mile long triple-track line, links the Ports of Los Angeles and Long Beach to BNSF's and UPRR's transcontinental rail lines near Downtown Los Angeles. Between State Road (SR) 91 in Carson and 25th Street in Los Angeles, the tracks lie in a 10-mile-long trench that eliminated more than 200 at-grade crossings. The corridor's owner, the Alameda Corridor Transportation Authority, recovers the cost of construction and maintenance through a user fee paid by rail traffic traversing the corridor.

All SCRRA Metrolink trains, along with North Country Transit District (NCTD)'s COASTER and Sprinter services and the *Pacific Surfliner*, *Southwest Chief*, and *Sunset Limited*, share tracks with freight rail. Ownership of these lines varies by segment, with some owned by the private freight railroads and others by public agencies as described in Section 6.1.

Table C.4: Southern California Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Southern California	Cajon, Needles, Yuma, San Bernardino, Alameda Corridor, Mojave–UPRR, Mojave–BNSF, Alhambra, Los Angeles, Cima, San Diego, Orange, SCRRA Valley, Olive, San Gabriel	Arizona & California Railroad Co., Los Angeles Junction Railway Company, Pacific Harbor Line, Inc., Pacific Sun Railroad, LLC., San Diego & Imperial Valley Railroad, Trona Railway Company

Source: Cambridge Systematics, Inc., 2012.

C.4 Additional Freight Rail System Information

This section summarizes additional attributes of the State's rail system, including:

- **Total Line/Track Miles.** This refers to the mileage of track operated by each railroad. Federal Railroad Administration (FRA) Track Class: The FRA track safety standards, which apply to both freight and passenger train operations, specify the minimum allowable track conditions for operation at a particular speed for a given class of track. Measures for specifying track class fall into four general areas–track structure (ties, rail, switch conditions), track geometry (curvature, alignment, elevation, surface), road bed (drainage, vegetation, etc.), and inspection (frequency and inspect qualifications). The FRA has nine categories of track, with Class 1 being the least rigorous and Class 9 the most. The FRA also defines a tenth category, "Excepted," which falls under Track Class 1 and precludes passenger trains operations and handling of hazardous commodities.
- **Maximum Allowable Gross Weight.** This refers to the maximum permissible gross weight of a rail car (i.e., the weight transferred to rail by a four-axle car of specified length from the weight of the car and the lading within it). Until the mid-1990s, the standard maximum allowable weight throughout the U.S. rail network stood at 263,000 pounds. Since then, the standard grew to 286,000 pounds, a change that the Class I railroads accomplished with relative ease. Smaller railroads have been adapting to this higher weight more slowly due to the costs involved and generally inferior physical conditions of their infrastructure.
- **Vertical Clearance.** This refers to the restrictions placed on the maximum height of a loaded rail car measured from top of rail to the top of the cargo while seated and secured. For double-stack container operation, vertical clearances must be at least 18 feet and 6 inches for two stacked international (each 8 feet and 6 inches) containers, 19 feet and 6 inches for a combination international and domestic, and 20 feet and 8 inches for two domestic containers (each 9 feet and 6 inches in height). Tri-level auto-rack cars require 19 feet and 6 inches clearance. For a route to enjoy unrestricted vertical clearance, the Association of American Railroads (AAR) requires a minimum of 22 feet and 6 inches.

Table C.5 summarizes additional attribute information for the State's Class I system by California region and rail subdivision, and Table C.6 summarizes this information for the State's major short line railroads.

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Central Coast California Region																	
Ventura	35.5	35.5	6	30	36	1 Track	36	A (A-main)		CTC		1		315K	36.1	16-18 ft	36.1
						2 Tracks		B (B-main)		ABS	35.5	2		286K		19-20 ft	
						3 Tacks		C (C-main)	35.5	MAN		3	29.4	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	6.7	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	
Santa Barbara	175.2	175.2	4	9	13	1 Track	175.2	A (A-main)		CTC		1		315K	169.9	16-18 ft	169.9
						2 Tracks		B (B-main)		ABS	175.2	2	1.4	286K		19-20 ft	
						3 Tacks		C (C-main)	175.2	MAN		3	111.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	61.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	
Coast	234	239.1	2	3	5	1 Track	228.8	A (A-main)		CTC		1		315K	223.7	16-18 ft	223.7
						2 Tracks	5.1	B (B-main)		ABS	233.7	2	19.1	286K		19-20 ft	
						3 Tacks		C (C-main)	233.5	MAN	0.3	3	107.0	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	108.9	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5		No Data		No Data	
Subtotal	444.7	449.8	-	-	-	1 Track	440.0	A (A-main)	0.0	CTC	0.0	1	0.0	315K	429.7	16-18 ft	429.7
						2 Tracks	5.1	B (B-main)	0.0	ABS	444.4	2	20.5	286K	0.0	19-20 ft	0.0
						3 Tacks	0.0	C (C-main)	444.2	MAN	0.3	3	248.2	263K	0.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	0.2			4	176.8	< 263K	0.0	> 22 ft	0.0
						>= 5 Tracks		H (B-branch)	0.3			5	0.0	No Data	0.0	No Data	0.0
Subtotal						1 Track	98.9%	A (A-main)	0.0%	CTC	0.0%	1	0.0%	315K	100.0%	16-18 ft	100.0%
						2 Tracks	1.1%	B (B-main)	0.0%	ABS	99.9%	2	4.6%	286K	0.0%	19-20 ft	0.0%
						3 Tacks	0.0%	C (C-main)	99.9%	MAN	0.1%	3	55.7%	263K	0.0%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	0.0%			4	39.7%	< 263K	0.0%	> 22 ft	0.0%
						>= 5 Tracks		H (B-branch)	0.1%			5	0.0%	No Data	0.0%	No Data	0.0%
Central Valley California Region																	
Bakersfield	109.7	114.7	26	12	38	1 Track	104.6	A (A-main)	109.7	CTC	105.2	1		315K	100.7	16-18 ft	0.0
						2 Tracks	5.1	B (B-main)		ABS	4.5	2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	2.3	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	5.8	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	100.5	No Data		No Data	100.7
Part of Stockton	126	126	24	12	36	1 Track	126	A (A-main)	125.8	CTC	125.8	1		315K	125.6	16-18 ft	125.6
						2 Tracks		B (B-main)	0.1	ABS	0.1	2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3	10.0	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	3.4	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.1			5	112.3	No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Fresno	274.7	304.3	22	0	22	1 Track	245.1	A (A-main)	274.1	CTC	250.9	1		315K	255.3	16-18 ft	
						2 Tracks	29.6	B (B-main)		ABS	23.4	2	1.4	286K		19-20 ft	255.3
						3 Tacks		C (C-main)		MAN	0.4	3	28.0	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	97.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.4			5	146.9	No Data		No Data	
Part of Sacramento	44.3	44.3	6	4	10	1 Track	44.3	A (A-main)	44.3	CTC	44.3	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2	6.0	286K	36.8	19-20 ft	
						3 Tacks		C (C-main)		MAN		3	6.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	32.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	36.8
Subtotal	554.7	589.3	-	-	-	1 Track	520.0	A (A-main)	553.9	CTC	526.2	1	0.0	315K	481.6	16-18 ft	125.6
						2 Tracks	34.7	B (B-main)	0.1	ABS	28.0	2	7.4	286K	36.8	19-20 ft	255.3
						3 Tacks		C (C-main)		MAN	0.6	3	47.0	263K	0.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	0.2			4	138.3	< 263K	0.0	> 22 ft	0.0
						>= 5 Tracks		H (B-branch)	0.5			5	359.6	No Data	0.0	No Data	137.5
Subtotal						1 Track	93.7%	A (A-main)	99.9%	CTC	94.8%	1	0.0%	315K	92.9%	16-18 ft	24.2%
						2 Tracks	6.3%	B (B-main)	0.02%	ABS	5.0%	2	1.3%	286K	7.1%	19-20 ft	49.2%
						3 Tacks		C (C-main)		MAN	0.1%	3	8.5%	263K	0.0%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	0.04%			4	25.0%	< 263K	0.0%	> 22 ft	0.0%
						>= 5 Tracks		H (B-branch)	0.09%			5	65.1%	No Data	0.0%	No Data	26.5%
Northern California Region																	
Martinez	104.7	209	20	34	54	1 Track	0.5	A (A-main)	44.9	CTC		1	0.7	315K	97.7	16-18 ft	97.7
						2 Tracks	104.2	B (B-main)	59.4	ABS	104.5	2	3.4	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3	37.9	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	3.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.2			5	61.4	No Data		No Data	
Roseville	149.1	159.4	18	4	22	1 Track	138.7	A (A-main)	149.1	CTC	83.8	1		315K	149.1	16-18 ft	149.1
						2 Tracks	10.4	B (B-main)		ABS	65.3	2	78.8	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	80.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4		< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	
Canyon	111.8	111.8	17	0	17	1 Track	111.8	A (A-main)	111.5	CTC	111.5	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2	70.3	286K	97.3	19-20 ft	97.3
						3 Tacks		C (C-main)		MAN	0.3	3	21.7	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	21.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5		No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Winnemucca	56.0	56.0	16.0	0.0	16.0	1 Track	56.0	A (A-main)	56.0	CTC	56.0	1		315K	50.4	16-18 ft	50.4
						2 Tracks		B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	21.2	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	11.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	18.0	No Data		No Data	
Part of Sacramento	65.7	65.7	16.0	2.0	18.0	1 Track	65.7	A (A-main)	65.7	CTC	65.7	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2	3.3	286K	58.6	19-20 ft	
						3 Tacks		C (C-main)		MAN		3	6.1	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	2.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	53.6	No Data		No Data	58.6
Part of Stockton	68.7	68.7	10	6	16	1 Track	68.7	A (A-main)		CTC		1		315K	67.6	16-18 ft	67.6
						2 Tracks		B (B-main)	67.1	ABS	67.1	2	1.5	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	1.6	3	10.9	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.9			4	14.3	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.7			5	40.9	No Data		No Data	
Niles	29.7	37.7	8	18	26	1 Track	21.7	A (A-main)	7.9	CTC		1	2.5	315K	30.8	16-18 ft	
						2 Tracks	8	B (B-main)		ABS	29.6	2	1.4	286K		19-20 ft	0.3
						3 Tacks		C (C-main)	16.8	MAN	1.3	3	2.4	263K		21-22 ft	
						4 Tracks		G (A-branch)	4.9			4	24.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	1.3			5		No Data		No Data	30.5
Valley	208.7	208.8	10	2	12	1 Track	208.6	A (A-main)	208.7	CTC	208.6	1		315K	187.8	16-18 ft	187.8
						2 Tracks	0.1	B (B-main)		ABS	0.1	2	29.5	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	25.2	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	54.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	100.7	No Data		No Data	
Oakland	82.1	87.5	7	6	13	1 Track	76.7	A (A-main)	5.4	CTC	74.4	1	20.7	315K		16-18 ft	81.7
						2 Tracks	5.4	B (B-main)	74.4	ABS	7.6	2	3.9	286K	81.7	19-20 ft	
						3 Tacks		C (C-main)	2.2	MAN	0.2	3	23.0	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	35.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.2			5		No Data		No Data	
Gateway	177.9	177.9	4	0	4	1 Track	177.9	A (A-main)	0.2	CTC	0.3	1		315K	169.9	16-18 ft	
						2 Tracks		B (B-main)		ABS		2	48.9	286K		19-20 ft	169.9
						3 Tacks		C (C-main)	0.2	MAN	177.5	3	38.6	263K		21-22 ft	
						4 Tracks		G (A-branch)	177.5			4	90.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Tracy	58.2	58.2	0	1	1	1 Track	58.2	A (A-main)		CTC		1	2.9	315K	52.7	16-18 ft	
						2 Tracks		B (B-main)	1.2	ABS	56.6	2	49.1	286K		19-20 ft	
						3 Tacks		C (C-main)	5.3	MAN	1.6	3	1.6	263K		21-22 ft	
						4 Tracks		G (A-branch)	51.8			4	5.3	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	52.7
Black Butte	87.9	87.9	8	2	10	1 Track	87.9	A (A-main)	87.8	CTC	87.8	1		315K	84.4	16-18 ft	84.4
						2 Tracks		B (B-main)		ABS	0.1	2	11.0	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	39.9	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	37.1	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.1			5		No Data		No Data	
Subtotal	1,200.6	1,328.7	-	-	-	1 Track	1,072.5	A (A-main)	737.3	CTC	688.2	1	26.8	315K	890.4	16-18 ft	718.7
						2 Tracks	128.1	B (B-main)	202.1	ABS	330.9	2	301.0	286K	237.6	19-20 ft	267.5
						3 Tacks	0.0	C (C-main)	24.5	MAN	182.7	3	309.0	263K	0.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	235.3			4	298.9	< 263K	0.0	> 22 ft	0.0
						>= 5 Tracks		H (B-branch)	2.8			5	274.6	No Data	0.0	No Data	141.8
Subtotal						1 Track	89.3%	A (A-main)	61.3%	CTC	57.3%	1	2.2%	315K	78.9%	16-18 ft	63.7%
						2 Tracks	10.7%	B (B-main)	16.8%	ABS	27.5%	2	24.9%	286K	21.1%	19-20 ft	23.7%
						3 Tacks	0.0%	C (C-main)	2.0%	MAN	15.2%	3	25.5%	263K	0.0%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	19.6%			4	24.7%	< 263K	0.0%	> 22 ft	0.0%
						>= 5 Tracks		H (B-branch)	0.2%			5	22.7%	No Data	0.0%	No Data	12.6%
Southern California Region																	
Cajon	88.6	154.1	56	2	58	1 Track	23.1	A (A-main)	88.6	CTC	88.6	1		315K	79.0	16-18 ft	78.4
						2 Tracks	65.5	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.3	3	15.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	32.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5	40.8	No Data		No Data	0.6
Needles	164.6	329.1	55	2	57	1 Track	0.2	A (A-main)	164.4	CTC	164.4	1		315K	173.6	16-18 ft	7.1
						2 Tracks	164.4	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3		263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	28.4	< 263K		> 22 ft	166.6
						>= 5 Tracks		H (B-branch)				5	145.2	No Data		No Data	
Yuma	195.5	246.7	44	1	45	1 Track	144.3	A (A-main)	195.3	CTC	195.3	1		315K	185.0	16-18 ft	185.0
						2 Tracks	51.2	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3	7.4	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	81.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	101.9	No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
San Bernardino	67.9	144.6	36	31	67	1 Track	0	A (A-main)	66.6	CTC	67.8	1		315K	68.0	16-18 ft	68.0
						2 Tracks	58.9	B (B-main)		ABS		2	1.4	286K		19-20 ft	
						3 Tacks	9	C (C-main)	1.2	MAN	0.5	3	9.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	57.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.5			5		No Data		No Data	
Alameda Corridor	17.1	30.5	28	0	28	1 Track	3.6	A (A-main)		CTC	13.1	1	1.5	315K	19.0	16-18 ft	
						2 Tracks	13.5	B (B-main)	13.1	ABS		2	0.5	286K		19-20 ft	0.3
						3 Tacks		C (C-main)	0.9	MAN	4	3	15.3	263K		21-22 ft	
						4 Tracks		G (A-branch)	3			4		< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	18.7
Mojave–UPRR	179.1	218.1	26	1	27	1 Track	140.2	A (A-main)	178.8	CTC	175.5	1		315K	175.9	16-18 ft	53.4
						2 Tracks	39	B (B-main)		ABS	3.3	2	24.5	286K		19-20 ft	122.5
						3 Tacks		C (C-main)		MAN	0.3	3	45.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	70.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5	38.0	No Data		No Data	
Mojave–BNSF	65.3	65.3	26	0	26	1 Track	65.3	A (A-main)	65.3	CTC	65.3	1		315K	65.5	16-18 ft	
						2 Tracks		B (B-main)		ABS		2	7.1	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3		263K		21-22 ft	
						4 Tracks		G (A-branch)				4	8.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	52.9	No Data		No Data	65.5
Alhambra	54.7	67.5	26	4	30	1 Track	42	A (A-main)	36.7	CTC	54.7	1		315K	54.9	16-18 ft	
						2 Tracks	12.8	B (B-main)	18.1	ABS		2	2.9	286K		19-20 ft	54.9
						3 Tacks		C (C-main)		MAN	1	3	1.1	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	51.9	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	1			5		No Data		No Data	
Los Angeles	58.7	89.1	16	11	27	1 Track	28.3	A (A-main)	56.9	CTC	58.7	1	1.0	315K	47.0	16-18 ft	54.2
						2 Tracks	30.4	B (B-main)	0.7	ABS		2	1.8	286K	8.5	19-20 ft	1.3
						3 Tacks		C (C-main)	1.1	MAN		3	2.7	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	7.4	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	46.4	No Data		No Data	
Cima	126.2	126.2	10	0	10	1 Track	126.2	A (A-main)	126.2	CTC	126.2	1		315K	121.0	16-18 ft	
						2 Tracks		B (B-main)		ABS		2	1.6	286K		19-20 ft	121.0
						3 Tacks		C (C-main)		MAN		3	4.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	11.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	107.7	No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
San Diego	59.9	61.2	5	42	47	1 Track	58.6	A (A-main)		CTC	59.9	1	7.5	315K		16-18 ft	56.4
						2 Tracks	1.3	B (B-main)		ABS		2	1.0	286K		19-20 ft	
						3 Tacks		C (C-main)	19.8	MAN		3	6.5	263K		21-22 ft	
						4 Tracks		G (A-branch)	40			4	50.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data	61.8	No Data	5.4
Orange	41.9	44.7	7	52	59	1 Track	39.1	A (A-main)		CTC	39.5	1		315K		16-18 ft	39.0
						2 Tracks	2.8	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)	34.3	MAN	2.4	3	16.8	263K	39.0	21-22 ft	
						4 Tracks		G (A-branch)	5.1			4	25.1	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	2.4			5		No Data		No Data	
SCRRA Valley	65.8	70.2	8	30	38	1 Track	56.9	A (A-main)		CTC		1		315K	65.3	16-18 ft	65.3
						2 Tracks	6.9	B (B-main)	6.9	ABS	63.3	2	8.9	286K		19-20 ft	
						3 Tacks		C (C-main)	56.4	MAN	2.4	3	29.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	25.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	2.4			5		No Data		No Data	
Olive	5.4	5.4	4	14	18	1 Track	5.4	A (A-main)		CTC	5.4	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)	5.4	MAN		3	5.4	263K		21-22 ft	
						4 Tracks		G (A-branch)				4		< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data	5.4	No Data	5.4
San Gabriel	51.3	51.3	N/A	N/A	N/A	1 Track	51.3	A (A-main)		CTC	11.1	1	1.8	315K		16-18 ft	
						2 Tracks		B (B-main)		ABS	23.2	2	1.6	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	17	3	29.9	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.9			4	22.3	< 263K		> 22 ft	53.3
						>= 5 Tracks		H (B-branch)	50.4			5		No Data	53.3	No Data	
Subtotal	1,242.0	1,704.0	-	-	-	1 Track	784.5	A (A-main)	978.8	CTC	1,125.5	1	11.7	315K	1,054.0	16-18 ft	606.7
						2 Tracks	446.7	B (B-main)	38.8	ABS	89.8	2	51.4	286K	8.5	19-20 ft	299.9
						3 Tacks	9.0	C (C-main)	119.1	MAN	28.3	3	190.5	263K	39.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	49.4			4	472.1	< 263K	0.0	> 22 ft	219.9
						>= 5 Tracks		H (B-branch)	57.3			5	533.0	No Data	120.5	No Data	95.6
Subtotal						1 Track	63.3%	A (A-main)	78.7%	CTC	90.5%	1	0.9%	315K	86.3%	16-18 ft	49.6%
						2 Tracks	36.0%	B (B-main)	3.1%	ABS	7.2%	2	4.1%	286K	0.7%	19-20 ft	24.5%
						3 Tacks	0.7%	C (C-main)	9.6%	MAN	2.3%	3	15.1%	263K	3.2%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	4.0%			4	37.5%	< 263K	0.0%	> 22 ft	18.0%
						>= 5 Tracks		H (B-branch)	4.6%			5	42.3%	No Data	9.9%	No Data	7.8%

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
All Regions																	
Grand Total	3,442.0	4,071.8	-	-	-	1 Track	2,817.0	A (A-main)	2,270.0	CTC	2,339.9	1	38.5	315K	2,855.8	16-18 ft	1,880.7
						2 Tracks	614.6	B (B-main)	241.0	ABS	893.1	2	380.2	286K	283.0	19-20 ft	822.8
						3 Tacks	9.0	C (C-main)	587.8	MAN	211.9	3	794.8	263K	39.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	285.1			4	1,086.1	< 263K	0.0	> 22 ft	219.9
						>= 5 Tracks		H (B-branch)	60.9			5	1,167.2	No Data	120.5	No Data	374.9
Grand Total						1 Track	81.9%	A (A-main)	65.9%	CTC	67.9%	1	1.1%	315K	86.6%	16-18 ft	57.0%
						2 Tracks	17.9%	B (B-main)	7.0%	ABS	25.9%	2	11.0%	286K	8.6%	19-20 ft	24.9%
						3 Tacks	0.3%	C (C-main)	17.1%	MAN	6.2%	3	22.9%	263K	1.2%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	8.3%			4	31.3%	< 263K	0.0%	> 22 ft	6.7%
						>= 5 Tracks		H (B-branch)	1.8%			5	33.7%	No Data	3.7%	No Data	11.4%

Note:

[a] Signal type" acronyms have the following meaning in this table: ABS–Automatic Block Signal; CTC–Centralized Traffic Control; MAN–Manual.

Sources: Oak Ridge National Laboratory (ORNL) rail network; California Department of Transportation (Caltrans) Geographic Information System (GIS) rail network; AECOM and Cambridge Systematics, Inc, 2013

[This page intentionally blank]

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Central Coast Region									
Santa Maria Valley Railroad	SMV	14.7	14.7	1	14.7	No Data	14.7	16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	14.7
				5		315K		No Data	
Ventura County Railroad Company	VCRR	13.0	13.0	1	13.0	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	13.0	No Data	13.0
Santa Cruz and Monterey Bay Railway Company	SCMB	0.0	12.8	1	12.8	No Data		16-18 ft	
				2		< 263K		19-20 ft	12.8
				3		263K	12.8	21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Subtotal		27.7	40.5	1	40.5	No Data	14.7	16-18 ft	0.0
				2	0.0	< 263K	0.0	19-20 ft	12.8
				3	0.0	263K	12.8	21-22 ft	0.0
				4	0.0	286K	0.0	> 22 ft	14.7
				5	0.0	315K	13.0	No Data	13.0
				1	100.0%	No Data	36.3%	16-18 ft	0.0%
				2	0.0%	< 263K	0.0%	19-20 ft	31.6%
				3	0.0%	263K	31.6%	21-22 ft	0.0%
				4	0.0%	286K	0.0%	> 22 ft	36.3%
				5	0.0%	315K	32.1%	No Data	32.1%
Central Valley Region									
San Joaquin Valley Railroad Co.	SJVR	258.0	286.7	1	158.1	No Data	47.3	16-18 ft	2.5
				2	101.9	< 263K		19-20 ft	47.6
				3	26.7	263K	3.1	21-22 ft	
				4		286K	115.7	> 22 ft	
				5		315K	120.7	No Data	236.7
California Northern Railroad	CFNR	58.2	58.2	1	4.4	No Data	58.2	16-18 ft	
				2	53.8	< 263K		19-20 ft	58.2
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Sierra Northern Railway–Oakdale	SERA	48.4	48.4	1	20.3	No Data		16-18 ft	
				2	28.1	< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	48.4	No Data	48.4
Central California Traction	CCT	15.0	15.0	1	15.0	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	15.0	No Data	15.0
Modesto & Empire Traction Co.	MET	9.1	9.1	1	9.1	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	9.1	No Data	9.1
Stockton Terminal & Eastern Railroad	STE	8.4	8.4	1	8.4	No Data	8.4	16-18 ft	
				2		< 263K		19-20 ft	0.2
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	8.3
West Isle Line, Inc.	WFS	5.8	5.8	1	5.8	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	5.8	No Data	5.8

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Subtotal		402.9	431.7	1	221.1	No Data	113.9	16-18 ft	2.5
				2	183.8	< 263K	0.0	19-20 ft	105.9
				3	26.7	263K	3.1	21-22 ft	0.0
				4	0.0	286K	115.7	> 22 ft	0.0
				5	0.0	315K	199.0	No Data	323.3
				1	51.2%	No Data	26.4%	16-18 ft	0.6%
				2	43%	< 263K	0.0%	19-20 ft	24.5%
				3	6%	263K	0.7%	21-22 ft	0.0%
				4	0%	286K	26.8%	> 22 ft	0.0%
				5	0%	315K	46.1%	No Data	74.9%
Northern California Region									
California Northern Railroad	CFNR	149.9	160.3	1	23.3	No Data	111.0	16-18 ft	
				2	58.3	< 263K		19-20 ft	111.0
				3	78.6	263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	49.1	No Data	49.1
Northwestern Pacific	NWP	0	61.8	1		No Data		16-18 ft	
				2	61.8	< 263K	61.8	19-20 ft	61.8
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	6.8	No Data	60.5

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Central Oregon & Pacific Railroad	CORP	58.9	58.9	1		No Data		16-18 ft	
				2	58.9	< 263K		19-20 ft	
				3		263K	58.9	21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	58.9
Lake County Railway (a division of Frontier Rail)	LCR/ LCY	41.1	41.1	1	41.1	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	41.1	No Data	41.1
Sierra Northern Railway– California Western	SERA	39.6	39.6	1	17.6	No Data		16-18 ft	39.6
				2	22.0	< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K	39.6	> 22 ft	
				5		315K		No Data	
Napa Valley Railroad	NVRR	21.7	21.7	1	6.0	No Data		16-18 ft	
				2	15.6	< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	21.7	No Data	21.7
Sierra Northern Railway– Western Sacramento/ Woodland	SERA	16.3	16.3	1	11.7	No Data		16-18 ft	
				2	4.6	< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K	16.3	> 22 ft	16.3
				5		315K		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Oakland Terminal Railway[a]	OTR	N/A	10.0	1	N/A	No Data	N/A	16-18 ft	N/A
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	
Sacramento Valley Railroad[a]	SAV	N/A	7.0	1	N/A	No Data	N/A	16-18 ft	N/A
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	
Richmond Pacific Railroad Corp.	RPRC	6.2	6.2	1	6.2	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	6.2	No Data	6.2

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Quincy Railroad	QRR	3.1	3.1	1		No Data		16-18 ft	
				2	3.1	< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K	3.1	No Data	3.1
Subtotal		N/A	424.6	1	151.1	No Data	111.0	16-18 ft	39.6
				2	177.3	< 263K	0.0	19-20 ft	111.0
				3	79.2	263K	83.3	21-22 ft	0.0
				4	0.0	286K	85.2	> 22 ft	16.3
				5	0.0	315K	127.9	No Data	240.5
				1	37.1%	No Data	27.2%	16-18 ft	9.7%
				2	44%	< 263K	0.0%	19-20 ft	27.2%
				3	19%	263K	20.4%	21-22 ft	0.0%
				4	0%	286K	20.9%	> 22 ft	4.0%
				5	0%	315K	31.4%	No Data	59.0%
Southern California Region									
Arizona & California Railroad Co.	AZRC	83.8	83.8	1	17.1	No Data		16-18 ft	
				2	55.1	< 263K		19-20 ft	
				3	11.6	263K	83.8	21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	83.8
Los Angeles Junction Railway Company[a]	LAJ		64.0	1		No Data	N/A	16-18 ft	N/A
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Pacific Sun Railroad, LLC	PSRR		62.0	1		No Data	N/A	16-18 ft	N/A
				2		< 263K		19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	
San Diego & Imperial Valley Railroad	SDIY	33.4	33.4	1	33.4	No Data		16-18 ft	
				2		< 263K		19-20 ft	
				3		263K	14.4	21-22 ft	
				4		286K		> 22 ft	
				5		315K	19.1	No Data	33.4
Trona Railway Company	TRC	30.9	30.9	1		No Data		16-18 ft	
				2	30.9	< 263K	30.9	19-20 ft	
				3		263K		21-22 ft	
				4		286K		> 22 ft	
				5		315K		No Data	30.9
Pacific Harbor Line, Inc.	PHL	18.9	18.9	1	4.8	No Data	13.2	16-18 ft	
				2	14.1	< 263K		19-20 ft	8.2
				3		263K	1.9	21-22 ft	
				4		286K		> 22 ft	
				5		315K	3.7	No Data	10.7

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Subtotal		N/A	293.0	1	55.3	No Data	13.2	16-18 ft	0.0
				2	100.1	< 263K	30.9	19-20 ft	8.2
				3	11.6	263K	100.0	21-22 ft	0.0
				4	0.0	286K	0.0	> 22 ft	0.0
				5	0.0	315K	22.8	No Data	158.8
				1	33.1%	No Data	7.9%	16-18 ft	0.0%
				2	60%	< 263K	18.5%	19-20 ft	4.9%
				3	7%	263K	59.9%	21-22 ft	0.0%
				4	0%	286K	0.0%	> 22 ft	0.0%
				5	0%	315K	13.6%	No Data	95.1%
Grand Total		N/A	1,189.6	1	467.9	No Data	252.8	16-18 ft	42.1
				2	461.3	< 263K	30.9	19-20 ft	237.8
				3	117.5	263K	199.2	21-22 ft	0.0
				4	0.0	286K	200.9	> 22 ft	31.0
				5	0.0	315K	362.6	No Data	735.5
				1	44.7%	No Data	24.2%	16-18 ft	4.0%
				2	44.1%	< 263K	3.0%	19-20 ft	22.7%
				3	11.2%	263K	19.0%	21-22 ft	0.0%
				4	0.0%	286K	19.2%	> 22 ft	3.0%
				5	0.0%	315K	34.6%	No Data	70.3%

Sources: Caltrans, 2012.

SCAC = Standard Carrier Alpha Code.

C.4.1 Federal Railroad Administration Track Class

The FRA has established nine specific classes of track (Class 1 to Class 9). Each classification has a corresponding maximum allowable operating speed, as well as a corresponding track structure, geometry, and inspection frequency.[4] Every railroad determines the track class for each segment of track on their system. The FRA track class provides a proxy for the condition of a line segment. Higher levels of maintenance and better track conditions accompany each successively higher FRA track class. If a line is not maintained sufficiently for trains to be operated at the class of track associated with the published timetable speeds of the line, then speed reductions ("slow orders") must be placed on the tracks. Slow orders, typically temporary, are removed once the track defects have been corrected. However, along low-density rail lines, slow orders to take on a more permanent nature, resulting in typical actual conditions noted for a given segment below the stated FRA track class.

As shown in Table C.7, over 87.9 percent of Class I railroad mainlines in the State have a maximum freight train speed of 40 mph or higher (Class 3), and about 65 percent of the Class I railroad mainlines have a maximum freight train speed of 60 mph or higher (Class 4).

Table C.7: FRA Track Classification by Rail Type and Region, 2009

Name of Region	Rail Type	Number of Line Miles by FRA Track Class (Maximum Freight Train Speed)					Percentage of Split by Length of FRA Track Class (Maximum Freight Train Speed)				
		1 (10 mph)	2 (25 mph)	3 (40 mph)	4 (60 mph)	5 (80 mph)	1 (10 mph)	2 (25 mph)	3 (40 mph)	4 (60 mph)	5 (80 mph)
Central Coast	Class I[a]	0	20	248	177	0	0.0%	4.6%	55.7%	39.7%	0.0%
	Short Lines[b]	40.5	0.0	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%
Central Valley	Class I[a]	0	7	47	138	360	0.0%	1.3%	8.5%	25.0%	65.1%
	Short Lines[b]	221.1	183.8	26.7	0.0	0.0	51.2%	42.6%	6.2%	0.0%	0.0%
Northern California	Class I[a]	27	301	309	299	275	2.2%	24.9%	25.5%	24.7%	22.7%
	Short Lines[b]	95.6	162.4	78.6	0.0	0.0	28.4%	48.3%	23.3%	0.0%	0.0%
Southern California	Class I[a]	12	51	191	472	533	0.9%	4.1%	15.1%	37.5%	42.3%
	Short Lines[b]	55.3	100.1	11.6	0.0	0.0	33.1%	60.0%	6.9%	0.0%	0.0%
California Total	**Class I[a]**	**38**	**380**	**795**	**1,086**	**1,167**	**1.1%**	**11.0%**	**22.9%**	**31.3%**	**33.7%**
	Short Lines[b]	**412.4**	**446.4**	**116.9**	**0.0**	**0.0**	**42.3%**	**45.8%**	**12.0%**	**0.0%**	**0.0%**

Sources: 1) Caltrans' GIS rail lines data, rail.shp; 2) California Regional Timetable No. 20; 3) UPRR: http://www.up.com, California Subdivisions Map; 4) BNSF: http://www.bnsf.com, Timetable No. 1, February 2011, BNSF: California Operating Division map; 5) National Transportation Atlas Database (NTAD) GIS rail lines data, Rail_Lines.shp; 6) American Short Line and Regional Railroad Association (ASLRRA; and 7) California Short Line Railroad Association (CSLRA).

[a] Track miles includes only line miles or the first mainline tracks of Class I mainline subdivisions. It does not include other mainline, passing, yard, or switching tracks.

[b] Track miles includes only line miles or the first mainline tracks of major freight short lines. It does not include other mainline, passing, yard, or switching tracks.

[4] *Federal Railroad Administration Track Safety Standards*.

Track class varies slightly between regions–for example, the Class I rail lines in the Central Valley have the highest average track class compared to the northern or southern regions. This may be due to a variety of factors, including the geography of each region (trains may move faster in flat, wide areas as opposed to over mountain passes), the population density of each region, or the volume of traffic using each rail line.

Additionally, Table C.7 shows that short lines in all regions of the State have lower track class and maximum train speeds than the Class I railroads. Almost 88 percent of the short line mileage operates at FRA track Class 2 or below, and all short line freight trains operate below 40 mph speeds (Class 3). The California Northern and Central Oregon and Pacific Railroads in northern California operate the highest freight train speeds among short line railroads.

C.4.2 Total Class I Track Miles

Table C.8 summarizes Class I track miles operated in each of the four regions. 3,000 of the 4,116 total Class I track miles in the State, are located in southern and northern California, with the remaining 1,000 miles split between the Central Coast and the Central Valley. Much of California's rail miles (about 82 percent) are single track–meaning that there is a single track with sidings placed at regular intervals to allow for trains to pass one another. However, certain areas–in particular, those near the San Pedro Bay Ports, the Port of Oakland, other traffic generating facilities, and BNSF's Transcontinental Corridor (TRANSCON)–have two or three tracks. These areas are shown in Exhibit C.1.

Table C.8: Class I Railroad Track Miles Operated by Region, 2011

Name of Region	Track Miles Operated[a]	Percentage of Split by Length of Number of Tracks		
		First Mainline	Second Mainline	Other Mainlines
Central Coast	450	98.9%	1.1%	
Central Valley	589	93.7%	6.3%	
Northern California	1,373	89.3%	10.7%	
Southern California	1,704	63.3%	36.7%	0.7%
California Total	**4,116**	**81.9%**	**17.9%**	**0.3%**

Sources: ORNL National Rail Network; Cambridge Systematics, Inc., 2012.

[a] Track miles includes only mainline tracks of Class I mainline subdivisions. It does not include passing, yard, or switching tracks.

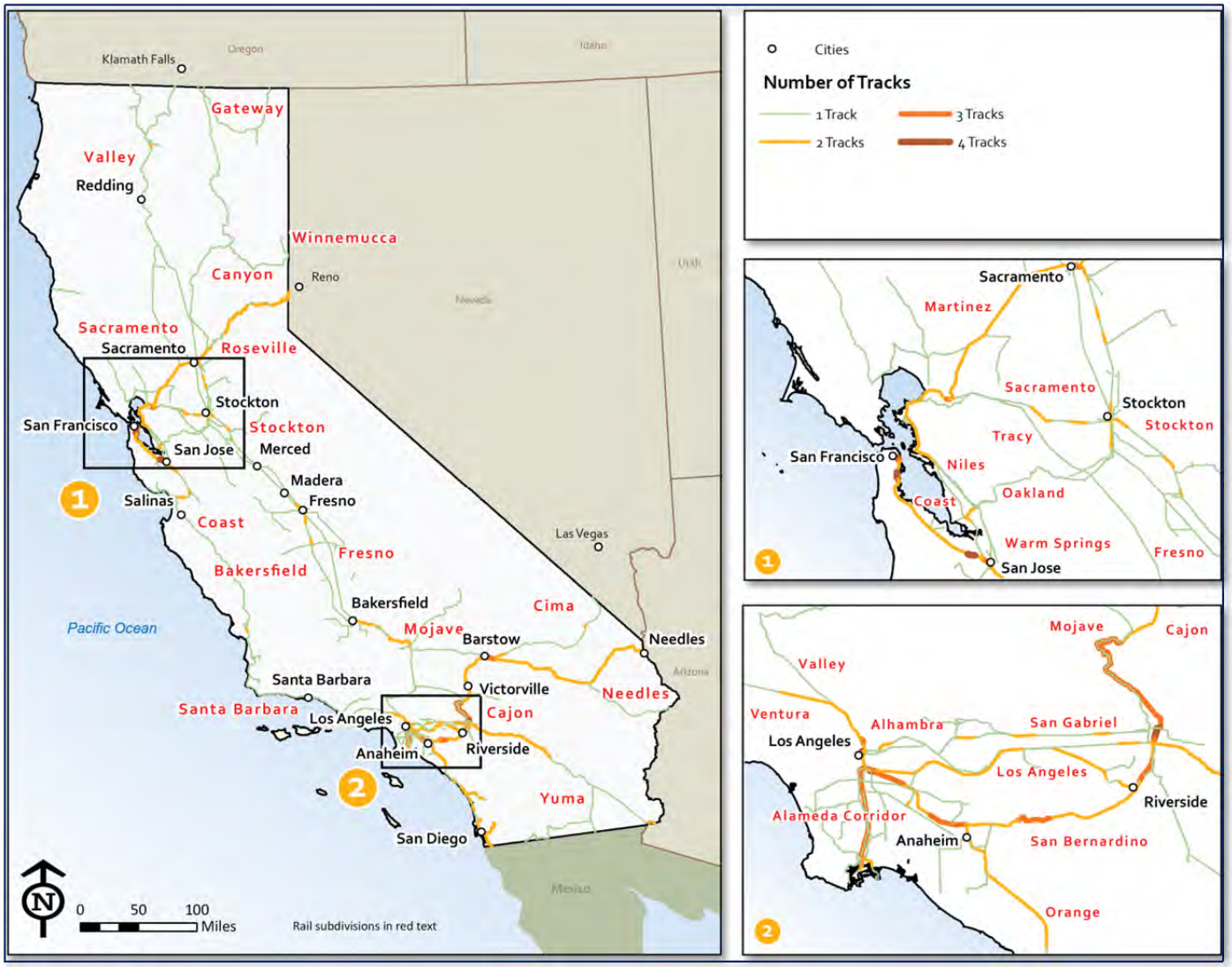

Exhibit C.1: Class I Rail System: Number of Tracks, 2011

Source: ORNL rail network.

C.4.3 Maximum Allowable Gross Weight

Every section of rail line has a maximum gross weight rating. Carrying weight in excess of this rating can lead to damaged rail infrastructure, or, in extreme cases, to catastrophic failure of tracks or bridges.[5] Nationwide, much of the Class I rail system is approved for heavy axle cars that can handle 286,000 pounds, or even 315,000 pounds, of gross weight. Similarly, in California, the vast majority of the Class I rail system (2,924 miles, or 87 percent of total rail miles) can carry up to 315,000 pounds, as shown in Table C.9 and Exhibit C.2. An additional 283 miles of track (8.4 percent) can carry only 286,000 pounds, with only a small percentage (39 miles or 1.2 percent of total miles) rated to less than 286,000 pounds.

Table C.9: Maximum Allowable Gross Weight by Rail Type and Region

		Number of Line Miles by Maximum Gross Weight Restriction Type					Percentage of Split by Length of Maximum Gross Weight Restriction Type				
Name of Region	**Rail Type**	**315,000 lbs.**	**286,000 lbs.**	**263,000 lbs.**	**Less than 263,000 lbs.**	**No Data**	**315,000 lbs.**	**286,000 lbs.**	**263,000 lbs.**	**Less than 263,000 lbs.**	**No Data**
Central Coast	Class I[a]	429.7	0.0	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%
	Short Lines[b]	14.7	0.0	12.8	0.0	13.0	36.3%	0.0%	31.6%	0.0%	32.1%
Central Valley	Class I[a]	481.6	36.8	0.0	0.0	0.0	92.9%	7.1%	0.0%	0.0%	0.0%
	Short Lines[b]	113.9	0.0	3.1	115.7	199.0	26.4%	0.0%	0.7%	26.8%	46.1%
Northern California	Class I[a]	958.6	237.6	0.0	0.0	0.0	80.1%	19.9%	0.0%	0.0%	0.0%
	Short Lines[b]	111.0	0.0	83.3	85.2	127.9	27.2%	0.0%	20.4%	20.9%	31.4%
Southern California	Class I[a]	1,054.0	8.5	39.0	0.0	120.5	86.3%	0.7%	3.2%	0.0%	9.9%
	Short Lines[b]	13.2	30.9	100.0	0.0	22.8	7.9%	18.5%	59.9%	0.0%	13.6%
California Total	**Class I[a]**	**2,924.0**	**283.0**	**39.0**	**0.0**	**120.5**	**86.9%**	**8.4%**	**1.2%**	**0.0%**	**3.6%**
	Short Lines[b]	**252.8**	**30.9**	**199.2**	**200.9**	**362.6**	**24.2%**	**3.0%**	**19.0%**	**19.2%**	**34.6%**

Sources: 1) Caltrans' GIS rail lines data,; 2) California Regional Timetable No. 20; 3) UPRR: California Subdivisions Map; 4) BNSF: Timetable No. 1, February 2011, BNSF: California Operating Division map; 5) National Transportation Atlas Database (NTAD) GIS rail lines data; 6) American Short Line and Regional Railroad Association (ASLRRA):; and 7) CSLRA.

[a] Track miles includes only line miles or the first mainline tracks of Class I mainline subdivisions. It does not include other mainline, passing, yard, or switching tracks. BNSF and UPRR weight restrictions data belongs to the year 2012.

[b] Track miles includes only line miles or the first mainline tracks of major freight short lines. It does not include other mainline, passing, yard, or switching tracks. Weight restrictions data for short lines belongs to the year 2009.

[5] Union Pacific Railroad, *Allowable Gross Weight*.

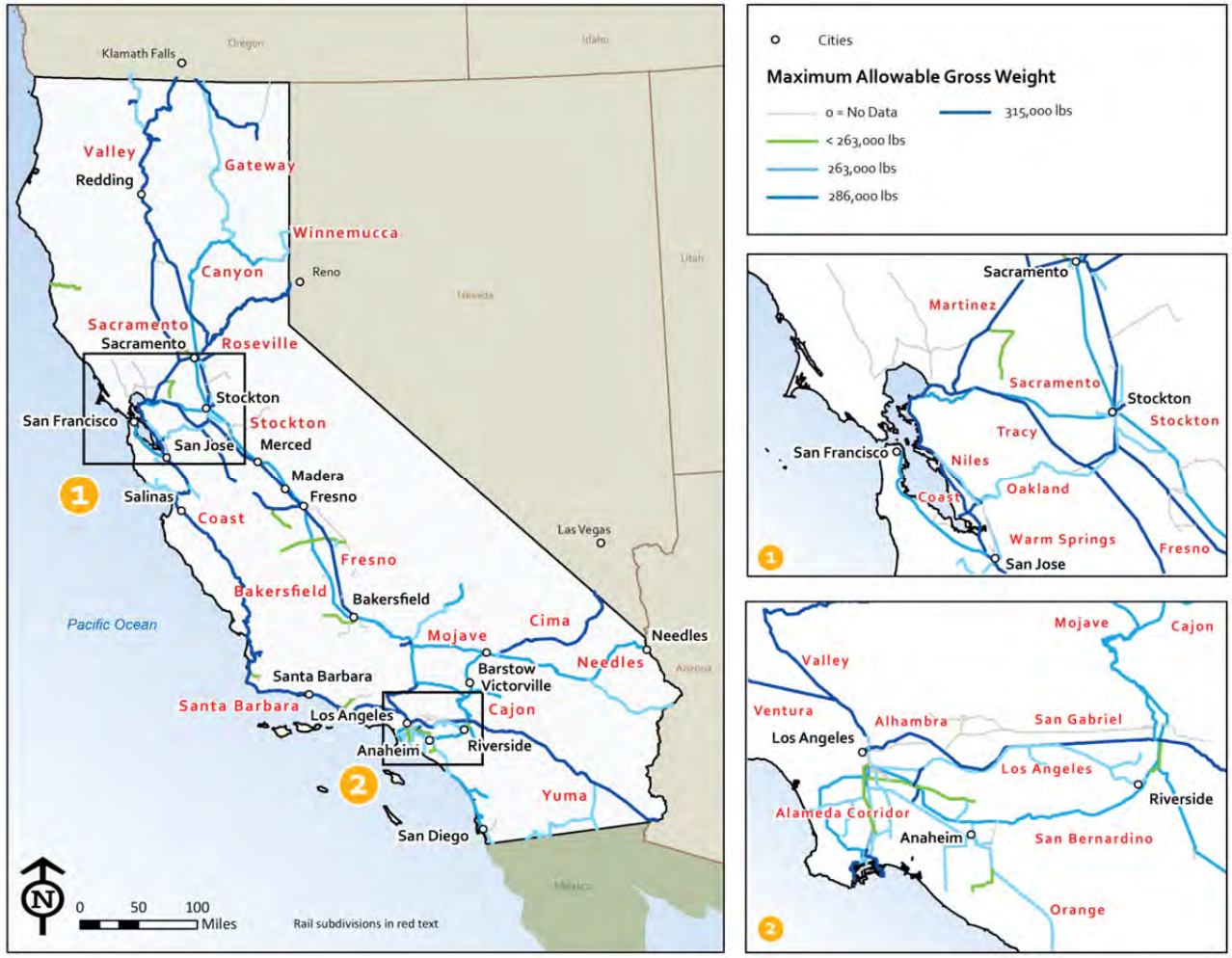

Exhibit C.2: Maximum Allowable Gross Weight

Note: BNSF and UPRR weight restrictions are for year 2012. Weight restrictions for short lines are for year 2009.

Source: Caltrans, 2012.

Short line railroads have a wider variety of track maximum weight ratings.[6] For those short lines reporting this information, roughly 253 miles (24 percent of total available short line rail miles) are rated to 315,000 pounds; 31 miles (3 percent of total) are rated to 286,000 pounds; and the remaining 400 miles (40 percent) are rated to 263,000 pounds or less.

C.4.4 Vertical Clearance

Vertical clearance refers to the height of a loaded train measured from the top of the rail to the top of the cargo while seated and secured on top of a rail car. Height restrictions dictate what type of traffic can move along a particular segment of rail. Table C.10 illustrates that almost 2,000 miles of track (56 percent) have height restrictions of between 16 to 18 feet. About 873 miles (26 percent) can accept car heights of 19 to 20 feet, sufficient for international double-stack service, and only a small portion (220 miles, or 6.5 percent) have height restrictions of more than 22 feet. This means that the majority of the freight rail system in California cannot accept domestic double-stack container traffic, which requires a minimum vertical clearance of 20 feet 6 inches. Exhibit C.3 displays vertical clearance for mainline track.

Table C.10: Maximum Height Restrictions by Rail Type and Region, 2009

Name of Region	Rail Type	Number of Line Miles by Height Restriction Type					Percentage of Split by Length of Height Restriction Type				
		16-18 ft	19-20 ft	21-22 ft	>22 ft	No Data	16-18 ft	19-20 ft	21-22 ft	>22 ft	No Data
Central Coast	Class I[a]	429.7	0.0	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%
	Short Lines[b]	0.0	12.8	0.0	14.7	13.0	0.0%	31.6%	0.0%	36.3%	32.1%
Central Valley	Class I[a]	125.6	255.3	0.0	0.0	137.5	24.2%	49.2%	0.0%	0.0%	26.5%
	Short Lines[b]	2.5	105.9	0.0	0.0	323.3	0.6%	24.5%	0.0%	0.0%	74.9%
Northern California	Class I[a]	736.5	317.9	0.0	0.0	141.8	61.6%	26.6%	0.0%	0.0%	11.9%
	Short Lines[b]	39.6	111.0	0.0	16.3	240.5	9.7%	27.2%	0.0%	4.0%	59.0%
Southern California	Class I[a]	606.7	299.9	0.0	219.9	95.6	49.6%	24.5%	0.0%	18.0%	7.8%
	Short Lines[b]	0.0	8.2	0.0	0.0	158.8	0.0%	4.9%	0.0%	0.0%	95.1%
California Total	**Class I[a]**	**1,898.5**	**873.2**	**0.0**	**219.9**	**374.9**	**56.4%**	**25.9%**	**0.0%**	**6.5%**	**11.1%**
	Short Lines[b]	**42.1**	**237.8**	**0.0**	**31.0**	**735.5**	**4.0%**	**22.7%**	**0.0%**	**3.0%**	**70.3%**

Sources: 1) Caltrans' GIS rail network; 2) California Regional Timetable No. 20; 3) UPRR: California Subdivisions Map; 4) BNSF:, Timetable No. 1, February 2011, BNSF: California Operating Division map; 5) National Transportation Atlas Database (NTAD) GIS rail lines data; 6) American Short Line and Regional Railroad Association (ASLRRA):; and 7) CSLRA.

[a] Track miles includes only line miles or the first mainline tracks of Class I mainline subdivisions. It does not include other mainline, passing, yard, or switching tracks.

[b] Track miles includes only line miles or the first mainline tracks of major freight short lines. It does not include other mainline, passing, yard, or switching tracks.

[6] This information is not available for all short line railroads in California. Therefore, statistics offered on short line railroads are, in some cases, representative of only a portion of the total short line system.

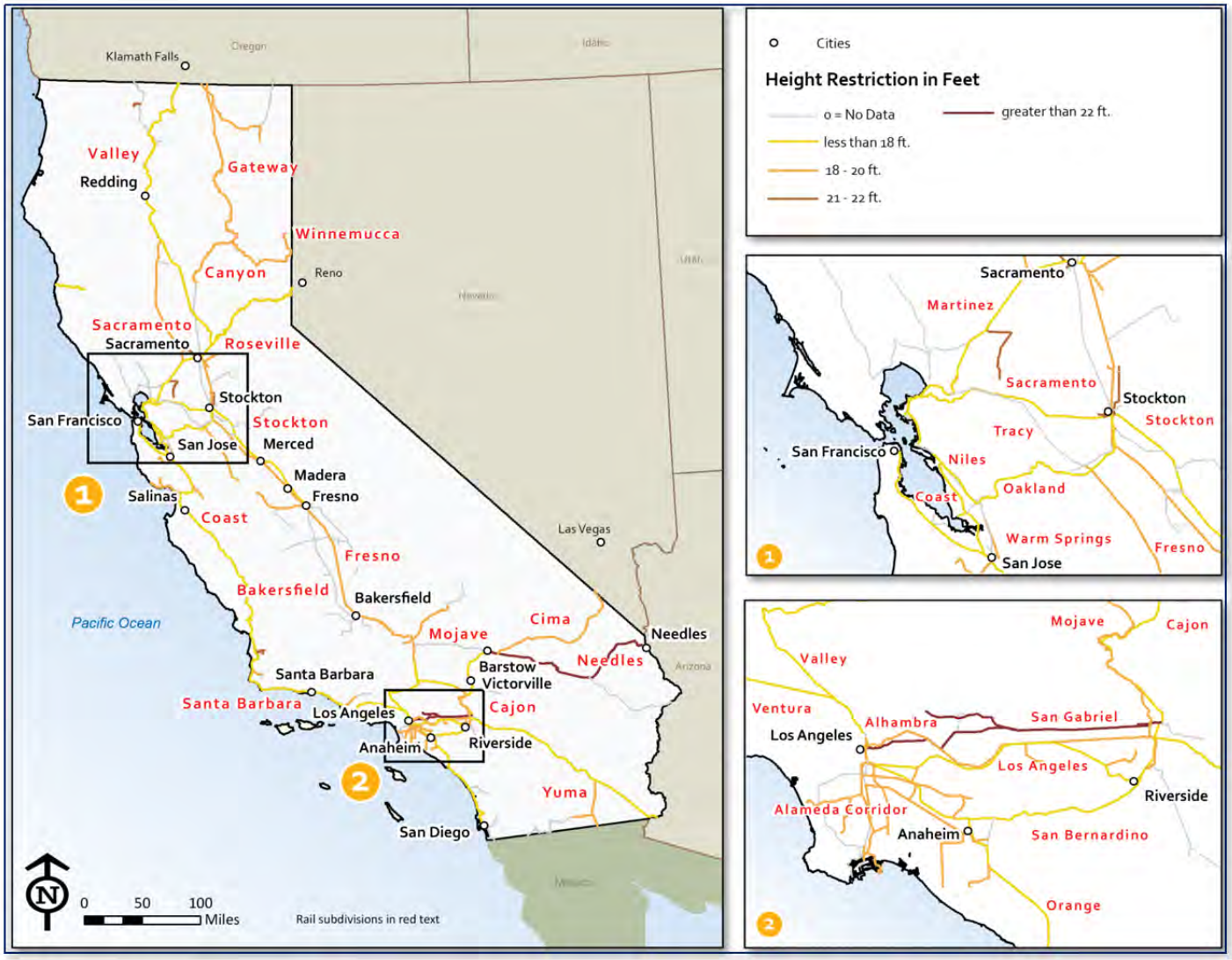

Exhibit C.3: Vertical Clearance Restrictions, 2009

Source: Caltrans, 2012.

Note: If track's height restriction is between two intervals, the color of the lower of the two intervals is shown.

C.5 Train Volumes

Table C.11 presents estimates of freight train volumes by train types for segments of track and by subdivision for the State's Class I rail mainlines.

Table C.11: Existing Train Volumes on Class I Rail Mainline Segments by Region, 2007

Segment From/To	Segment To/From	Subdivision	Base Year Intermodal Freight Train Count (Daily)	Base Year Freight Non-Intermodal Train Count (Daily)	Base Year Total Freight Train Count (Daily)
Central Coast Region					
Los Angeles Union Station	Burbank Downtown	SCRRA Valley	0	10	10
Burbank Downtown	Gemco Plant	Ventura	0	8	8
Gemco Plant	CP Davis	Ventura	0	6	6
CP Davis	East Ventura	Ventura	0	6	6
East Ventura	San Luis Obispo	Santa Barbara	0	6	6
San Luis Obispo	Callender	Coast	0	4	4
Callender	San Jose	Coast	0	2	2
Central Valley Region					
Bakersfield	Fresno	Bakersfield	14	12	26
Fresno	Stockton	Stockton	12	12	24
El Pinal	Sacramento	Sacramento	0	6	6
Bakersfield	Fresno	Fresno	8	10	18
Fresno	Stockton	Fresno	8	10	18
Stockton	El Pinal	Fresno	22	18	40
El Pinal	Sacramento	Fresno	22	12	34
Northern California Region					
Stockton	Port Chicago	Stockton	6	4	10
Port Chicago	Richmond	Stockton	6	4	10
Sacramento	Martinez	Martinez	10	8	18
Martinez	Richmond	Martinez	10	8	18
Richmond	El Cerrito	Martinez	10	8	18
El Cerrito	Oakland	Martinez	14	10	24
Oakland	Oakland Coliseum	Niles	2	6	8
Oakland Coliseum	Niles	Niles	2	6	8
Niles	San Jose	Niles	0	8	8

Table C.11: Existing Train Volumes on Class I Rail Mainline Segments by Region, 2007 (continued)

Segment From/To	Segment To/From	Subdivision	Base Year Intermodal Freight Train Count (Daily)	Base Year Freight Non-Intermodal Train Count (Daily)	Base Year Total Freight Train Count (Daily)
Niles	Lathrop	Oakland	2	2	4
Lathrop	Stockton	Oakland	10	14	24
Stockton	Port Chicago	Tracy	0	0	0
Port Chicago	Martinez	Tracy	0	0	0
Sacramento	Roseville	Roseville	18	14	32
Roseville	Auburn	Roseville	18	0	18
Auburn	Reno, NV	Roseville	18	0	18
Sacramento	Marysville	Sacramento	4	10	14
Roseville	Marysville	Valley	0	16	16
Marysville	Klamath Falls, OR	Valley	4	4	8
Marysville	Keddie	Canyon	0	18	18
Keddie	Flanigan, NV	Canyon/Winnemucca	0	16	16
Keddie	Klamath Falls, OR	Gateway	0	4	4
Southern California Region					
Hobart	Fullerton	San Bernardino	28	4	32
Fullerton	Atwood	San Bernardino	28	4	32
Atwood	W. Riverside	San Bernardino	28	6	34
W. Riverside	Riverside	San Bernardino	42	14	56
Riverside	Highgrove	San Bernardino	42	14	56
Colton	San Bernardino	San Bernardino	32	14	46
San Bernardino	Keenbrook	Cajon	36	16	52
Keenbrook	Silverwood	Cajon	36	16	52
Silverwood	Barstow	Cajon	38	20	58
Barstow	Yermo	Needles	46	18	64
Yermo	Needles	Needles	40	14	54
Barstow	Mojave	Mojave–BNSF	14	12	26
Mojave	Bakersfield	Mojave–UPRR	22	22	44
Lancaster	Mojave	Mojave–UPRR	8	10	18
Palmdale	Lancaster	Mojave–UPRR	8	10	18
Silverwood	Palmdale	Mojave–UPRR	0	12	12
Keenbrook	Silverwood	Mojave–UPRR	4	16	20
W. Colton	Keenbrook	Mojave–UPRR	4	16	20

Table C.11: Existing Train Volumes on Class I Rail Mainline Segments by Region, 2007 (continued)

Segment From/To	Segment To/From	Subdivision	Base Year Intermodal Freight Train Count (Daily)	Base Year Freight Non-Intermodal Train Count (Daily)	Base Year Total Freight Train Count (Daily)
East Los Angeles	Pomona	Los Angeles	12	2	14
Pomona	Montclair	Los Angeles	16	2	18
Montclair	Mira Loma	Los Angeles	16	4	20
Mira Loma	W. Riverside	Los Angeles	16	4	20
Santa Clarita	Palmdale	SCRRA Valley	0	6	6
Burbank Downtown	Santa Clarita	SCRRA Valley	0	6	6
Los Angeles	Burbank Downtown	SCRRA Valley	0	10	10
Fullerton	Orange	SCRRA Orange	0	6	6
Orange	Irvine	SCRRA Orange	0	8	8
Irvine	Laguna Niguel	SCRRA Orange	0	8	8
Laguna Niguel	Oceanside	SCRRA Orange	0	4	4
Oceanside	San Diego	NCTD San Diego	0	6	6
Atwood	Orange	SCRRA Olive	0	4	4
LATC	El Monte	Alhambra	16	6	22
El Monte	Bassett	Alhambra	16	6	22
Bassett	Industry	Alhambra	16	6	22
Industry	Pomona	Alhambra	20	8	28
Pomona	Montclair	Alhambra	16	8	24
Montclair	Kaiser	Alhambra	16	10	26
Kaiser	W. Colton	Alhambra	16	12	28
W. Colton	Colton	Alhambra	14	14	28
Yermo	Las Vegas, NV	Cima	6	4	10
Colton	Indio	Yuma	26	18	44
Indio	Yuma, AZ	Yuma	26	18	44

Sources: AECOM and Cambridge Systematics, Inc., 2012.

C.6 Surface Transportation Board Railroad Abandonment Filings

Table C.12 lists all of the Surface Transportation Board abandonment filings in California between 2005 and 2010. This list includes all segments covered by abandonment filings in this period, and may include cases where abandonment was denied. This list reveals no clear patterns or trends in abandonment filings. Miles of route proposed for abandonment changed sporadically from year to year, and short line railroads consistently (across the 2005 to 2010 timeframe) submitted more abandonment requests than Class I railroads. In fact, between 2005 and 2010, short line railroad abandonment requests affected almost 193 miles compared to only 83 miles attributed to Class I railroads. Discussions with Class I railroads suggest that many of these requests were for industrial leads or other connector facilities to individual industries and businesses.

Table C.12: Rail Line Abandonment Filings with FRA, 2005 to 2010

Name	Owner/Line	Year	Counties	City	Length
Almanor Railroad Co.		2010	Plumas, Lassen	Clear Creek	12.3
BNSF	Alameda Beltline RR	2010	Alameda		2.0
UPRR	Brea Chemical Industrial Lead	2010	Orange	Brea	1.2
UPRR	South San Francisco Industrial Lead	2010	San Mateo		0.6
SDIY		2009	San Diego	Escondido	1.4
Arizona and California Railroad Co.		2009	San Bernardino and Riverside		49.4
Tulare Valley RR Co.		2009	Tulare	Ducor	5.9
UPRR	McHenry Industrial Lead	2009	San Joaquin and Stanislaus		5.2
UPRR (Nevada-CA)	Lassen Valley Railway LLC	2009			22.3
UPRR	Lakewood Industrial Lead	2008	Los Angeles	Lakewood	0.3
San Joaquin Valley RR Co.	South Exeter Branch	2008	Tulare		30.6
San Joaquin Valley RR Co.	South Exeter Branch	2008	Tulare		9.2
UPRR	Santa Monica Industrial Lead	2008	Los Angeles	Los Angeles	0.4
LA Metro	Santa Monica Industrial Lead	2008	Los Angeles		0.3
UPRR	Loyalton Industrial Lead	2007	Plumas and Sierra		11.1
UPRR	Loyalton Industrial Lead	2007	Sierra	Loyalton	0.7
BNSF		2007	Riverside	Riverside	0.5
UPRR	Riverside Industrial Lead	2007	Riverside		0.3
UPRR (Nevada-CA)	Flanigan Industrial Lead	2006			21.8
UPRR (Nevada-CA)	Susanville Industrial Lead	2006	Wendal, Lassen		0.6
UPRR	Pearson Industrial Lead	2006	Yuba		4.8
Sunset Railway Co/ San Joaquin Valley RR	Sunset Subdivision	2005	Kern	Levee	0.2
McCloud RR Co.		2005	Siskiyou, Shasta		80.0
Los Angeles Junction Railway		2005	Los Angeles	Maywood	0.5
Santa Clara Valley Transportation Authority	Industrial Line	2005	Santa Clara		0.2
Santa Clara Valley Transportation Authority	Milpitas Line	2005	Alameda	Fremont	2.8
UPRR	Tustin Industrial Lead	2005	Orange	Orange	1.5
UPRR	Holtville Industrial Lead	2005	Imperial County		9.38

Source: FRA Abandonment filings.

[This page intentionally blank]

Appendix D

SECTION 6.2 SUPPLEMENTAL INFORMATION:
FREIGHT DEMAND ANALYSIS AND
POSITIVE TRAIN CONTROL

[This page intentionally blank]

D.1 Freight Demand Data and Methodology

D.1.1 Methodology and Data Sources

This section discusses the current and forecast (2040) commodity flows and train volumes over the freight rail system. The commodity flow analysis and forecasts used a blend of economic and commodity flow data sources, drawn from publicly available datasets as well as some specialized, confidential data provided to California Department of Transportation (Caltrans) for the development of the California State Rail Plan. Six main data sources support the commodity flow assessment:

1. **2007 Confidential Carload Waybill Sample–Surface Transportation Board (STB).** The Association of American Railroads (AAR) collects Waybill data annually for the STB from railroads that have moved at least 4,500 carloads each year for each of the previous three years, or that move five percent or more of any state's total rail traffic. The Waybill dataset enabled assembly of county-to-county 2007 tonnage estimates of rail flows and information on railway routing, and Caltrans received this data under a confidential user agreement. This sample formed the basis for the base year (2007) freight rail traffic. This was then corroborated and augmented using Freight Analysis Framework Version 3 (FAF3) commodity flows database (2007 to 2040) and California's economic forecasts from Transportation Economic Development Impact System (TREDIS) (2008-2041) to estimate the forecast year (2040) commodity flows.
2. **Freight Analysis Framework (FAF3)–FHWA.** Developed and provided by the Federal Highway Administration (FHWA), FAF3 provides tonnage estimates by commodity type, and mode for 123 U.S. regions consisting of major metropolitan areas, state remainders, and 16 entire states. The primary basis for FAF3 is a 2007 survey of the shipping behavior of 100,000 U.S. manufacturers and wholesalers (i.e., the Commodity Flow Survey), supplemented by *The Journal of Commerce*'s Port Import Export Reporting System, the U.S. Army Corps of Engineers' Waterborne Commerce Database, and the STB's Carload Waybill Sample for rail. The forecast incorporated into FAF3, produced by IHS Global Insight using Q2 2010 as the base period, was applied to the 2007 Carload Waybill sample to project volumes in 2040, as well as the intermediate years of 2015, 2020, 2025, 2030, and 2035. The FAF3 growth rates were then adjusted using TREDIS economic data.
3. **Class I Railroad Train Counts and Data–UPRR/BNSF.** Representatives of the Union Pacific (UPRR) and BNSF Railway (BNSF) provided train count data for limited segments on the California rail network. These counts validated flows created through other data sources.
4. **TREDIS Data.** Caltrans and the University of California, Davis purchased this dataset in 2011, which includes output and demand forecasts by industrial sector for the years 2008 to 2041. These data formed the basis for understanding California's economy as well as adjusting commodity flow growth rates as suggested by the FAF3 dataset. Moody's Economy.com forecasts provide the actual basis for sector data incorporated in TREDIS. Using these forecasts to adjust the FAF3 commodity growth rates ensured that the freight forecasts were consistent with the passenger travel forecasts developed using Moody's employment data, and that the freight growth rates were based on more recent forecasts that take into account the slower recovery of the nation's and California's economy than is reflected in the FAF3 forecasts.

5. **San Pedro Bay Port Forecasts.** Freight rail forecasts for southern California, which are dominated by intermodal traffic from the San Pedro Bay Ports, generally match forecasts being used by these ports for environmental documents associated with port expansion projects. These port rail forecasts use container forecasts developed by The Tioga Group and IHS Global Insight and updated in July 2009 to reflect the impacts of the recent recession and the slowdown in international import trade.
6. **Interviews with Short Line Railroad Managers/Operators.** Since our primary data source (the Carload Waybill sample) concentrates on Class I railroad data, a set of one-on-one interviews with short line rail managers supplemented available short line railroad information and commodity flow information. Although this information did not sufficiently identify the commodity flows and train volumes by line, it provided insight into current and future markets served by short line railroads in California as discussed in Section 6.2.2, as well as short line railroads' supporting role to the Class I railroads.

D.1.2 Goods Movement Analysis Zones

The freight commodity flow and market discussion uses six goods-movement analysis zones, as shown in Table D.1 and Exhibit D.1. These zones follow the FHWA's definition of California's economic geography in the FAF3 commodity flow database. Four represent the State's metropolitan regions, while the fifth zone–defined as "the remainder of California" in FAF3–is divided into two zones: the San Joaquin Valley (Valley) and the remaining non-urban counties that are not part of the San Joaquin Valley (i.e., the remainder of California). The San Joaquin Valley separation represents its importance as a distinctive economic region that stands apart from the other non-urbanized sections of California. The Valley's substantial agricultural production distinguishes the region from a freight perspective.[7]

The statewide rail-based commodity flows shown in Table D.2 were disaggregated to the goods movement analysis zones and then individual counties.

Table D.1: The Six Goods Movement Analysis Zones

Goods Movement Analysis Zone	Counties Included
Los Angeles/Long Beach	Los Angeles, Orange, Riverside, San Bernardino, Ventura
San Diego	San Diego
Sacramento	El Dorado, Nevada, Placer, Sacramento, Sutter, Yolo, Yuba
San Jose/San Francisco/Oakland	Alameda, Contra Costa, Marin, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma
San Joaquin Valley	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare
Remainder of California	All counties not designated in the other five regions

Source: Cambridge Systematics, Inc., 2012.

[7] In 2011, the agricultural output from the San Joaquin Valley was about $35 billion.

Exhibit D.1: The Six Goods Movement Analysis Zones

Sources: Economic and Social Research Institute (ESRI) Geographic Information System (GIS) data; Cambridge Systematics, Inc., 2012.

Table D.2: California Rail Flows and Percentage Growth for Highest-Volume[a] Commodities by Rail Service Type between 2007 and 2040

SCTG2 Commodity	Carload						Intermodal						Total		
	Ports Market			Domestic and Other Market			Ports Market			Domestic and Other Market					
	2007 Tons (000s)	2040 Tons (000s)	Percent Growth	2007 Tons (000s)	2040 Tons (000s)	Percent Growth	2007 Tons (000s)	2040 Tons (000s)	Percent Growth	2007 Tons (000s)	2040 Tons (000s)	Percent Growth	2007 Tons (000s)	2040 Tons (000s)	Percent Growth
Mixed Freight	28	56	99.6%	645	1,397	116.7%	54,635	161,599	195.8%	16,958	44,089	160.0%	72,266	207,141	186.6%
Cereal Grains (including seed)	160	210	30.9%	12,228	12,706	3.9%	1,942	3,646	87.7%	25	40	64.2%	14,355	16,602	15.7%
Other Prepared Foodstuffs, and Fats and Oils	187	371	98.5%	7,216	11,497	59.3%	305	542	77.8%	1,081	1,901	75.9%	8,789	14,311	62.8%
Wood Products	63	48	-24.1%	8,102	8,408	3.8%	135	311	130.1%	212	303	42.9%	8,512	9,069	6.5%
Motorized and Other Vehicles	856	1,409	64.6%	5,062	9,849	94.6%	264	485	83.5%	501	404	-19.4%	6,683	12,147	81.8%
Coal and Petroleum Products, n.e.c.	534	867	62.5%	5,425	7,542	39.0%	27	67	144.1%	17	26	54.4%	6,003	8,503	41.6%
Basic Chemicals	1,085	2,114	94.9%	4,299	6,593	53.4%	500	1,123	124.4%	118	201	69.7%	6,002	10,030	67.1%
Base Metal in Primary or Semi-Finished Forms	1,498	1,646	9.9%	3,804	4,677	23.0%	167	143	-13.9%	45	38	-14.9%	5,513	6,505	18.0%
Pulp, Newsprint, Paper, and Paperboard	6	9	40.9%	4,773	5,739	20.2%	141	116	-17.9%	142	112	-21.2%	5,062	5,975	18.0%
Other	1,422	2,618	84.1%	29,100	48,489	66.6%	2,998	10,314	244.0%	4,055	9,299	129.3%	37,575	70,720	88.2%
Total	**5,953**	**9,439**	**58.6%**	**84,912**	**120,622**	**42.1%**	**61,675**	**179,303**	**190.7%**	**23,220**	**56,503**	**143.3%**	**175,760**	**365,866**	**108.2%**

Sources: Federal Highway Administration FAF3 database; STB Carload Waybill Sample.

[a] Highest-volume in terms of 2007 total rail-based flow volume in tons.

D.2 County-Level Rail Commodity Flows

D.2.1 2007 Outbound

Examination of county-level rail commodity flows provides insights into which regions depend most on freight rail, as well an initial indication of where potential bottlenecks in the network will be in the future.

Exhibit D.2 shows the origin of rail commodity tonnages by California county. Los Angeles County originates the greatest amount of rail tonnage (25 million to 50 million tons), reflecting the prominence of Los Angeles County as home to the two largest container ports in the U.S. (the Port of Los Angeles and the Port of Long Beach), as well as its position as the largest county in the U.S. in terms of manufacturing production. In fact, in 2007, the County produced $118 million of manufactured products.[8]

Rail-based imports from southern California ports, which primarily include mixed freight and automobiles and their parts, comprise the majority of outbound traffic from Los Angeles County. In addition, rail also handles goods manufactured in Los Angeles County–namely, base metal products, refined petroleum and related products, basic chemicals, motorized vehicles and their parts, and aircraft, space vehicles, missiles, and their parts, some of which are exported to other parts of the world. In addition, San Bernardino, San Joaquin, Kern, Contra Costa, and Alameda counties also originated significant tons of rail-carried commodities (10 million to 25 million tons).

- San Bernardino County is home to BNSF's San Bernardino intermodal yard, which generates a substantial portion of the county's mixed freight rail traffic. The next important commodity shipped by rail from San Bernardino County, nonmetallic minerals, includes manufactured cement, crushed stone, sand, and gravel for construction.[9]
- San Joaquin County generates a fair amount of outbound mixed freight traffic due to the presence of BNSF's Stockton and UPRR's Lathrop intermodal yards. Food manufacturing contributes most of the other rail flows from San Joaquin County, including prepared foodstuffs, alcoholic beverages, milled grain products, bakery products, and other agricultural products.
- Kern County extracts several nonmetallic minerals, including cement, gypsum, crushed stone, sand and gravel, sulfur, borates, silver, gold, and shale, much of which gets shipped by rail.[10] In addition, oil refineries near Bakersfield also depend on rail. Kern County also moves basic chemicals and other agricultural products by rail.
- Contra Costa County has several oil refineries located near Richmond, Martinez, Benicia and San Francisco that depend on rail for transportation. Contra Costa County also manufactures base metal products, some of which are exported out of the Port of Richmond's bulk terminal. In addition, motorized vehicles and their parts, basic chemicals, and some mixed freight moves out of the county by rail.
- Alameda County generates mixed freight from the Oakland International Gateway and Railport-Oakland intermodal yards at the Port of Oakland. Motorized vehicles and their parts, alcoholic beverages, basic chemicals, and waste and scrap also move from Alameda County by rail.

[8] Los Angeles County Development Corporation and Kyser Center for Economic Research, *Manufacturing: Still a Force in Southern California*), 2011, Page 16/54 Chart 8, "LA County in 2007: Value of manufactured shipments is about $118 billion (excluding petroleum products manufacturing)."

[9] United States Geological Survey, *2008 Minerals Yearbook: California* (http://minerals.usgs.gov/minerals/pubs/state/2008/myb2-2008-ca.pdf), July 2012, Page ii.

[10] Ibid.

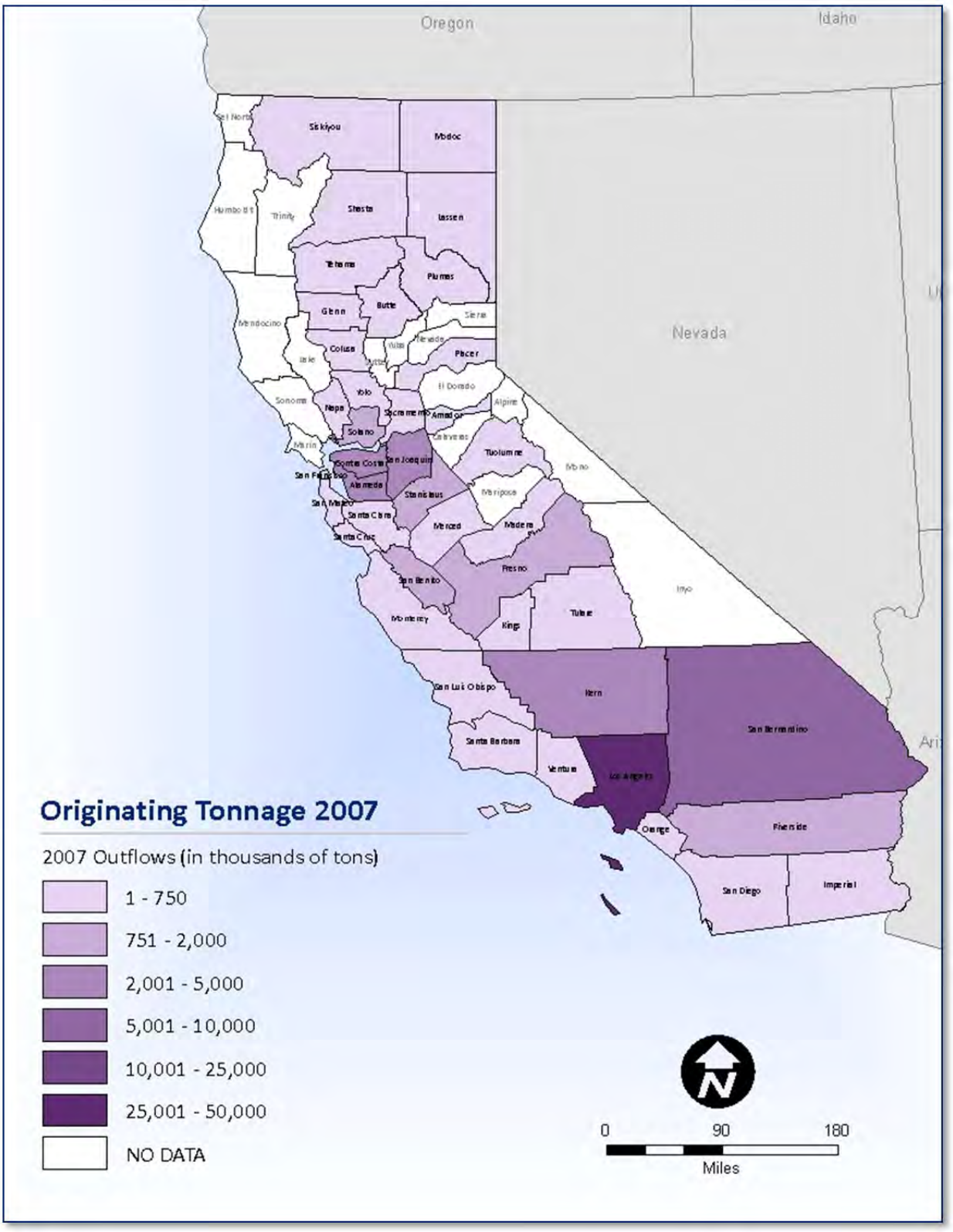

Exhibit D.2: California Rail Tonnage Origin by County, 2007 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

D.2.2 2007 Inbound

Exhibit D.3 shows rail commodity tonnages by county destination in 2007. Los Angeles County and San Bernardino County received the highest overall rail tonnage, with 10 million to 50 million tons, respectively. San Joaquin and Alameda counties received 5 million to 10 million tons, respectively.

Incoming commodities for Los Angeles, San Bernardino, and San Joaquin counties include cereal grains (including seeds) and prepared foodstuffs, while meat, fish, and seafood are key incoming commodities for Alameda County. This includes cereal and foods bound both for export through the Ports of Los Angeles and Long Beach and the Port of Oakland, as well as the large population bases in the respective local markets. Manufacturing industries in San Bernardino County use base metals brought in by rail, while manufacturing industries in San Joaquin County and Alameda County mainly depend on nonmetallic mineral products and wood products supplied through rail.

In addition, animal feed and related products and a small amount of fertilizers transported by rail support the farming industries of some counties in the Central Valley (Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare). Rail supplies coal to power plants in San Bernardino and Contra Costa counties and to manufacturing industries in Kern and San Joaquin counties.

D.2.3 2040 Outbound

Exhibit D.4 shows the origin of rail commodity tonnages by California county in 2040. Los Angeles County, originates the most rail tonnage (50 million to 140 million tons), followed by San Bernardino, San Joaquin, and Alameda counties (25 million to 50 million tons). To a large extent this reflects the locations of major intermodal terminals and the continuing growth in importance of intermodal traffic in the State's rail system. Apart from the large growth in mixed freight traffic, a sizeable increase in rail shipments basic chemicals out of Los Angeles County will result from an increase in the export of these commodities. Los Angeles County expects moderate growth in the rail tons of motorized vehicles and their parts, and aircraft, space vehicles, missiles, and their parts, with lower growth in base metals and coal and petroleum products.

Aside from the large increase in intermodal mixed freight traffic, San Bernardino County is likely to have moderate growth in the transport of nonmetallic minerals, base metals, and related products by rail. However, only a small increase in the tons of basic chemicals transported by rail is expected.

Again, besides the high growth in mixed freight, San Joaquin County will experience fairly high growth in food manufacturing, especially alcoholic beverages. In addition to the base year rail traffic, San Joaquin County has potential to rail more agricultural products that are currently being moved by trucks, such as fruits and nuts, vegetables, grain, and meat products.[11]

D.2.4 2040 Inbound

Exhibit D.5 shows rail commodity tonnages by county destination in 2040. Los Angeles County will remain the largest single destination for rail tonnage (25 million to 50 million tons), followed by San Bernardino, San Joaquin, and Alameda counties (10 million to 25 million tons). Again, these forecasts reflect the continued growth in importance of intermodal traffic and the location of distribution facilities and ports serving the State's major population centers in the San Francisco Bay Area and Los Angeles Basin.

[11] Cambridge Systematics, Inc., *San Joaquin Valley Interregional Goods Movement Plan, Task 4: Commodity Flow Profile (Technical Memorandum)*, 2012.

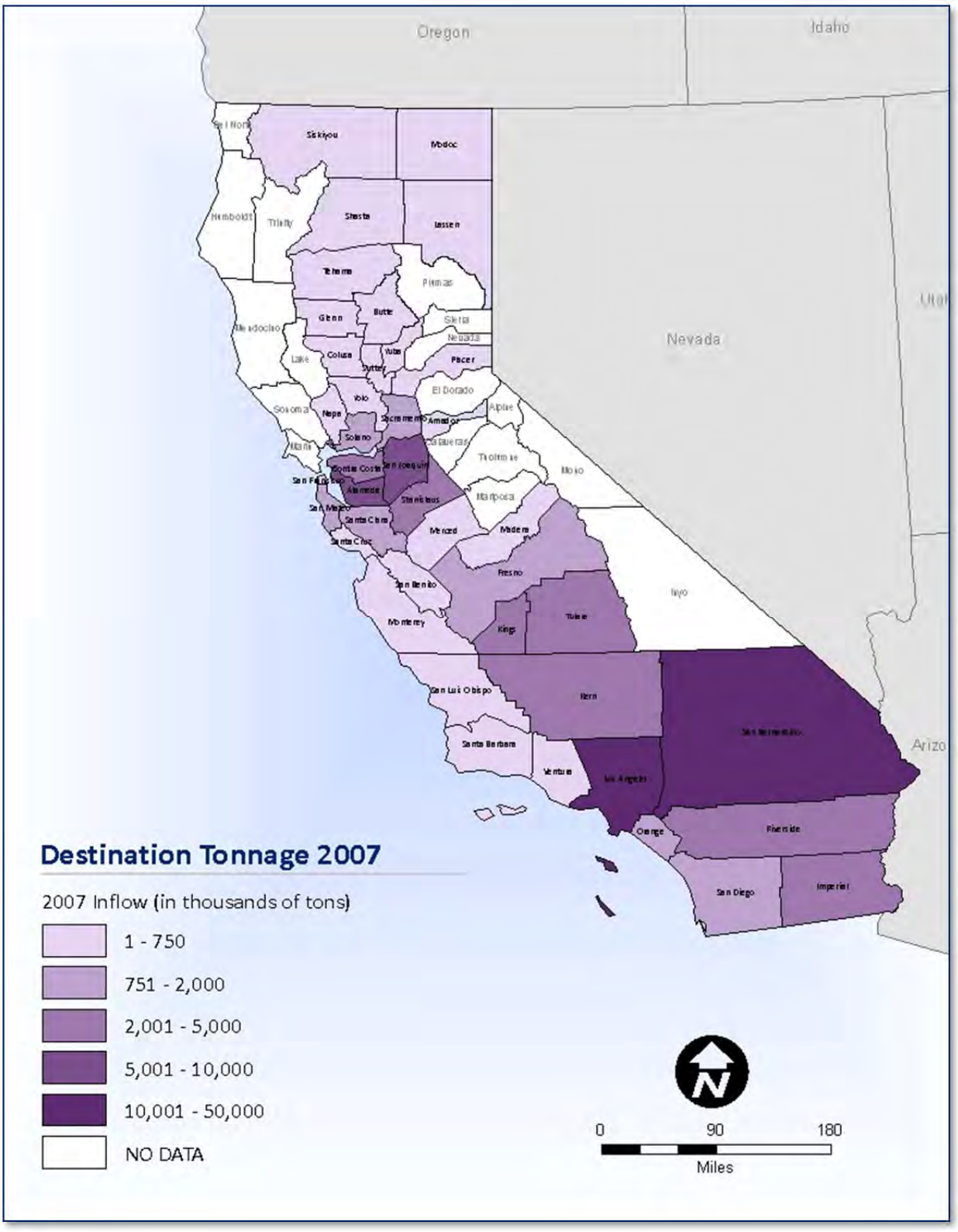

Exhibit D.3: California Rail Tonnage Destination by County, 2007 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

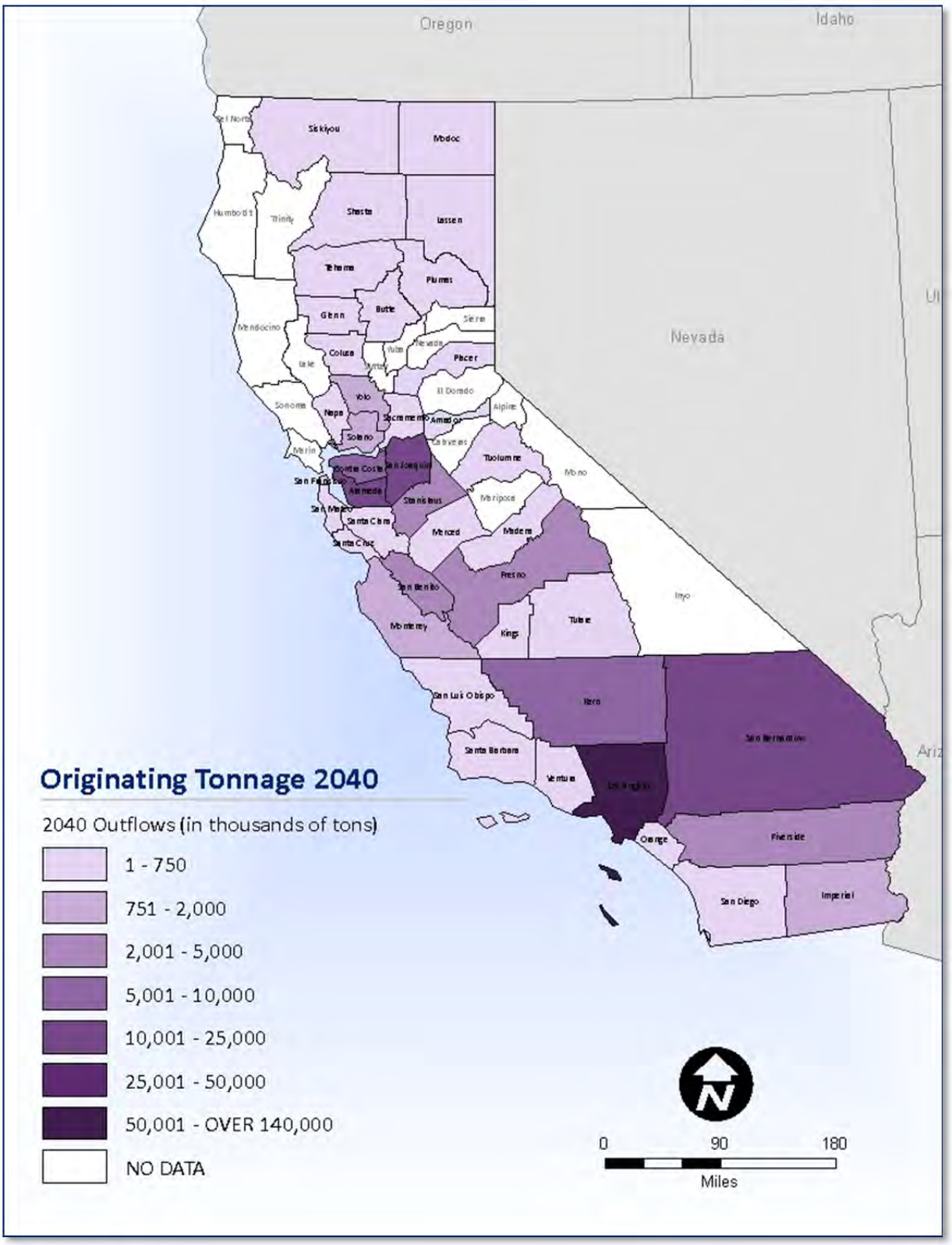

Exhibit D.4: California Rail Tonnage Originating by County, 2040 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

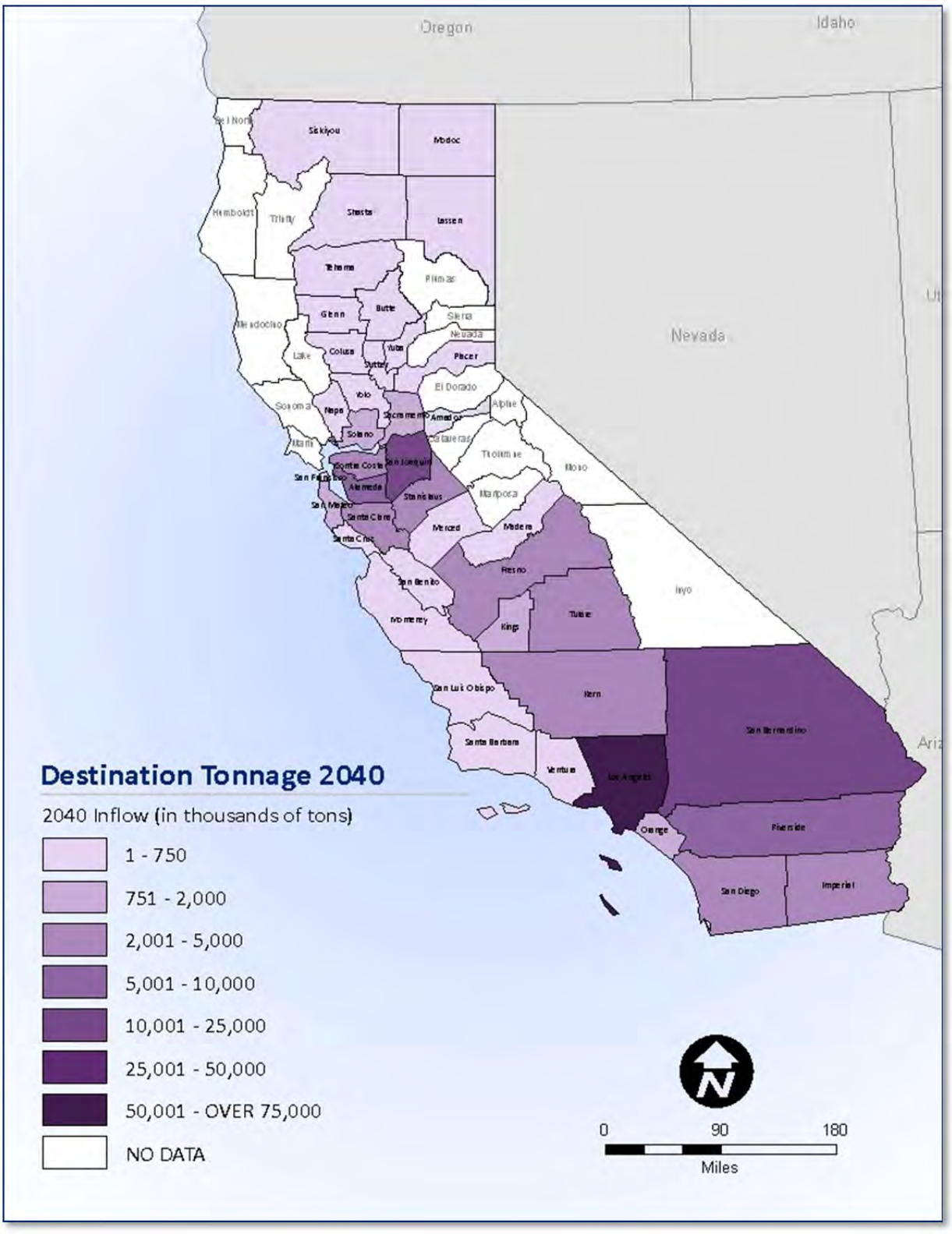

Exhibit D.5: California Rail Tonnage Destination by County, 2040 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

Cereal grains (including seeds) and prepared foodstuffs show uneven growth across Los Angeles, San Bernardino, and San Joaquin counties. While inbound rail tons of cereal grains (including seeds) grow in Los Angeles and San Bernardino counties, they should decline in San Joaquin County and neighboring Central Valley counties. Meat, fish, and seafood destined for Alameda County by rail should rise. San Bernardino County's inbound rail tons of base metals, as well as the inbound rail tons of nonmetallic mineral products and wood products for San Joaquin and Alameda counties, show small changes.

Basic chemicals received by Los Angeles and Contra Costa counties by rail show growth, but the remaining counties (Kern, San Bernardino, and San Joaquin) show decline. Both animal feed and related products and fertilizers destined for Central Valley counties show a sharp decline, likely due to a shift in transportation logistics of the farming industry in this region, such as increased use of local suppliers and reduced dependence on rail services. Coal supplied by rail may decline in the State due to a change in sources of energy production, a trend that discussed elsewhere in Chapter 6.

D.3 Freight Railroad Implementation of Positive Train Control

Positive Train Control (PTC) refers to technology that is capable of preventing train-to-train collisions, over-speed derailments, and casualties or injuries to roadway workers (e.g., maintenance-of-way workers, bridge workers, and signal maintainers). The technology combines:

- Precise real-time locating (usually with Global Positional System (GPS)) of all trains and other vehicles occupying track.
- Cataloging of infrastructure, including turnouts, crossing junctions, grades, and associated permissible speeds.
- Algorithms that calculate the effective safe braking characteristics for each train en route in PTC territory.
- Wireless communications between all operating units, including engineers, dispatchers, and work crews.

Prior to October 2008, development of PTC systems proceeded haltingly on a voluntary basis among many of the major freight railroads and passenger operators. However, the Rail Safety Improvement Act of 2008 (RSIA) (signed by the President on October 16, 2008, as Public Law 110-432) mandated the widespread installation of PTC systems by December 2015 on all lines handling regularly scheduled passenger trains and/or toxic inhalation hazard (TIH) materials. Freight-only lines handling TIH materials with total freight volumes of five million or more gross tons annually also necessitate installation of PTC. This requirement effectively mandates PTC on most of the Class I rail network. In California, UPRR's and BNSF's mainlines, along with a few short line segments that host regularly scheduled passenger service, will require PTC installation.

Following the passage of RSIA, a series of Federal Railroad Administration (FRA) rules and industry dialogue have resulted in some clarifications and refinements to the initial requirements. These include establishment of minimum passenger and freight train volume thresholds under which carriers are exempt from implementing PTC (the most notable beneficiary being the Northern New England Passenger Rail Authority's Portland-Boston *Downeaster* service). The industry has also pushed strongly to reduce the mainline mileage requiring PTC, and, therefore, the cost of implementation, by arguing that declining volumes of TIH traffic since 2008 obviate the need to install PTC on some lines. This effort proved successful in March 2011, when the AAR reached agreement with the FRA to reduce the 73,000 route-miles over which PTC was to be installed by approximately 10,000 miles.

Although development of PTC technologies dates back to the 1980s, RSIA initiated a concerted industry effort to implement PTC within the specified timetable. However, the technology hurdles remain substantial, and major system elements, particularly communications radios and software, are still in the early stages of development. As currently conceived, PTC is being deployed by the freight carriers purely as an "overlay" over existing wayside signaling systems. This forces carriers to continue to maintain existing signal systems along with PTC, thereby offsetting potential savings and ancillary business benefits that may be incurred through the replacement of obsolete systems. An additional concern is the potential loss of line capacity resulting from the implementation of algorithms that ensure safe stopping distances under "worst case" conditions.

These issues have led many in industry to question the merits of the entire mandate. Research by the FRA and others has found that the costs of deployment, expected to be a minimum of $10 billion for the freight carriers, will far outweigh potential benefits at a ratio of 11:1 or more.[12] Without significant financial assistance from the federal government, implementation of PTC is effectively an unfunded mandate (with the railroad industry burdened with the full cost of its implementation), and one that would not be possible absent the Class I railroads' present strong financial condition. However, the financial demands of PTC certainly have an effect on the railroads' investment decisions, by diverting funds from other needs that may directly benefit capacity and service.

PTC systems are eligible for funding under the Railroad Rehabilitation and Improvement Financing Program (RRIF); however, no railroads have approached FRA for funding of PTC projects using this program. PL110-432 also authorized Railroad Safety Technology Grants that can be used to support PTC projects at $50 million per year from 2009 to 2013. Thus far, these funds were only appropriated once in Fiscal Year (FY) 2010

With the increasing likelihood that the 2015 deadline will not be met, the freight carriers have increased pressure on public decision-makers to extend the implementation deadline. However, the deadline has, thus far, remained firm. The recent two-year extension of the surface transportation legislation (Moving Ahead for Progress in the 21st Century Act, or "MAP–21"), approved by Congress on June 29, 2012, does not include any statutory changes to the implementation timeline. Nevertheless, as the deadline looms ever closer, the pressure to defer the mandated completion date will grow.

Among short lines nationally, fewer than 100 among the 550 or so operating in the U.S. will require the installation of PTC. However, even those that do not require its installation may still incur PTC-related expenditures if their locomotives operate over Class I lines that are required to have PTC installed. Installation costs of on-board hardware are expected to be at least $50,000, and considerably more for older units that lack microprocessor control systems, still operated by many short lines.[13] Several California short lines will be impacted by this requirement, including the San Joaquin Valley Railroad, the Pacific Sun Railroad, and the San Diego and Imperial Valley Railroad.

All railroads, even those exempt from the PTC requirements, were required to submit an implementation plan to the FRA by April 15, 2010. Thus, in addition to the Class I railroads and passenger carriers, various short lines and their holding companies, such as Anacostia and Pacific and RailAmerica, responded with declarations of exemption and/or implementation plans. The following sections summarize information from the BNSF and UPRR submissions.

[12] William C. Vantuono, "PTC: Is Everyone on Board," *Railway Age*, May 2010, pp. 29-37. Also see "Assessment of the Commercial Benefits of Positive Train Control," Oliver Wyman Inc. for the Association of American Railroads, April 23, 2010.

[13] Ibid, p. 30.

D.3.1 BNSF Railway

BNSF's Positive Train Control Implementation Plan (PTCIP) to FRA laid out the method, locations, and order in which BNSF plans to deploy its PTC system. The plan was subsequently revised several times in 2010 and 2011. In the submission from September 2011, BNSF laid out the following schedules for implementing PTC throughout its system:

- 2011–1 of 96 subdivisions to have completed PTC implementation–1.0 percent.
- 2012–31 of 96 subdivisions to have completed PTC implementation–32.3 percent.
- 2013–55 of 96 subdivisions to have completed PTC implementation–57.3 percent.
- 2014–75 of 96 subdivisions to have completed PTC implementation–78.1 percent.
- 2015–96 of 96 subdivisions to have completed PTC implementation–100 percent.

In addition to the general schedule, BNSF also stated that, within California, it will install the wayside infrastructure portion of a PTC system on certain rail lines that share passenger and freight service in the Los Angeles Basin region of southern California by December 31, 2012. Although this means that BNSF will have the wayside physical infrastructure in place along the lines by that date, BNSF anticipates that its locomotive fleet will not be fully PTC-equipped until December 31, 2015, and, therefore, PTC will not be fully implemented on freight-only rail lines in the Los Angeles Basin earlier than this date.

D.3.2 Union Pacific

Similar to BNSF, UPRR's 2010 PTC Implementation Plan identified all line segments that will have PTC installed, and segments in which UPRR desired exemption or exclusion from the requirements. The railroad set forth the following yearly metrics for the number of line segments on which it shall have commissioned PTC operations subject to FRA's disposition of request for exclusion of certain line segments from the PTC baseline:

- 2012. Approximately 300 route-miles to have completed PTC implementation–1.4 percent of network route-miles.
- 2013. Approximately 9,650 route-miles have completed PTC implementation–37 percent of network route-miles.
- 2014. Approximately 14,100 route-miles have completed PTC implementation–54 percent of network route-miles.
- 2015. Approximately 19,500 route-miles have completed PTC implementation–75 percent of network route-miles.

In California, lines handling passenger service around the Bay Area and the Los Angeles region, along with the Sunset Corridor to Yermo, should receive PTC in the first implementation phase, according to current projections. Other lines include the San Joaquin, Cascade, and Donner Summit routes in the third phase, the Los Angeles and Salt Lake routes in the fourth phase, and the Feather River route in the fifth phase.

[This page intentionally blank]

Appendix E

SECTION 6.3 SUPPLEMENTAL INFORMATION:

RAIL CAPACITY AND BOTTLENECK ANALYSIS

[This page intentionally blank]

E.1 Rail Capacity and Bottleneck Data and Methodology

Analysis of capacity and operational issues and needs used two principal approaches:

1. **Review of Prior Analyses and Reports.** Many of the capacity and operational issues described herein were previously identified in prior studies or plans. The primary source documents (along with technical memoranda, data, and analyses supporting these source documents) used to support the current analysis include:
   - Southern California Association of Governments (SCAG) Regional Transportation Plan, Goods Movement Appendix, 2012.
   - I-710 Railroad Goods Movement Study, 2009.
   - Multi-County Goods Movement Action Plan, Technical Memorandum No. 3, 2008.
   - San Joaquin Valley Goods Movement Study, Task 4, 2012.
   - Bay Area Goods Movement Strategy, 2007.
   - California State Transportation System Needs Assessment, 2011.
   - California State Rail Plan (August 2007 to 2008 to 2017 to 2018).
   - Trade Corridor Improvement Fund Updated Projects, 2012.
   - Transportation Investment Generating Economic Recovery (TIGER) I/II/III/IV Projects Lists, 2009 to 2012.
   - San Pedro Bay Ports Rail Enhancement Program, 2006.
2. **Simulation and Capacity Analysis Method.** Rail simulation modeling was conducted on four current or potential future intercity passenger rail corridors (*Pacific Surfliner* north corridor, *Pacific Surfliner* south corridor, *San Joaquin*, and *Coast Daylight*). The simulation models provide information used in the evaluation of alternatives for Service Development Plans (SDP) for these intercity corridors, such as identification of capacity bottlenecks. A more complete discussion of capacity issues in shared use corridors, as well as the simulation models in general, is provided in Chapter 7. In addition, the future year train volumes supported estimates of the degree of network saturation in terms of a volume-capacity ratio under the existing infrastructure condition (i.e., a “do-nothing” scenario).

[This page intentionally blank]

Appendix F

SECTION 6.4 SUPPLEMENTAL INFORMATION:
STATE AND FEDERAL REGULATORY BODIES AND
OTHER INSTITUTIONAL ARRANGEMENTS

[This page intentionally blank]

F.1 State Agencies Involved in Rail System Planning

The following state agencies are involved in rail system planning:

F.1.1 California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates public utilities, and regulates railroads and at-grade crossings. The CPUC employs federally certified staff inspectors and coordinates with the Federal Railroad Administration (FRA) (the largest participating state agency in the nation) to ensure that railroads comply with federal railroad safety regulations.

The CPUC's Rail Crossings Engineering Section (RCES) investigates and evaluates requests to construct new rail crossings or modify existing rail crossings. RCES engineers also investigate train-related incidents that occur at rail crossings and complaints regarding rail crossing safety. In addition, the RCES establishes and reviews the establishment of quiet zones within the approaches of rail grade crossings.

The RCES administers three funding programs for reducing hazards at highway-rail crossings:

- **Section 130.** As previously mentioned, this program provides funds to local governments (cities and counties) and any public entity to eliminate hazards at existing at-grade crossings between public highways and rail lines.
- **Warning Device Maintenance Fund Program.** This provides funds to railroads to pay for the local government's share of the costs of maintaining automatic warning devices at highway-rail crossings.
- **Section 190 Grade Separation Program.** This state-funded program is available for projects seeking to eliminate or grade-separate existing at-grade crossings, and includes both crossing consolidations or track removal projects. On July 28, 2011, the CPUC issued an Order Instituting Investigation (OII) for establishing the highway-rail Grade Separation Priority List (Priority List) for Fiscal Year (FY) 2012-2013 and FY 2013-2014. The California Transportation Commission and the California Department of Transportation use the Priority List to allocate funds made available to the program to assist local governments in financing existing at-grade crossings of city streets, county roads, or state highways in need of separation, or existing separations in need of alterations or reconstruction, in accordance with Section 2452 of the California Streets and Highways Code. The list, which is usually created every two years, establishes the relative priorities for funding qualified projects to grade-separate railroad crossings or improve existing grade-separated crossings.

F.1.2 California Environmental Protection Agency

The California Environmental Protection Agency (Cal/EPA) develops, implements, and enforces the State's environmental laws that promote and protect clean air, clean water, clean soil, safe pesticides, and waste recycling and reduction. Cal/EPA actually refers to the Office of the Secretary and to the agency as a whole. In addition to the Office of the Secretary, the constituent entities of Cal/EPA are the Air Resources Board (ARB), State Water Resources Control Board, the Department of Pesticide Regulation, Department of Toxic Substances Control, and the Office of Environmental Health Hazard Assessment.

One of the key ways the Cal/EPA influences freight rail is through the ARB. The ARB enforces air emissions from both mobile sources (vehicles and equipment) and stationary sources. While the State has limited powers to regulate railroads due to federal preemption under the Clean Air Act and interstate

commerce laws, ARB can help establish voluntary agreements (better known as Memorandums of Understanding) with the Class I railroads.

For instance, the ARB has entered into a pollution reduction agreement with Union Pacific and the BNSF Railway (BNSF) to reduce locomotive diesel particulate matter emissions near rail yards. As a result, the railroads have committed to implementing a package of related strategies, including idling limitations and idling reduction devices, use of lower sulfur diesel fuel, development of health risk assessments, fines for noncompliance, and other measures.[14]

In addition, several other regulations or voluntary agreements relate to locomotives. Since 2004, intrastate locomotives must use fuel that meets ARB diesel fuel specifications (starting in 2007). A 1998 Memorandum of Understanding between the ARB and the Class I railroads accelerated the introduction of U.S. Environmental Protection Agency (EPA) Tier 2 locomotive standards for fleets in the South Coast Air Basin.[15] Finally, the ARB and Class I railroads have proposed 2010 Commitments to further reduce diesel particulate matter (PM) emissions at four high priority railyards, are all located in southern California.[16]

- One element of California's strategy to reduce emissions, the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program), offers grant funding to industrial users to acquire technologies that reduce emissions from non-automotive combustion engines to levels that are lower than required through regulatory mandates. The ARB and regional emissions regulatory agencies such as the South Coast Air Quality Management District (SCAQMD) and the Bay Area Air Quality Management District (BAAQMD) cooperatively manage the program.[17] Both large and small freight railroads have received funding to retrofit and replace locomotives throughout the State. Among small railroads benefitting from the program, noteworthy examples include Pacific Harbor Lines, Inc. (PHL), which now operates only low-emissions locomotives in its San Pedro location, and the Modesto and Empire Traction Company (MET) in Modesto, which has done the same with a fleet of six new units acquired in 2011-2012.[18,19] The Carl Moyer program stands alone as the only state program that provides financial assistance of some form to smaller railroads.
- The Proposition 1B Goods Movement Emission Reduction Program also provides some assistance for freight rail, providing financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies through truck replacement, engine replacement, or retrofit. Projects funded under this program must achieve emission reductions more substantial than those required by law or regulation. Currently the Sacramento and South Coast Districts are completing projects to upgrade 19 locomotives in the Los Angeles/Inland Empire trade corridor, which will be operational in 2012. Contracts for additional locomotives in the corridor should be signed in late 2012.[20]

[14] Air Resources Board, *Reducing Locomotive Emissions: New Actions Agreed to by UP and BNSF Railroads*, August 2005.

[15] Air Resources Board, *Locomotives*, October 18, 2011.

[16] Air Resources Board, *2010 Commitments to Further Reduce Diesel PM Emissions at Four High Priority Railyards*, November 28, 2011.

[17] Air Resources Board, *Carl Moyer Program Guidelines*, October 26, 2012.

[18] White, Ronald D., «Short rail line serving L.A. and Long Beach ports gets greener» *Los Angeles Times*, September 29, 2011.

[19] RJ Corman Railroad Group, *R. J. Corman Railpower Delivers First of Five Locomotives to M&ET* (press release), May 2, 2011.

[20] Air Resources Board, *Proposition 1B: Goods Movement Emission Reduction Program–June 2012 Semi-Annual Status Report,* http://www.arb.ca.gov/bonds/gmbond/docs/prop_1b_goods_movement_june_2012_semi_annual_report%20_to_dof.pdf.

F.2 Federal Agencies Involved in Rail System Planning

The following federal agencies are involved in rail system planning:

F.2.1 U.S. Department of Transportation

Federal Railroad Administration

As one of the modal agencies within the U.S. Department of Transportation (DOT), the FRA holds responsibility for developing and enforcing railroad safety rules, managing the Railroad Rehabilitation and Improvement Financing (RRIF) program, providing oversight of Amtrak for U.S. DOT, and managing a small research program. With the passage of the Passenger Rail Improvement and Investment Act (PRIIA) in 2008, and the subsequent provision of capital funding for intercity passenger rail in the American Recovery and Reinvestment Act (ARRA), the FRA was tasked with managing these programs. Traditionally, the vast majority of FRA personnel and financial resources have been devoted to safety enforcement activities.

The FRA operates through seven divisions under the offices of the Administrator and Deputy Administrator. Out of these seven divisions, the Office of Railroad Policy and Development administers federal investment and assistance to the rail industry as well as the development and implementation of FRA policy concerning intercity passenger rail and high-speed rail (HSR). It also sponsors projects for rail safety research and provides investment opportunities for small freight railroad projects, primarily through the RRIF.

The Office of Railroad Safety promotes and regulates safety throughout the nation's railroad industry. It employs more than 415 federal safety inspectors, who operate out of eight regional offices nationally. FRA inspectors specialize in five safety disciplines (track, signal and train control, motive power and equipment, operating practices, and hazardous materials), and participates in numerous grade crossing and trespass-prevention initiatives. The Office of Railroad Safety also collects and compiles accident/ incident data from the railroads.

Surface Transportation Board

Established in 1996 as the successor to the long-lived Interstate Commerce Commission, the Surface Transportation Board (STB) adjudicates disputes over rates and services between shippers and carriers, and has administrative authority over rail restructuring transactions, including oversight of mergers and acquisitions, new line construction, and rail line abandonment; railroad rate regulation; and rate and service disputes involving shippers and railroads. In 2008, the PRIIA expanded the role of the STB into mediation of conflicts between passenger rail operators and freight rail owners. This provision is intended to address long-standing concerns about enforcement of Amtrak's statutory rights to operate passenger trains over the freight network. The STB functions as an independent agency, but is administratively affiliated with the U.S. DOT.

Pipeline and Hazardous Material Safety Administration

The Pipeline and Hazardous Material Safety Administration sets safety regulations for hazardous materials across all modes, including freight rail. More information on this is included in Section 6.5, Freight Rail Safety.

F.2.2 Other Federal Department and Agencies

Department of Homeland Security

The Department of Homeland Security (DHS) through the Transportation Security Administration (TSA), in cooperation with the U.S. DOT, leads rail security, primarily a federal matter. Prior to the increased national attention to security after September 11, 2001, rail security concerns were mostly handled by the railroads themselves, in cooperation with a community of first responders responsible for addressing rail incidents involving hazardous materials.

Environmental Protection Agency

The EPA impacts railroads in a variety of ways, including regulation of locomotive emissions, which have a considerable impact on long-term investment strategies as well as day-to-day operations.

F.3 Best Practices: Rail Planning at the State Level

F.3.1 The Ohio Rail Development Commission

The Ohio Rail Development Commission (ORDC) is an independent agency of the Ohio DOT. The ORDC is charged with developing, promoting, and supporting safe, adequate, and efficient rail service in Ohio. The ORDC, the successor to the Ohio High-Speed Rail Authority and the Division of Rail Transportation within the Ohio DOT in 1994, combines all of Ohio's non-regulatory rail programs into one agency.

ORDC operates as an independent commission responsive to economic development and industry needs. The operational costs of the ORDC are part of the Ohio DOT appropriations, but the ORDC reports to a separate board. The ORDC focuses on the creation and preservation of Ohio jobs and improvement of Ohio's economic welfare. In order to achieve these goals, ORDC may acquire, construct, enlarge, improve, equip, and to sell, lease, exchange, or otherwise dispose of property, structures, equipment, and facilities for rail transportation.

F.3.2 Michigan Office of Rail, Freight Services, and Safety

Michigan DOT houses the Office of Rail, Freight Services and Safety, performing both regulatory and program functions. As part of their regulatory efforts, the Freight Services and Safety program monitors the physical condition of railroad crossings and facilitates reviews to determine if safety enhancements at crossings are needed. Program level efforts include providing funding for safety enhancements at railroad crossings, as well as rail infrastructure improvement and rail freight-related economic development loans.[21]

The State also has two freight-specific loan programs: the Freight Economic Development Program and the Michigan Rail Loan Assistance Program. The Freight Economic Development Program provides low-interest loans that can be converted to grants to rail users locating or expanding in the state and local government entities interested in helping these businesses. The Michigan Rail Loan Assistance Program provides zero-interest loans to enhance the efficiency or safety of existing freight rail service. Eligible applicants include railroads, local governments, economic development corporations, and current or prospective rail users. Eligible projects include any type of construction or rehabilitation work that is associated with permanently affixed track materials and related structures such as bridges and culverts.[22]

[21] Michigan Department of Transportation, *About Freight Services & Safety*.

[22] Ibid.

F.3.3 Minnesota's Office of Freight, Rail, and Waterways

Minnesota DOT's Office of Freight, Rail and Waterways houses the Freight Planning and Development Unit. This unit reviews Minnesota DOT's role in freight transportation and develops strategies for Minnesota DOT to improve its knowledge and integration of freight transportation into policy, planning, and investment processes, thereby improving economic competitiveness. In an effort to make better decisions that improve or augment freight transportation service productivity and safety the office builds partnerships that promote the exchange of information, ideas, and opportunities between the shipping community and Minnesota DOT. These partnerships; enhance the efficiency of goods movement; and promote both safety enhancements and innovation and research that improve the safety, efficiency and productivity of the system.[23]

F.4 Best Practices: Private Sector Rail Stakeholders in the Planning Process

The need to include private-sector viewpoints in the public planning process has evolved over the last decade, driven by the recognition that understanding private-sector needs can lead to a planning process that helps to maximize the economic benefits (e.g., jobs, gross domestic product (GDP), etc.) of private industries. New funding arrangements such as Public-Private Partnerships have increased the desire of DOTs to involve the private sector in the planning process, as it can lead to a better use of shared resources to fund mutually beneficial projects.

Private-sector participation in the public planning process became more formalized through Section 6001 and 6002 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act–A Legacy for Users (SAFETEA-LU).[24] Both of these sections include requirements for states and metropolitan planning organizations (MPOs) to develop long-range transportation plans in consultation with freight stakeholders, including freight railroads and shippers who utilize freight railroads.

In all, many states now recognize the benefit of including private-sector freight stakeholders in the public planning process. More specifically, many states have realized that a freight-specific advisory committee can allow for continuous, expert feedback into planned public infrastructure investments and improvements. Table F.1 outlines examples of these state groups.

Washington, in particular, serves as a good example because it has organized freight planning stakeholder groups at both the statewide and regional levels. The Freight Mobility Strategic Investment Board (FMSIB) offers freight-specific project prioritization at the state level, while the Freight Action Strategy for the Everett–Seattle–Tacoma (FAST) Corridor partnership and the Freight Mobility Roundtable offer venues for public and private freight stakeholder coordination in the Puget Sound region. Both of these groups have significant influence over ensuring freight needs are understood and are considered in regional and statewide transportation policy. In addition, all of the groups have a direct link to actual project implementation and funding sources.

[23] Minnesota Department of Transportation, *MnDOT Freight Planning & Development: Background*.

[24] Federal Highway Administration, *Fact Sheets on Highway Provisions: Statewide Planning.*

Table F.1: Public-Private Sector Coordination Efforts

	Formed By	Purpose	Meeting Frequency	Annual Budget Authority
Washington State FMSIB	Washington State Legislature	Advise legislature about project selection	Bimonthly	$6 million
FAST Corridor and Regional Freight Mobility Roundtable (Puget Sound Region)	Washington State DOT	Advise Washington State DOT and the Puget Sound Regional Council, on project selection	Bimonthly	Varies with member jurisdiction
Colorado Freight Advisory Council	Governor/DOT	A forum on freight movement and infrastructure	Quarterly	None
Minnesota Freight Advisory Committee	Minnesota DOT	A forum for discussion between Minnesota DOT and the private sector	Quarterly	None
Anchorage MPO Freight Advisory Committee	Anchorage Metropolitan Area Transportation Solutions (AMATS)	Air issues, discuss solutions, and evaluate technical project proposals	Quarterly	None

Source: Cambridge Systematics, Inc., 2012.

F.4.1 Washington State Freight Mobility Strategic Investment Board

The Washington State Freight Mobility Strategic Investment Board FMSIB, an independent agency created in 1998 by the Washington State Legislature, reviews, prioritizes, and recommends freight mobility transportation projects of strategic importance to the State of Washington. The Washington State Governor accepts nominations for and appoints the 12 members of the FMSIB. Members come from the general public; the trucking, rail, maritime, and port industries; and from local government (counties and cities); in addition to the DOT Secretary and Governor Representative. The group meets on a Friday approximately every other month to discuss projects and potential partnerships.

The Board evaluates and ranks eligible freight mobility and freight mitigation projects using a multi-criteria analysis and scoring method. In making its selections, the Board gives priority ranking to projects with the highest level of non-FMSIB funding, as well as those with private-sector participation. The board determines final project selection, as well as the State's share of project costs. The FMSIB's position as an independent state agency with funding authority means it can implement freight projects without competing with other transportation priorities (although all projects must still be part of a state or regional transportation plan).

According to the FMSIB 2011 Annual Report, the Board has assisted in bringing to completion 42 projects, with 10 underway or ready to enter construction in 2012. Projects include grade separations, pedestrian overpasses, turning lane improvements, freeway ramps, and Intelligent Transportation Systems (ITS) projects. FMSIB has been able to leverage, on average, $5.00 of non-program funds for every $1.00 that it contributes to a capital project.

F.4.2 The Freight Action Strategy for the Everett-Seattle Tacoma Corridor (FAST Corridor)

The FAST Corridor partnership promotes freight mobility in the Puget Sound region. The FAST partnership, formed in 1998 has 26 members, including stakeholders from the federal, state, and regional levels; ports; cities and counties; and freight carriers. It is administered through the Puget Sound Regional Council, the MPO for the Puget Sound region. The FAST coordinates solutions to the region's freight mobility challenges by making targeted improvements to critical rail and truck corridors that connect Puget Sound ports to statewide, national, and international markets.

An important consultative body to the FAST partnership, the Puget Sound Regional Freight Mobility Roundtable, serves as a public-private forum to define freight mobility needs and recommendations in the region. The roundtable includes freight carriers of all modes; major regional shippers; the ports; and state, local, and federal agencies. FAST and the Regional Freight Mobility Roundtable coordinate their efforts through bimonthly meetings, where the two groups discuss freight trends and issues in the region, as well as ongoing planning activities like the Long-Range Transportation Plan.

Since 1998, the FAST partnership has successfully assembled about $568 million of funding from public and private sources, which have been used to complete nine projects and begin four more. The projects include grade separations, rail yard access projects, and ITS deployments.

F.4.3 The Colorado Freight Advisory Council (FAC)

The Colorado Freight Advisory Council (FAC) grew out of the growing volumes of both domestic and international freight traffic crossing through the State. Because of its location near the geographic center of the U.S. and its relatively low population, Colorado, a "bridge state" experiences significant through freight traffic. The FAC was formed in 2003 with its primary purpose to serve as a forum for discussion regarding freight movement and infrastructure within the State. The FAC has 15 members drawn from the Colorado freight industry and local governments.

The FAC holds regular meetings approximately once per quarter. As a voluntary organization, the Colorado FAC serves in an advisory role. It does not have budget authority nor can it select specific freight projects for implementation. However, the Colorado FAC does feature extensive participation by the private sector. Twelve of its 15 members represent carriers, shippers, and other freight stakeholders, making the FAC a valuable resource for engaging the private sector and gathering input for freight planning efforts.

One key conclusion from the FAC was that Colorado needed to maintain better freight data in order to support an expanded planning effort. Accordingly, Colorado DOT produced a Freight Data Assessment Study in 2005 as a first step in defining a framework for a proper data collection program. This study identified current and ongoing freight data requirements for Colorado DOT; assessed the availability and quality of that data; and recommended a framework for Colorado DOT to collect, maintain, and distribute freight data.

F.4.4 Minnesota Freight Advisory Committee (MFAC)

The MFAC acts as a forum to exchange ideas between Minnesota DOT and the private-sector freight community. The MFAC, created in 1998, works to ensure that freight needs are addressed through transportation planning and programming and provides input to the Minnesota DOT freight investment committee on freight issues, needs, and policies. In addition to this, the MFAC helps develop guidelines to better address freight needs and recommends research tasks to be undertaken by Minnesota DOT. MFAC membership consists of a wide selection of freight stakeholders, including shippers, government, carriers, advocacy groups, consultants, brokers, and individuals from academia and research.

The MFAC meets on a quarterly basis to discuss relevant freight issues. Input provided by MFAC members feeds into Minnesota DOT's planning process, including the statewide transportation plan and studies. Essentially, the MFAC acts as a sounding board for statewide transportation plans by evaluating and commenting on it from the goods movement perspective.

F.4.5 The Anchorage MPO Freight Advisory Committee

The Anchorage MPO FAC advises the AMATS organization.[25] This committee includes personnel from the Port of Anchorage, the Alaska Railroad Corporation, the Alaska Trucking Association, and other representatives from the private sector that are directly involved with freight movement. The FAC ensures that freight interests are considered in AMATS policies, and advances project development through activities such as the Long-Range Transportation Plan. The FAC therefore provides a forum for the private freight industry (including rail) to air concerns, discuss issues, and suggest project solutions to local government. In addition, the FAC often reviews technical project proposals and to offer insights into improving access and freight circulation patterns for proposed projects. AMATS has a dedicated staff member that coordinates with the FAC and serves as an advocate for freight within the agency.

F.5 Best Practices: Short Line Rail Assistance Programs

F.5.1 Kansas State Rail Serve Improvement Fund

Kansas has the State Rail Service Improvement Fund (SRSIF), which provides $5 million annually in low-interest loans to railroads and port authorities operating within the State in order to help them improve their service.[26,27] The program assists in the rehabilitation of railroad tracks, bridges, yards, rail shops, buildings, and sidings of short line railroads operating in Kansas. Since the program's inception in 2000, SRSIF has funded between two and nine projects each fiscal year. These projects have contributed to the protection of short line service in communities across the State.

Kansas also operates the Local Rail Freight Assistance (LRFA) Program. This program began in 1991 through the FRA to assist railroads in their rehabilitation efforts. Funds from the federal LRFA Program are loaned to railroads at a rate below the prime interest rate and payments on the loan (including principal and interest) are used to generate additional loans. This loan program, currently totaling $3 million, allows the railroads to improve and rehabilitate their systems for more profit and safety. Such service contributes to the State's economy, enhances market competitiveness, attracts new industry, and encourages expansion of current business.

F.5.2 ConnectOregon Program

The ConnectOregon program is a lottery-bond-based initiative that generates revenues to invest in air, marine, rail, and transit infrastructure.[28] These investments improve connections between the highway system and other modes of transportation, facilitate the flow of commerce, and reduce delays. In 2005, the Oregon State Legislature authorized $100 million of lottery-backed bonds to fund the program, and the Oregon Transportation Commission approved funding for 39 projects, a number of which are

[25] Though AMATS is a regional (not state) agency, this example is included here because it is one of the few examples where a public agency asks freight stakeholders for their assessment and feedback on technical project submittals. It is, therefore, an innovative way of harnessing knowledge from private-sector freight stakeholders.

[26] Kansas Department of Transportation, *Railroad Assistance Program: State Rail Service Improvement Fund*.

[27] Ibid.

[28] Oregon Department of Transportation, *Transportation Development–Planning: ConnectOregon*.

completed or nearing completion. In 2007, the legislature authorized another $100 million of funding in lottery-backed bonds, and the OTC approved 30 projects for funding. In 2009, the legislature approved another $100 million in funding and, in 2011, $40 million was authorized. Public- and private-sector entities can apply for grants or loans under the ConnectOregon program, and are required to provide a match of at least 20 percent of the project cost if applying for grants.

Several short line rail projects received ConnectOregon awards in 2010, including a $4.7 million project for the Portland and Western Railroad, a $2.1 million project for the Prineville Railway, and a $2.6 million award for the Albany and Eastern Railroad Company.

F.5.3 The Wisconsin Freight Rail Infrastructure Improvement Program

Wisconsin DOT administers two freight rail assistance programs, including the Freight Rail Infrastructure Improvement Program (FRIIP). Wisconsin's original rail assistance program created in 1977 helped preserve freight rail service during an era when widespread railroad bankruptcies and line abandonments threatened the availability of rail service in Wisconsin. In 1992, the FRIIP loan program expanded the State's rail assistance programs. FRIIP loans enable the State to encourage a broader array of improvements to the rail system, particularly on privately-owned lines. It also provides funding for other rail-related projects, such as loading and transloading facilities.

Since 1992, $112 million in FRIIP loans have been awarded to projects that demonstrate that they:

- Help connect an industry to the national railroad system.
- Make improvements to enhance transportation efficiency, safety, and intermodal freight movement.
- Accomplish line rehabilitation.
- Develop the economy.

F.5.4 The Wisconsin Freight Rail Preservation Program

Wisconsin DOT also administers the Freight Rail Preservation Program (FRPP).[29] In 1992, this program replaced the original rail assistance grant program, providing grants to local units of government, industries, and railroads for the purpose of preserving essential rail lines and rehabilitating them following purchase.

Since 1980, under both the original rail assistance program and FRPP, $155 million in grants have been awarded for rail acquisition and rehabilitation projects. The FRPP provides grants up to 80 percent of the cost in order to purchase abandoned rail lines in an effort to continue freight service (or for the preservation of the opportunity for future service) and rehabilitate facilities such as tracks or bridges on publicly-owned rail lines. The 2011 to 2013 DOT budget provides bonding authority for $30 million.

[29] Wisconsin Department of Transportation, *Freight Railroad Preservation Program*.

F.5.5 Iowa's Railroad Revolving Loan and Grant Program

Iowa's Railroad Revolving Loan and Grant program provides assistance in different ways to projects that demonstrate benefits.[30] For example, for targeted job creation projects (those that provide immediate, direct job opportunities), the program can provide assistance as either loans or grants, but grant funding is limited to 50 percent (with a 50 percent local match), while loans require a 20 percent matching contribution. Projects that will provide demonstrated rail network improvements, on the other hand, are only eligible for loans, offered at 0 percent interest, provided that there is a 20 percent local matching contribution. For FY 2013, the program has a minimum of $2 million available for projects and, for the first time, will offer a minimum $200,000 for rail port planning and development studies.

Iowa Rail Finance Authority (IRFA) Board administers the program with staff assistance from the Iowa DOT. Appropriations and repayments from previous Iowa DOT and IRFA loans fund the program.

Industries, railroads, local governments, and economic development agencies may apply for financial assistance for projects that build rail spurs to new or expanding development, build or rebuild sidings to accommodate growth, purchase or rehabilitate existing rail infrastructure, or rehabilitate existing rail lines to increase capacity, or for other targeted job creation projects related to rail network improvement.

F.5.6 The Indiana Industrial Rail Service Fund

The Indiana Industrial Rail Service Fund (IRSF) assists in the rehabilitation of railroad infrastructure or railroad construction of Class II and Class III railroads.[31] These grants help maintain and increase existing business shipping levels on the rail lines, and also assist with funding needed improvements related to maintaining rail service in Indiana. Eligible applicants are limited to port authorities and Class II and Class III railroads. Grants through the IRSF program can be used for the rehabilitation of railroad infrastructure or railroad construction. Examples of projects include bridge deck repair, new ties and ballast, and track upgrades. Railroads are limited to a grant award that does not exceed 75 percent of the total cost of the project. In FY 2011, grants totaled $1.5 million.

F.6 Best Practices: Public Private Partnerships

F.6.1 The Alameda Corridor

California's Alameda Corridor, one of the most well-known and successful public-private partnerships (PPP), consists of a 20-mile double- and triple-track rail corridor linking the Ports of Los Angeles and Long Beach to the transcontinental rail network in downtown Los Angeles that grade-separates freight trains from street traffic and passenger trains. The project was one of the largest design-build projects in the U.S., undertaken with the objectives of reducing port-related rail-traffic delays, achieving operational improvements and safety enhancements by elimination of at-grade crossings, mitigation environmental impacts through more efficient operations, and promoting economic development. The project involved consolidation of railroad traffic (90 miles of branch line tracks into one 20-mile corridor) and construction of grade separations (east-west street overpasses south of Route 91 and depressed rail trench from 25th Street to Route 91) to separate freight trains from passenger trains and street traffic.

[30] Iowa Department of Transportation, *Railroad Revolving Loan (RRLG) Program*.

[31] Indiana Department of Transportation, *Industrial Rail Service Fund: Grant Application FY 2012,* http://www.in.gov/indot/files/Rail_IRSFApplication_111012.pdf.

The Alameda Corridor serves as a model for applications of innovative financing techniques, involving contributions from private as well as federal, state, and local sources. The total cost of the project was close to $2.5 billion, funded through a combination of sources. These sources include the following:

- Revenue-backed bonds issued by the Alameda Corridor Transportation Authority (ACTA) and consisting of:
  - Senior tax-exempt bonds ($494 million).
  - Senior taxable bonds ($500 million).
  - Subordinate bonds ($167 million).
- U.S. DOT loan ($400 million).
- Grants from the Ports of Los Angeles and Long Beach ($394 million).
- Grant from the Los Angeles Metropolitan Transportation Authority (Metro) ($347 million).
- Grants from interest income and other federal and state sources ($160 million).

User fees and container charges for the use of the system by the private railroads and the ports cover debt service costs for the project. A key aspect of the project financing, the loan agreement between ACTA and the federal government, involved leveraging of federal credit assistance. The federal government incurred a cost close to $59 million for the subsidy cost associated with making a $400 million subordinate loan, covered through a congressional appropriation. The federal government's junior-lien status for the debt provided key assistance to ACTA for implementing the project. This federal government action provided the model for the subsequently enacted Transportation Infrastructure Finance and Innovation Act (TIFIA) loan guarantee program.

F.6.2 The Chicago Regional Environmental and Transportation Efficiency Project (CREATE)

The Chicago Regional Environmental and Transportation Efficiency Project (CREATE) a PPP created by the State of Illinois, City of Chicago, Metra, and the railroad industry (BNSF, Canadian Pacific Railway, Canadian National, CSX Transportation, Norfolk Southern Corporation, and Union Pacific) funds improvements in five rail corridors, including one primarily for passenger trains; constructs 25 new grade separations to eliminate many commuter delays; and opens a key corridor in downtown Chicago for commercial development. The goals of this program:

- Reduce rail and motorist congestion.
- Improve passenger rail service.
- Enhance public safety.
- Promote economic development.
- Create jobs.
- Improve air quality.
- Reduce noise from idling or slow-moving trains.

At its inception, the total cost of the project was estimated at $1.5 billion. The financial contributions of both the private and the public sector depended on the economic benefits that each partner would receive from the projects. An analysis of public and private benefits indicated that the project would generate about $4 billion in benefits, with 95 percent of those benefits being public and 5 percent private. The railroads committed to funding a roughly proportional amount of the project cost as their derived benefit, which in this case equals $212 million. In reality, this is closer to 14 percent of the project costs. The public sector is expected to provide the remaining $1.3 billion, including $20 million from METRA, the commuter rail service in the Chicago area, with the remainder coming from local, state, and federal contributions.

F.6.3 The Reno Transportation Rail Access Corridor

The Reno Transportation Rail Access Corridor (ReTRAC) project offers another example of an innovative funding package to finance a large capital investment. The ReTRAC corridor involved the building of a 2.3-mile subsurface rail corridor through Reno, Nevada's downtown. The goals of the project included:

- Enhancing the mobility of the Nevada warehousing core in and near Reno;
- Minimizing impacts from pedestrian conflicts;
- Minimizing emergency vehicle delay;
- Minimizing train-related congestion;
- Reducing air emissions caused by delay and idling vehicles.
- Improving the aesthetics and continuity of the Reno Downtown region.

The major project sponsors of the Reno ReTRAC included federal and state transportation agencies, the City of Reno, the Union Pacific Railroad, and gaming-related businesses in downtown Reno. The funding program for the project is shown in Table F.2.

F.7 Best Practices: Multi-State Coalitions

F.7.1 Multi-State Coalitions

A multi-state initiative to plan, fund, and implement specific rail projects recognizes the multi-jurisdictional nature of freight rail movements, as well as the benefit of increased project partners to support, fund, or plan rail projects. Several multi-state consortiums offer innovative case studies of approaches to finance large-scale rail infrastructure projects that span, or benefit, several states, including the Midwest Regional Rail Initiative and the Mid-Atlantic Rail Operations Study (MAROps), shown in Table F.3.

Table F.2: Reno ReTRAC Funding Allocations

Funding/Finance Source	Amount	Percent of Project Cost
Sales Tax	$120 million	45%
Railroad Right-of-Way (ROW) and Lease	$87 million	33%
Special Assessment District Fees	$21 million	8%
Federal and State Transportation Funds	$21 million	8%
1% Room Tax	$13 million	5%
Interest Income	$2 million	1%
Total	**$264 million**	**100%**

Source: Reno ReTrac website, https://www.reno.gov/Index.aspx?page=387.

Table F.3: Multi-State and Multi-Partner Rail Financing Strategies

Multi-State Agreement	Proposed Financing Strategies
Midwest Regional Rail Initiative (MWRRI)	• Federal loans and grants, Grant Anticipation Notes, and TIFIA loans • State funding to purchase trainsets and to match federal funding for infrastructure improvements • State general funds • Capital and revenue generated from system-related activities, such as joint development
MAROps	• Direct funding from railroad revenues • Direct funding from state and local appropriations • Federal rail programs, including the RRIF and TIFIA • Federal-aid grant programs, including Congestion Management Air Quality (CMAQ) • Federal highway and rail safety programs • Federal tax credit bond programs • Toll or user charges to pay back loans, bonds, or state infrastructure bank (SIB) programs • Sale of freight assets for passenger-rail use • State-based approaches such as property tax relief to railroads in exchange for public-purpose improvements by railroads

Sources: *Midwest Regional Rail System: Executive Report, Transportation Economics and Management Systems*, Inc., September 2004; I-95 Corridor Coalition Database, http://www.i95coalition.org/i95/Projects/ProjectDatabase/tabid/120/agentType/View/PropertyID/178/Default.aspx.

F.7.2 The Midwest Regional Rail Initiative (MWRRI)

The Midwest Regional Rail Initiative, a nine-state initiative to improve and expand passenger rail is sponsored by the transportation agencies of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin. This multiagency effort began in 1996. Elements of the regional system include use of 3,000 miles of existing rail right of way to connect rural and urban areas, operation of a hub and spoke passenger rail system, introduction of high-speed trains operating at up to 110 mph, and multimodal connections to improve system accessibility. MWRRI is currently in its seventh phase, which involves the analysis of the area for the Milwaukee-Minneapolis/St. Paul segment of the HSR corridor to Chicago to assist Minnesota DOT, the FRA route analysis, and the selection of a preferred alternative.

Capital requirements are estimated at around $7.7 billion (in 2002 dollars), over a 10-year implementation period. Planned funding sources include federal loans and grants (including Grant Anticipation Notes, TIFIA loans, and Federal Funding Agreements); state funding in the form of state support to purchase trainsets and match federal funding for infrastructure improvements; general funds; and capital and revenue associated from system activities such as joint development proceeds. Federal support will be the major source of funding, and cover up to 80 percent of infrastructure costs.

F.7.3 The I-95 Corridor Coalition/Mid-Atlantic Rail Operations Study (MAROps)

The MAROps Study was a joint initiative of the I-95 Corridor Coalition's five member states (New Jersey, Pennsylvania, Delaware, Maryland and Virginia) and three railroads (Amtrak, CSX, and Norfolk Southern). The FRA and Federal Highway Administration (FHWA) participated as advisors. Over a two-year period, the MAROps participants crafted a 20-year, $6.2 billion program of rail improvements aimed at improving north-south rail transportation for both passengers and freight in the Mid-Atlantic region and reducing truck traffic on the region's overburdened highway system. The study examined a number of national models for innovative, public-private financing of rail improvements and identified the following options as the most promising:

- Direct funding out of railroad revenues, state and local appropriations, and congressional earmarks, as available.
- Existing or pending federal rail assistance programs, including the RRIF, a $35 billion loan program, and TIFIA, which provides loans and loan guarantees for large projects. The proposed High-Speed Rail Infrastructure Improvement Act, which would authorize more than $71 billion in tax-exempt state bond financing, loans, and loan guarantees, would expand these assistance programs.
- Federal-aid formula grant programs such as the CMAQ program, which has been used to fund transportation improvements that reduce congestion and engine emissions in regions that do not meet national air quality standards.
- Highway and rail safety programs, which can be used to eliminate dangerous highway-rail grade crossings or improve grade separations.
- Federal tax credit bond programs, which could be used to generate capital for investment in rail infrastructure projects.
- Toll or user charges on increased rail freight traffic and revenue, which can be used to repay loans, bonds, and SIB programs.
- Sale of freight assets for passenger-rail use.
- State-based approaches, where states could elect to provide property tax relief to the railroads in exchange for public-purpose improvements by the railroads.

The MAROps findings offer a good overview of the emerging methods to finance freight rail projects. They also offer a case study of how a multi-state partnership can work in a coordinated fashion to address regional freight rail needs. The I-95 Coalition extended the MAROps approach to include the New England states (Northeast Rail Operations Study) and the Southeast states (Southeast Rail Operations Study). It also commissioned a second phase of work for MAROps, with the objective of developing specific institutional and funding approaches to implement the MAROps program.

F.8 Rail Safety and Security

F.8.1 Safety and Security Mandates

As described in Chapters 5 and 6, the Rail Safety Improvement Act of 2008 (RSIA) and the corresponding regulations issued by FRA require passenger and major freight railroads to implement PTC on most major track lines by December 31, 2015.

RSIA also directed the FRA, as defined under Section 202, to identify the 10 states that have had the most highway-rail grade crossing collisions, on average, during 2006, 2007, and 2008. These states, including California, must prepare and submit a highway-rail grade crossing safety action plan that addresses the following requirements:

- Identifies specific solutions for improving safety at crossings, including highway-rail grade crossing closures or grade separations.
- Focuses on crossings that have experienced multiple accidents or are at high risk for such accidents.
- Covers a five-year time period.

States needed to submit their State Action to the FRA by August 27, 2011.

Rail security is primarily a federal matter led by the TSA in cooperation with the U.S. DOT. Prior to the increased national attention to security after September 11, 2001, rail security concerns were mostly handled by the railroads themselves, in cooperation with a community of first responders tasked with addressing rail incidents involving hazardous materials. Railroads responded quickly after the September 11, 2001 terrorist attacks to develop more robust security plans. These efforts were formalized through the enactment of the Implementing Recommendations of the 9/11 Commission (IRC) Act of 2007, which established requirements for rail security planning, information sharing, and hazardous material routing. Specifically, the Act requires the DHS/TSA to:

- Develop a national rail security strategy and risk assessment.
- Compel railroads to develop their own internal risk assessments.
- Develop new programs for rail security training, exercises, and testing.
- Support research and development efforts focused on rail security.[32]

[32] Implementing Recommendations of the 9/11 Commission Act of 2007, 110 P.L. 53.

The IRC Act also contains a clause that preempts state laws where they conflict with the federal regulations. In essence, the clause states that the federal requirements constitute a uniform national standard. States can only enact stricter regulations if they do not conflict with U.S. law; are necessary to address a local hazard; and do not place an unreasonable burden on interstate commerce.

F.8.2 Freight Rail Safety Statistics

Rail system safety is evaluated by measuring the number of incidents, accidents, fatalities, and injuries that occur on the system. These statistics can be subdivided into operational impacts (e.g., employee injuries, operational incidents resulting in railroad property damage, etc.) and third-party incidents (e.g., right-of-way incursions by motor vehicles and pedestrians, grade crossing accidents, etc.).

California's accident rate exceeds the national average in a number of categories, including the number of fatalities that occur per 1,000 route-miles. As shown in Table F.4, California's average annual fatality rate for all freight rail accidents and incidents over the last 10 years far exceeds the national average. At 7.98 annual fatalities per 1,000 route-miles for all accident categories, the rate of fatalities on California track doubles the national average. "Other Incidents" account for over three-quarters of fatalities, with an average annual fatality rate of 6.14 from 2002 to 2011.[33] Nationally, between 2002 and 2011, "Other Incidents" accounted for approximately 60 percent of fatalities. Additionally, California has the highest number of fatalities occurring at grade crossings over the last three years. As required by federal law, California must prepare plans for reducing such crashes and incidents.

In response to safety concerns, the CPUC developed a Rail Safety Action Plan for fiscal years 2009 through 2012. The Safety Plan outlines a number of rail safety goals as well as action plan elements to help achieve those goals. Action items include:

- Conduct focused inspections and regular inspections of all railroad and light rail transit operations.
- Process all rail crossing improvement applications in a timely manner.
- Develop the CPUC Rail Safety Information Management System database/work module.
- Work with the FRA and affected freight railroads to develop a comprehensive inventory of highway-rail crossings in the State.
- Issue semi-annual and annual Rail Safety Activity Reports to the Commission.

As a result of these efforts, accidents, fatalities, and injuries in California have been declining at a faster rate than the national average, as shown in Exhibits F.1 and F.2. As shown in Table F.5, total freight rail accidents were reduced by over 10 percent between 2010 and 2011 throughout the State, compared to 3.9 percent in the U.S. Additionally, fatalities are down by nearly 2 percent, compared to 1.8 percent across the country.

[33] "Other incidents" are defined as those other than collisions, derailments, and crossing incidents that cause physical harm to people.

Table F.4: California Freight Rail Accidents/Incidents, 2002 to 2011

Description	California	U.S.
Total Accidents/Incidents (10-year total)	**5,548**	**93,481**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	81.09	54.84
Avg. Annual Fatality Rate (per 1,000 route-miles)	7.98	3.65
Avg. Annual Injury Rate (per 1,000 route-miles)	48.52	31.45
Train Accidents (collisions, derailments, and other accidents)	**1,422**	**24,613**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	20.78	14.44
Avg. Annual Fatality Rate (per 1,000 route-miles)	0.12	0.04
Avg. Annual Injury Rate (per 1,000 route-miles)	1.15	1.64
Highway-Rail Incidents (10-year total)	**871**	**23,777**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	12.73	13.95
Avg. Annual Fatality Rate (per 1,000 route-miles)	1.72	1.44
Avg. Annual Injury Rate (per 1,000 route-miles)	4.14	4.73
Other Incidents (5-year total)	**3,255**	**45,091**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	47.57	26.45
Avg. Annual Fatality Rate (per 1,000 route-miles)	6.14	2.17
Avg. Annual Injury Rate (per 1,000 route-miles)	43.23	25.09

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

Table F.5: California Freight Rail Accidents/Incidents, 2011

Description	California	U.S.	California Change from 2010	U.S. Change from 2010
Total Accidents/Incidents	350	6,856	-10.3%	-3.9%
Fatalities	37	505	-19.6%	-1.8%
Injuries	209	3,827	-11.4%	-7.4%
Train Accidents (collisions, derailments, and other accidents)	77	1,810	0.0%	4.2%
Fatalities	0	6	-	50.0%
Injuries	4	62	0.0%	19.2%
Highway-Rail Incidents	66	1,729	-13.2%	-1.9%
Avg. Annual Fatalities	10	188	-9.1%	1.6%
Avg. Annual Injuries	22	650	-8.3%	-0.8%
Other Incidents	207	3,317	-12.7%	-8.8%
Avg. Annual Fatalities	27	311	-22.9%	-4.3%
Avg. Annual Injuries	183	3,115	-12.0%	-9.1%

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

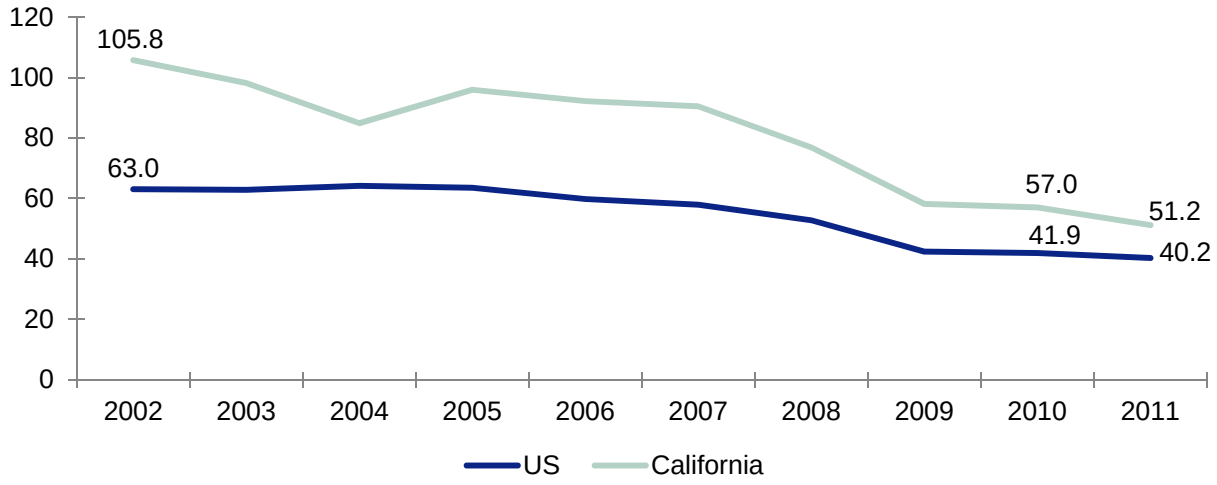

Exhibit F.1: Freight Rail Accident/Incident Rate per 1,000 Route-Miles, 2002 to 2011

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

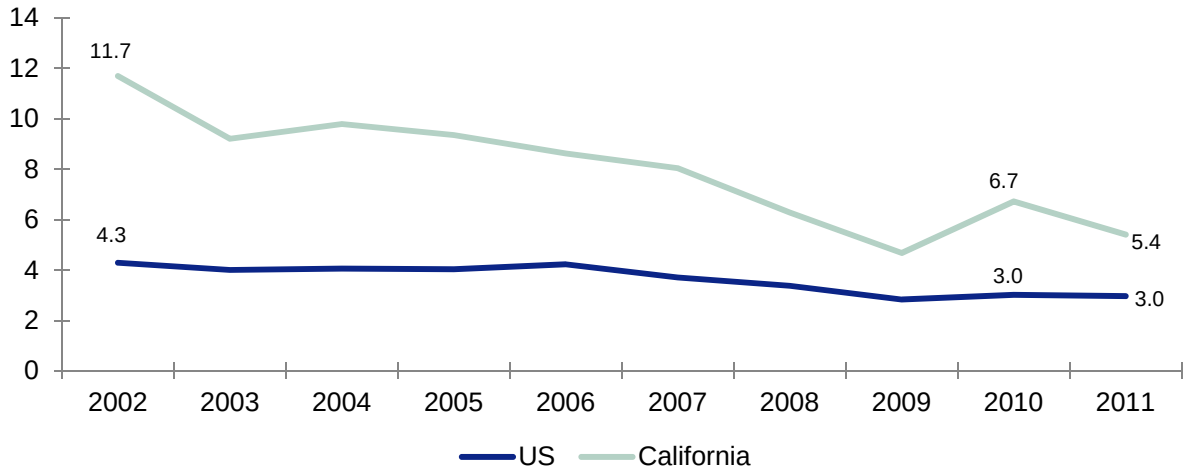

Exhibit F.2: Freight Rail Fatality Rate per 1,000 Route-Miles, 2002 to 2011

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

F.8.3 Safety and Security Programs and Projects

Many of the federal and state programs described in Section 5.4 addressing passenger rail safety and security apply to freight rail, as well. These include the federal Section 130 Crossing Improvement Program and the state Section 190 Grade Separation Program, Highway-Railroad Crossing Safety Account (Proposition 1B), and Warning Device Maintenance Fund (refer to Section 5.4 for more detailed descriptions of these programs). This section summarizes the additional programs and projects that specifically address freight rail safety and security issues.

Freight Rail Security Grant Program

The Freight Rail Security Grant Program was authorized by the IRC Act of 2007 to provide funding for security initiatives of freight rail carriers transporting bulk poisonous-by-inhalation/toxic-inhalation-hazard materials. Congress appropriated $10 million to the program for FY 2011 to be administered by TSA.[34]

Rail Line Relocation Grants

The FRA's Rail Line Relocation Grant program provides states with funding to mitigate the adverse effects of rail traffic on safety, vehicle traffic flow, quality of life, or economic development by relocating rail lines away from downtown areas. Fifty percent of the funds are dedicated to projects of $20 million or less; states or non-federal entities must pay at least 10 percent of project costs.

[34] Transportation Security Administration, *Fiscal Year 2011 Freight Rail Security Grant Program*.

[This page intentionally blank]

Appendix G

DEMAND AND CAPACITY SUPPLEMENTAL INFORMATION

[This page intentionally blank]

This appendix provides supplemental information on demand and capacity issues for the three existing intercity rail routes as well as two proposed routes. The existing routes are the *Pacific Surfliner*, *San Joaquin*, and *Capitol Corridor*. The information on the *Pacific Surfliner* route is presented in two parts. The first covers the northern portion of the route between Los Angeles Union Station (LAUS) and San Luis Obispo, and the second covers the southern portion of the route between LAUS and San Diego. The proposed routes are the *Coast Daylight* and Coachella Valley service. Demand and Capacity information is also provided for commuter rail services: Caltrain, Altamont Corridor Express (ACE), Metrolink, and COASTER.

G.1 *Pacific Surfliner*

G.1.1 *Pacific Surfliner* Route North of LAUS

The following subsections outline issues and improvement needs for the *Pacific Surfliner* route north of LAUS. This information was drawn from the *Pacific Surfliner North Service Development Plan* (2013), the *2012 LOSSAN Corridor-wide Strategic Implementation Plan*, the 2010 *LOSSAN Corridor Strategic Assessment Report,* and the *2007 LOSSAN North Strategic Plan.*

Demand Issues

- The full *Pacific Surfliner* route, which runs from San Diego to San Luis Obispo, is the second-most heavily traveled passenger rail route in the U.S., behind only the Boston–Washington, D.C. Northeast Corridor. The passenger rail demand is likely to grow with the increase in ridership.
- The traditional peak direction for Metrolink trains has mostly meant trips from Ventura and Orange counties to downtown Los Angeles work centers. Over the long term, a stronger reverse commute from Los Angeles to Ventura County may occur.
- Long-term plans include introduction of new high-speed rail (HSR) service operating on dedicated tracks within the existing Metrolink-owned right-of-way across the San Fernando Valley and into LAUS, and provision of peak-period commuter service between the Ventura and Santa Barbara.

Capacity, Operational, and Safety Issues and Needs

- More than 80 percent of the *Pacific Surfliner* route north of LAUS service operates on a single-track basis; double-track operations are from LAUS to Moorpark. Double-track improvements are planned for segments between Control Point (CP) Raymer just north of Van Nuys Station and CP Bernson just south of Chatsworth, between Moorpark and Ventura.[35]
- Another constraint is that although there is double-track at Van Nuys Station, there is only a single platform south of the double track, requiring a train to "hold out," or stop short of the station, if an opposing train is already stopped there.
- Sidings are limited in number and length, and, in some instances, are not connected to the main line track, frequently requiring passenger trains to pull into sidings, wait, and then back out onto the main line to proceed. This is a constraint for the Ventura–Santa Barbara segment of the corridor.
- Some curve realignments are required to increase passenger train speeds and safety.

[35] A Control Point is a location where signals and/or switches of a traffic control system are operated and/or controlled from a distant location by a train dispatcher.

- Significant sections of single track still use Automatic Block System (ABS) and manual switches, requiring dispatch approval to proceed. In the long run, the Santa Barbara–San Luis Obispo segment of the corridor may need to replace the manual switches with either "island" or continuous Centralized Traffic Control (along the entire route) that allows remotely located dispatchers to observe train progress electronically and remotely set siding switches.[36]
- The Southern California Regional Rail Authority (SCRRA) is developing a comprehensive strategy called the Metrolink Sealed Corridor Initiative to improve overall safety by overcoming the current "open" nature of the right-of-way (many grade crossings and frequent pedestrian and vehicular trespassing), which limits top operating speeds and reduces service reliability.

G.1.2 *Pacific Surfliner* Route South of LAUS

Demand on the *Pacific Surfliner* route, SCRRA's proposed Sealed Corridor improvements, and ongoing Positive Train Control (PTC) installation on the entire *Pacific Surfliner* route were discussed in the previous section about the *Pacific Surfliner* route north of LAUS. The following subsections outline issues and improvement needs for the *Pacific Surfliner* route south of LAUS. This information was drawn from the *Pacific Surfliner South Service Development Plan* (2013), the 2012 *LOSSAN Corridor-wide Strategic Implementation Plan*, and the 2010 *LOSSAN Corridor Strategic Assessment Report*.

Demand Issues

- For Metrolink, the traditional peak directions have mostly been trips from Ventura and Orange counties to downtown Los Angeles work centers. However, new markets have been emerging, and over the longer term, a stronger reverse commute from Orange County to developing Inland Empire work centers may occur.
- The Orange County Transportation Authority (OCTA) is currently upgrading tracks and stations along the existing Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency (LOSSAN) rail corridor from Fullerton to Laguna Niguel to provide for new service, referred to subsequently in this study as the "Orange County Shuttle."

Capacity, Operational, and Safety Issues and Needs

- Several segments of the *Pacific Surfliner* route south of LAUS are currently constrained by the lack of passing or second main tracks. In San Diego County, 46 percent of the rail corridor is single track. Several segments between Laguna Niguel and San Diego require double-tracking to handle future passenger rail demand.
- The segment of track between Hobart Yard and Fullerton Junction includes sections of both double- and triple-track. The BNSF Railway (BNSF) and the California Department of Transportation (Caltrans) Division of Rail are currently designing and implementing a major improvement to the section of the LOSSAN rail corridor between Fullerton (Fullerton Junction) and Los Angeles (Redondo Junction). The project will complete a third main track for the entire section from Fullerton to Los Angeles. The only exception would be the segment located at the crossing of Rosecrans and Marquardt Avenues in the City of La Mirada. While the California

[36] "Island" l operations describe lines that do not have Centralized Traffic Control installed along an entire route, but rather only in discrete or "island" segments, typically at sidings, junctions, and station areas. In the remaining segments, operations would be governed by manual dispatching techniques, typically track warrant control.

Public Utilities Commission (CPUC) indicated that it would approve this crossing modification to accommodate the third track, this segment currently lacks the necessary funding for grade separation.

- Safety improvements are needed at certain grade crossings between Fullerton and Laguna Niguel as a part of the Sealed Corridor Initiative program. This program has been largely completed in Orange County, with improvements to more than 50 at-grade crossings.

G.2 *Coast Daylight* Route

The proposed *Coast Daylight* passenger rail service will operate over the entire length of the *Pacific Surfliner* route north of LAUS. The issues and needs for improvements identified for the *Pacific Surfliner* route north of LAUS are also relevant to *Coast Daylight* trains. No additional rail infrastructure improvements would be needed for portions of the *Coast Daylight* route within the *Pacific Surfliner* operating area.

The following subsections outline issues and improvement needs for portions of the proposed *Coast Daylight* route north of San Luis Obispo. This information was drawn from the *Coast Daylight Service Development Plan (2013)*, the 2006 *Caltrain Extension to Monterey County Passenger Rail Stations Final Environmental Impact Repor*t, the 2001 *California Passenger Rail System (Amtrak) 20-Year Improvement Plan*, and ongoing environmental review for the segment between Salinas and San Luis Obispo.

G.2.1 Demand Issues

- At present, Amtrak's daily Los Angeles to Seattle *Coast Starlight* service is the only passenger service available between San Luis Obispo and San Jose. With a single daily train, the range of travel needs by communities along the route cannot be met. Furthermore, due to the length of the route, trains are often subject to delays, particularly in the southbound direction. Implementation of the planned *Coast Daylight* trains will fill these gaps, thereby providing intercity rail service as a viable option for many travelers.
- Longer-term plans include the introduction of HSR services on the segment between Gilroy and San Francisco. However, the implementation of HSR is not expected to have a major impact on *Coast Daylight* ridership, since its primary purpose will be to serve intermediate markets along the route for which HSR will not be a competitive option.

G.2.2 Capacity, Operational, and Safety Issues and Needs

- Outside the urbanized commuter rail territory, most of the corridor is single track; double-track exists between San Francisco and San Jose.
- Between San Jose and Gilroy, the only improvement project is double-tracking to be carried out by the Santa Clara Valley Transportation Authority, which has already been environmentally cleared. Environmental evaluation of additional service through the extension of *Capitol Corridor* service from San Jose to Salinas will be addressed in an ongoing Environmental Assessment led by the Transportation Agency for Monterey County in coordination with the Federal Transit Administration (FTA).

- Improvements in the remaining 134 miles between Salinas and San Luis Obispo will be addressed in an ongoing Environmental Assessment led by the San Luis Obispo Council of Governments, in coordination with Caltrans and the Federal Railroad Administration (FRA).
- Sidings are limited in number and length.
- Significant sections still use ABS and manual switches, requiring dispatcher approval to proceed.
- Some curve realignments are required to increase passenger train speeds and safety.
- Station improvements including providing new stations and transit connectivity are needed.
- Operational impacts of *Coast Daylight* service in the Caltrain corridor between San Jose and San Francisco, which will be upgraded to accommodate HSR service, have not been analyzed to date and are the subject of future planning efforts.

G.3 *San Joaquin* Route

The following subsections outline issues and improvement needs for the *San Joaquin* route. This information was drawn from the *San Joaquin Service Development Plan* (2013), the *San Joaquin Corridor Programmatic Environmental Impact Report–2035 Vision (initial study) released November 2012*, the 2008 *San Joaquin Corridor Strategic Plan*, and the *California State Rail Plan* (2007-2008 to 2017-2018).

G.3.1 Demand Issues

- As per the *San Joaquin Service Development Plan* (2013), the passenger rail demand is likely to grow.
- The California High-Speed Rail Authority 2012 Business Plan calls for *San Joaquin* trains to use the first construction section of the Initial Operating Section of the HSR system in 2018. Trains traveling on the *San Joaquin* route would use this 130-mile segment from Madera to north of Bakersfield. This service scenario, which is studied in the *San Joaquin Service Development Plan* (2013), raises significant demand issues.
- In the long-term once the HSR system is in operation, it is likely that the *San Joaquin* route would operate as a feeder to the HSR system.

G.3.2 Capacity, Operational, and Safety Issues and Needs

- The average travel time between Oakland and Bakersfield is 6 hours and 13 minutes with an overall average speed, including station dwell time, of 50 miles per hour (mph). Between Sacramento and Bakersfield, the overall average speed is 53 mph. The maximum track speed on the *San Joaquin* route is 79 mph.
- The 2008 *San Joaquin Corridor Strategic Plan* based on a BNSF capacity and performance analysis using Berkeley Simulation Software's RTC simulation model identified a long-term need for complete double-tracking of the *San Joaquin* route, curve realignments, and signal control upgrades in order to handle future rail demand.
- The *San Joaquin Corridor Strategic Plan* notes that the *San Joaquin* route has over 400 public and private at-grade crossings throughout the corridor on both the Union Pacific (UPRR) and BNSF rail lines. On the BNSF route alone, there are 362 at-grade crossings with 255 public and

107 private crossings. In California, the *San Joaquin* route has 3 out of the top 10, and 8 out of the top 20 at-grade road crossings with the most accidents between 1995 and 2004.

G.4 *Capitol Corridor* Route

The following subsections outline issues and improvement needs for the *Capitol Corridor route*. This information was drawn from the 2010 *Capitol Corridor Service Expansion Plan–Service Development Plan*, the 2007 *California State Rail Plan* (2007/2008 to 2017/2018), and the 2005 *Capitol Corridor Joint Powers Authority Vision Plan*.

G.4.1 Demand Issues

- The *Capitol Corridor* is the third-busiest service in the Amtrak system, after the Amtrak Northeast Corridor and the *Pacific Surfliner* route. The passenger rail demand is likely to grow with the increase in ridership.
- The *Capitol Corridor Service Development Plan* adopted an incremental approach to increase service frequencies (as well as reduce travel times and maintain the current high on-time performance), as guided by both the *CCJPA Vision Plan* (2005) and the *California State Rail Plan* (Fiscal Year (FY) 2007/2008 to FY 2017/2018).
- Plans are also underway to extend the *Capitol Corridor* south from San Jose to Salinas over the UPRR's Coast Division.[37]

G.4.2 Capacity, Operational, and Safety Issues and Needs

- The Capitol Corridor Joint Powers Authority (CCJPA) is currently maintaining an on-time performance of 92.4 percent. This is largely due to working with UPRR to eliminate slow orders and maintain the rail infrastructure to FRA Track Class V (90 mph maximum speed for passenger trains, 70 mph for freight) standards while operating at Class IV standards (80 mph maximum speed for passenger trains, 60 mph for freight). Similar collaborative efforts are needed in the future.
- The known impediment to frequency increases between Auburn and Sacramento and between Oakland and San Jose is constrained railroad capacity.
- For the Auburn–Sacramento segment, capacity constraints in the Auburn to Reno corridor, east of CCJPA's service area boundary in Auburn, constrain freight rail service, as well as the ability of CCJPA to implement additional service between Sacramento and Auburn. UPRR has funded and completed improvements on one of the main tracks between Auburn to Reno, which has freed up some of the congestion in the Roseville Yard and allowed CCJPA to operate one round trip. Improvements to the second main track between Auburn and Reno need to be made in order to allow the additional round trip *Capitol Corridor* train between Sacramento to Auburn.
- For the Oakland–San Jose segment, CCJPA worked with both UPRR and Caltrain to identify the necessary capacity improvements to increase service from 7 to 11 daily round trips.

[37] http://www.capitolcorridor.org/included/docs/board_meetings/ccjpa_agenda_120220.pdf, pp. 17-21.

- The *Capitol Corridor Service Development Plan* also proposes inclusion of a new station stop at Union City. This proposed station would be adjacent to the recently renovated Union City Bay Area Rapid Transit Station. Service to this station would required a slight rerouting from the existing Niles subdivision alignment on to the Oakland subdivision via a new alignment (termed the "Shinn Connection"), and then back to the Niles Subdivision.

G.5 Caltrain

The following subsections outline issues and improvement needs for Caltrain. This information was drawn from the *2012 Caltrain/California HSR Blended Operations Analysis* and the *Caltrain Strategic Plan* (2004/2023).

G.5.1 Demand Issues

- Future Caltrain service improvements include electrification, track and station improvements, route extension to Salinas, and potential operation of HSR trains on the Caltrain right-of-way.

G.5.2 Capacity, Operational, and Safety Issues and Needs

- Environmental studies on the Caltrain electrification project are underway.
- According to the 2012 *Caltrain/California HSR Blended Operations Analysis* considered as a "proof of concept" for a "build-out" type scenario, the key findings are as follows:
  - A blended operation on the Caltrain route where Caltrain and high-speed trains are sharing tracks is conceptually feasible.
  - An electrified system with an advanced signal system and electric trains increases the ability to support future train growth in the corridor.
  - The Blended System without passing tracks for train overtakes can reliably support up to six Caltrain trains and two HSR trains per hour per direction.
  - The Blended System with passing tracks for overtakes can reliably support up to six Caltrain trains and four HSR trains per hour per direction.
- Supporting HSR trains results in non-uniform Caltrain headways.
- Increasing maximum speed from 79 mph to 110 mph decreases travel times for both rail services.

G.6 Altamont Corridor Express

The following subsections outline issues and improvement needs for the ACE. This information was drawn from the *Preliminary Alternatives Analysis Report* of the 2011 *Altamont Corridor Rail Project EIR/EIS* and the 2007 *Bay Area Regional Rail Plan*.

G.6.1 Demand Issues

- Upgrading the Altamont rail corridor is a joint project between the California High-Speed Rail Authority (Authority) and the San Joaquin Regional Rail Commission (SJRRC). The Authority

has been serving as the lead agency, conducting planning and California Environmental Quality Act environmental work for the upgrade of the Altamont rail corridor. The Authority and SJRRC are currently working to transition the lead agency role to SJRRC. The *Preliminary Alternative Analysis Report* considered creating a new commuter and intercity train service connecting the Central Valley, Tri-Valley, and Silicon Valley as an evolution of the existing ACE rail service, serving both intercity travelers and commuters.

G.6.2 Capacity, Operational, and Safety Issues and Needs

- The Altamont Corridor Rail Project would incrementally upgrade ACE service on a separate, dedicated passenger track, and may ultimately be fully grade-separated, electrified, and compatible with HSR rolling stock.

G.7 Metrolink

The following subsections outline issues and improvement needs for Metrolink's routes as reported in the 2007 *SCRRA Strategic Assessment*.

G.7.1 Demand Issues

- According to SCRRA, a key unknown outcome is SCRRA's ability to grow its services on the freight railroads over which Metrolink operates. SCRRA is thus making an effort to determine how best to ramp up service levels, including off-peak and weekend trains, over the next 20 years.
- As mentioned earlier, the OCTA is making improvements to introduce a new Orange County Shuttle service between Fullerton and Laguna Niguel.
- In the future, HSR service in southern California will significantly increase demand for Metrolink service. The Southern California Rail Partners Working Group, working in conjunction with the Authority, is developing plans for Metrolink service to accommodate demand caused by HSR service.

G.7.2 Capacity, Operational, and Safety Issues and Needs

- As seen earlier, capital improvements are underway for triple-tracking the BNSF mainline between Los Angeles and Fullerton, including a new Eastern Area Maintenance Facility, a maintenance-of-way facility, and communications improvements.
- In the medium term, SCRRA is expecting improvements to LAUS between Fullerton and West Riverside, completion of double-tracking of the UPRR mainline between Los Angeles and West Riverside, and procurement of additional rolling stock.
- In the long term, SCRRA is anticipating a fourth main track between Los Angeles and Fullerton.
- As mentioned before, SCRRA is developing a comprehensive safety strategy as part of the Metrolink Sealed Corridor Initiative. SCRRA is also enhancing safety through modifications to rolling stock to incorporate crash energy management technologies to enhance crashworthiness.

G.8 COASTER

As the COASTER passenger rail service operates over a portion of the *Pacific Surfliner* route, the issues and needs for improvements on COASTER have already been discussed under the *Pacific Surfliner* Route South of LAUS discussion.

G.9 Coachella Valley

The following subsection outlines issues and improvement needs for the proposed Coachella Valley route as reported in the *2013 Coachella Valley Planning Study*.

G.9.1 Demand Issues

- The route is proposed to connect Orange County and Riverside County to Coachella Valley, a route only currently served by the *Sunset Limited 3 times a week at very inconvenient times*.
- At the downtown Fullerton and Riverside Stations, the new train service will be able to connect with numerous other passenger rail services.
- Stops on this route have been planned to access major activity centers, with new stations at locations such as Loma Linda, where community support is strong.
- The *2013 Coachella Valley Planning Study* suggests next steps in planning for service in the Coachella Valley include development of a complete service development plan and a program environmental report.

G.9.2 Capacity, Operational, and Safety Issues and Needs

- During peak periods, it may be difficult to obtain a train slot between Fullerton and Los Angeles because of the various commuter and intercity trains operating during that period.
- Based upon a review of Amtrak, Metrolink, and UPRR train schedules; running times between Los Angeles, Fullerton, and Riverside; and authorized passenger train speeds on the track between Colton and Indio, the total estimated travel time between Indio and Los Angeles, with all the stations identified in this review, is estimated to be approximately 3 hours and 10 minutes, resulting in an average speed of 44.5 miles per hour.
- This service needs rolling stock, a layover facility, and station improvements (to protect passengers from severe summer conditions in the Coachella Valley).

Appendix H

PLANNED OR PROGRAMMED
GRADE SEPARATION PROJECTS

[This page intentionally blank]

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects

Source[a]	County/City	Project Description	Project Cost[b]	Construction[c]	
				Begin	End
HRCSA	Alameda	Kato Road Grade Separation	$52,265,000	30-Aug-11	30-Dec-12
HRCSA	Alameda	Warren Avenue Grade Separation	$56,000,000	25-Nov-11	25-Nov-14
MTC RTP	Alameda	7th Street Grade Crossing	$175,000,000		
TCIF	Contra Costa	Marina Bay Parkway Grade Separation	$37,950,000	7-Jun-11	Oct 01, 201
HRCSA	Kern	BNSF Grade Separation at 7th Standard Road/Santa Fe Way	$28,853,000	10-Apr-10	1-Jul-11
KCOG RTP	Kern	At Union Pacific Railroad–Construct Grade Separation	$26,400,000	2025	
KCOG RTP	Kern	Rosedale Highway at Minkler Spur/Landco–Construct Grade Separation	$17,400,000	2013	
KCOG RTP	Kern	Hageman Road/BNSF Railroad Grade Separation	$39,500,000	15-Dec-10	30-Jul-12
HRCSA	Los Angeles	Nogales Street Grade Separation	$110,500,000	Short-term	
SCAG RTP	Los Angeles	Valley View Avenue	$80,091,791	Short-term	
SCAG RTP	Los Angeles	Baldwin Avenue (El Monte)	$75,900,000	Short-term	
SCAG RTP	Los Angeles	Greenwood Avenue	$69,600,000	Medium-term	
SCAG RTP	Los Angeles	Del Amo Boulevard	$32,958,024	Short-term	
SCAG RTP	Los Angeles	South Wilmington	$72,413,643	Short-term	
SCAG RTP	Los Angeles	San Gabriel Trench (Ramona Street, Mission Road, Del Mar Avenue, San Gabriel Boulevard)	$336,500,000	Short-term	
SCAG RTP	Los Angeles	Turnbull Canyon Road	$96,000,000	Medium-term	
SCAG RTP	Los Angeles	Fairway Drive (Alh) (Industry/Walnut)	$82,800,00	Medium-term	
SCAG RTP	Los Angeles	Fairway Drive (LA)(Industry/ LA County)	$106,100,000	Medium-term	
SCAG RTP	Los Angeles	Reeves Grade Separation	$125,469,739	Short-term	
SCAG RTP	Los Angeles	Puente Avenue	$84,600,000	Medium-term	
SCAG RTP	Los Angeles	Fullerton Road	$143,200,000	Medium-term	

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/City	Project Description	Project Cost[b]	Construction[c]	
				Begin	End
SCAG RTP	Los Angeles	Hamilton Boulevard	$76,300,000	Medium-term	
SCAG RTP	Los Angeles	Durfee Avenue	$73,600,000	Medium-term	
HRCSA	Merced	G Street Undercrossing	$18,000,000	15-Jun-10	15-Dec-11
SCAG RTP	Orange	Pacentia Avenue Undercrossing	$83,399,515	Short-term	
SCAG RTP	Orange	Kraemer Boulevard	$72,133,171	Short-term	
SCAG RTP	Orange	Lakeview Avenue	$102,309,659	Short-term	
SCAG RTP	Orange	Raymond Avenue Grade Separation	$87,319,358	Short-term	
SCAG RTP	Orange	Tustin Avenue and Rose Drive Overcrossing	$100,479,467	Short-term	
SACOG RTP	Placer	Midas Avenue Grade Separation–Midas Avenue from Pacific Street to Third Street Construct 2-Lane Grade Separation of UPRR Tracks including Right of Way	$7,054,487		2035
SCAG RTP	Riverside	Auto Center Drive Grade Separation	$34,277,127	Short-term	
SCAG RTP	Riverside	Avenue 52 Grade Separation Project	$26,789,645	Short-term	
SCAG RTP	Riverside	Clay Street Grade Separation	$39,390,651	Short-term	
SCAG RTP	Riverside	Iowa Avenue Grade Separation	$33,208,356	Short-term	
SCAG RTP	Riverside	Magnolia Avenue Grade Separation (Union Pacific Railroad)	$58,304,804	Short-term	
SCAG RTP	Riverside	Riverside Avenue Grade Separation	$31,430,988	Short-term	
SCAG RTP	Riverside	Streeter Avenue Grade Separation	$39,205,846	Short-term	
SCAG RTP	Riverside	Sunset Avenue Grade Separation	$33,047,853	Short-term	
SCAG RTP	Riverside	Avenue 56 Grade Separation Union Pacific Yuma Subdivision	$28,445,546,	Short-term	
SCAG RTP	Riverside	Tyler Street	$83,153,710	Long-term	

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/City	Project Description	Project Cost[b]	Construction[c]	
				Begin	End
SCAG RTP	Riverside	McKinley Street	$43,773,232	Long-term	
SCAG RTP	Riverside	Chicago Avenue	$462,186,411	Long-term	
SCAG RTP	Riverside	Grade Separation on Mary Street between Marguerite Avenue and Indiana Avenue	$43,792,132	Short-term	
SCAG RTP	Riverside	Avenue 66	$40,298,396	Long-term	
SCAG RTP	Riverside	Bellgrave Avenue	$117,879,367	Long-term	
SCAG RTP	Riverside	Pierce Street from Magnolia Avenue to Indiana Avenue–Grade Separation	$89,565,528	Long-term	
SCAG RTP	Riverside	Madison Street	$108,683,419	Long-term	
SCAG RTP	Riverside	Spruce Street	$256,241,763	Long-term	
SCAG RTP	Riverside	Jurupa Road	$102,174,813	Long-term	
SCAG RTP	Riverside	Joy Street	$40,303,798	Long-term	
SCAG RTP	Riverside	Adams Street	$108,538,822	Long-term	
SCAG RTP	Riverside	Viele Avenue	$37,074,524	Long-term	
SCAG RTP	Riverside	California Avenue	$30,269,484	Long-term	
SCAG RTP	Riverside	22nd Street	$27,317,116	Long-term	
SCAG RTP	Riverside	San Gorgonio Avenue	$27,911,550	Long-term	
SCAG RTP	Riverside	Hargrave Street	$32,040,127	Long-term	
SCAG RTP	Riverside	Avenue 62	$100,262,409	Long-term	
SCAG RTP	Riverside	3rd Street	$39,740,665	Long-term	
HRCSA	Sacramento	6th Street Overcrossing–Roadwork	$15,730,000	8-Feb-12	8-Feb-13
SACOG RTP	Sacramento	New Overcrossing: UPRR Grade Separation–A Street	$13,734,399		2035

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/City	Project Description	Project Cost[b]	Construction[c]	
				Begin	End
SACOG RTP	Sacramento	Jackson Highway (SR 16) at Watt Avenue–Construct New Roadway Grade Separation Interchange at the Intersection of Jackson Highway and Watt Avenue	$3,426,489		
SCAG RTP	San Bernardino	Green Tree Boulevard Extension	$2,662,560	Medium-term	
SCAG RTP	San Bernardino	Glen Helen Parkway Railroad Grade Separation	$32,671,236	Short-term 1-Apr-12	1-Sep-13
SCAG RTP	San Bernardino	Laurel Street Grade Separation (BNSF)	$57,524,991	Short-term	
SCAG RTP	San Bernardino	Lenwood Road Grade Separation	$33,271,383	Short-term	
SCAG RTP	San Bernardino	Palm Avenue Railroad Grade Separation	$32,043,322	Short-term	
SCAG RTP	San Bernardino	South Milliken Avenue	$83,095,052	Short-term	
SCAG RTP	San Bernardino	Hunts Lane	$37,770,816	Short-term	
SCAG RTP	San Bernardino	Campus Avenue	$27,916,923	Long-term	
SCAG RTP	San Bernardino	San Antonio Avenue	$27,916,923	Long-term	
SCAG RTP	San Bernardino	Main Street Grade Separation Widening	$26,038,939	Long-term	
SCAG RTP	San Bernardino	Mt. Vernon Avenue	$44,792,687	Short-term	
SCAG RTP	San Bernardino	North Vineyard Avenue Grade Separation	$51,891,488	Short-term	
SCAG RTP	San Bernardino	South Archibald Avenue Grade Separation	$62,686,154	Short-term	
SANDAG RTP	San Diego	10th Avenue at Harbor Drive Grade Separation Improvements	$66,000,000	7-Nov-13	25-Aug-16
SANDAG RTP	San Diego	32nd Street at Harbor Drive Grade Separation Improvements	$118,460,000	7-Nov-13	25-Aug-16
SANDAG RTP	San Diego	Blue Line Rail Grade Separations (Taylor Street, Washington/Sassafras Street, 28th Street, 32nd Street, E Street, H Street, Palomar Street)	$861,000,000		

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/City	Project Description	Project Cost[b]	Construction[c]	
				Begin	End
SANDAG RTP	San Diego	Orange Line (Trolley) Rail Grade Separations (Euclid Avenue, Broadway/Lemon Grove Avenue, Allison Avenue/ University Avenue/La Mesa Boulevard, Severin Street)	$491,000,000		
SANDAG RTP	San Diego	Rail Line Grade Separation/ Barrio Logan Enhancement	$66,000,000		
SJCOG RTP	San Joaquin	Airport Way at UPRR–Construct 5-Lane Grade Separation	$21,492,318		
SJCOG RTP	San Joaquin	Airport Way at BNSF At-Grade Crossing	$2,800,000		
SJCOG RTP	San Joaquin	Alpine Way at UPRR Construct Grade Separation	$31,400,000		
SJCOG RTP	San Joaquin	Daggett Road at BNSF–Construct Grade Separation	$12,460,000		
SJCOG RTP	San Joaquin	Eight Mile at UPRR (Easterly)–Construct Grade Separation	$42,400,000	1-Oct-10	1-Nov-12
SJCOG RTP	San Joaquin	Eight Mile at UPRR (Westerly)–Construct Grade Separation	$39,400,000	1-Oct-10	1-Nov-12
SJCOG RTP	San Joaquin	Harney Lane at UPRR–Construct Grade Separation	$18,502,089		
SJCOG RTP	San Joaquin	Lower Sacramento Road at UPRR–Construct Grade Separation	$40,000,000	2016	2020
SJCOG RTP	San Joaquin	Main Street at UPRR–Construct Grade Separation	$10,000,000		
SJCOG RTP	San Joaquin	Morada Lane at UPRR–Construct Grade Separation	$34,600,000		
SJCOG RTP	San Joaquin	SR 12 at UPRR–Construct Grade Separation	$91,000,000		
SJCOG RTP	San Joaquin	Wilma Avenue at UPRR–Construct Grade Separation	$10,000,000		
SACOG RTP	Sutter	Rednail Road/UPRR Grade Crossing Safety–in Unincorporated Sutter County	$564,153		2020
HRCSA	Tulare	Bardsley Avenue Grade Separation	$14,486,000	1-Apr-12	31-Oct-13
HRCSA	Tulare	Betty Drive Grade Separation	$27,418,000	20-Dec-10	1-Jun-11

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/City	Project Description	Project Cost[b]	Construction[c]	
				Begin	End
HRCSA	Tulare	Cartmill Avenue Grade Separation	$26,808,000	1-Dec-10	31-May-12
SCAG RTP	Ventura	In Oxnard at Rice Avenue Railroad Grade Separation	$14,434,425	Short-term	

[a] HRCSA–Highway-Railroad Crossing Safety Account.

MTC RTP–Metropolitan Transportation Commission Regional Transportation Plan (RTP).

TCIF–Trade Corridor Improvement Fund.

KCOG RTP–Kern Council of Governments RTP.

SCAG RTP–Southern California Association of Governments RTP.

SANDAG RTP–San Diego Association of Governments RTP.

SACOG RTP–Sacramento Area Council of Governments RTP.

SJCOG RTP–San Joaquin Council of Governments RTP.

[b] Project costs are taken from the document noted in the "Source" column.

[c] Construction time frame for projects in the SCAG region (Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties) are presented in terms of short-term (2012-2019), medium-term (2020-2027),and long-term (2028+).

Appendix I

AIR QUALITY BENEFITS METHODOLOGY

[This page intentionally blank]

Appendix I. Air Quality Emission Benefits

The appendix describes the calculation methodology for air quality emissions benefits and provides result tables for each pollutant by geographic subregion, passenger rail corridor, and year.

I.1 Calculation Method

California is divided geographically into air basins for the purpose of managing the air resources of the State on a regional basis. Each air basin generally has similar meteorological and geographic conditions throughout. The State is currently divided into 15 air basins[38] with numerous subareas. In this analysis, the subareas are defined by the California Air Resources Board Emissions Factor model (EMFAC)[39] and included in parentheses; for example, "(SV)" designates the Sacramento Valley air basin from EMFAC. Emission rates for each pollutant were estimated using EMFAC2011-SG for 2020, 2025, and 2035 at the county/subarea air basin level. These rates were then aggregated to generate composite emission factors for key subareas, and then further aggregated to each of seven reporting regions.[40] These 7 reporting regions and component subareas are as follows:

1. **The Sacramento Region** (two total EMFAC subarea air basins):
   - Sacramento (SV).
   - Yolo (SV).
2. **The Bay Area** (12 total EMFAC subarea air basins):
   - Alameda (SF).
   - Contra Costa (SF).
   - Marin (SF).
   - Napa (SF).
   - San Francisco (SF).
   - San Mateo (SF).
   - Santa Clara (SF).
   - Santa Cruz (NCC).
   - Solano (SF and SV).
   - Sonoma (NC and SF).

[38] The 15 air basins are Great Basin Valleys (GBV), Lake County (LC), Lake Tahoe (LT), Mojave Desert (MD), Mountain Counties (MC), North Central Coast (NCC), North Coast (NC), Northeast Plateau (NEP), Sacramento Valley (SV), Salton Sea (SS), San Diego (SD), San Francisco Bay (SF), San Joaquin Valley(SJV), South Central Coast (SCC), and South Coast (SC). For further details, see: http://www.arb.ca.gov/desig/airbasins/airbasins.htm.

[39] EMFAC2011 is the latest installment of the EMFAC series of models, which is California Air Resources Board's tool for estimating emissions from on-road vehicles.

[40] The subareas are a subset of the total air basins in the region and were selected specifically to cover air basins relevant for this analysis.

3. **The Central Coast and Monterey Bay** (four EMFAC subarea air basins):
   - Monterey (NCC).
   - San Benito (NCC).
   - San Luis Obispo (SCC).
   - Santa Barbara (SCC).
4. **The San Joaquin Valley** (11 EMFAC subarea air basins):
   - Calaveras (MC).
   - Fresno (SJV).
   - Kern (SJV).
   - Kings (SJV).
   - Madera (SJV).
   - Mariposa (MC).
   - Merced (SJV).
   - San Joaquin (SJV).
   - Stanislaus (SJV).
   - Tulare (SJV).
   - Tuolumne (MC).
5. **The Greater Los Angeles Region** (11 EMFAC subarea air basins):
   - Imperial (SS).
   - Kern (MD).
   - Los Angeles (MD and SC).
   - Orange (SC).
   - Riverside (MD, SC, and SS).
   - San Bernardino (MD and SC).
   - Ventura (SCC).
6. **San Diego** (one EMFAC subarea air basin):
   - San Diego.
7. **The Rest of California** (27 EMFAC subarea air basins):
   - Alpine (GBV).
   - Amador (MC).
   - Butte (SV).
   - Colusa (SV).
   - Del Norte (NC).
   - El Dorado (LT and MC).
   - Glenn (SV).
   - Humboldt (NC).
   - Inyo (GBV).

- Lake (LC).
- Lassen (NEP).
- Mendocino (NC).
- Modoc (NEP and GBV).
- Nevada (MC).
- Placer (LT, MC, and SV).
- Plumas (MC).
- Shasta (SV).
- Sierra (MC).
- Siskiyou (NEP).
- Sutter (SV).
- Tehama (SV).
- Trinity (NC).
- Yuba (SV).

Per standard practice, 2035 emissions rates were used as a reasonable approximation to 2040. The emission certification standards and the phase-in schedule for those standards, do not change after 2025, providing additional justification for the use of 2035 emissions rates.

The reported emission reduction benefits in each table were estimated by combining region-specific emission rates for each pollutant, with forecasts of vehicle miles traveled (VMT) reductions. This process assumes that the distribution of VMT by speed in each region is not altered significantly enough to affect regional emissions; this assumption was checked against travel model results.

The VMT and vehicle hours traveled (VHT) reductions were calculated using a three-step process:

1. The analysis used the High-Speed Rail (HSR) Ridership and Revenue Model to calculate 2020, 2025, and 2040 baseline–or "no action"–VMT and VHT. The model scenarios that produced these no action values include:
   - Growth based on socioeconomic forecasts for the respective years.
   - 2013 service levels for the Altamont Corridor Express, *Pacific Surfliner*, *San Joaquin,* and *Capitol Corridor* routes.
   - Projected future year service levels for California's commuter rail, rapid transit, light rail, and fixed-route bus systems. Future year commuter rail service level assumptions were provided by the rail operators, while other transit service levels are consistent with financially constrained regional transportation plans.
2. For the 2020 analysis, new passenger rail trips were calculated for the illustrative service plan assumptions shown in Table 10.1 using the methods described in Section 10.1. The forecast scenario used the same socioeconomic growth forecasts and commuter rail, rapid transit, light rail, and fixed-route bus service assumptions from the "no action" scenarios. These forecasts reflected trip diversions from vehicle or air travel to intercity passenger rail, or new induced intercity passenger rail trips. The diverted vehicle trips were used to calculate VMT and VHT for each origin destination pair to determine VMT and VHT reductions within each reporting region and air basin.
3. For the 2025 and 2040 analysis, the prior step was used to forecast VMT and VHT reduction associated with the *Pacific Surfliner* and *Coast Daylight* illustrative service plans. For other

intercity passenger rail routes, the HSR Ridership and Revenue Model was used to determine VMT and VHT reductions within each reporting region and air basin. As with the 2020 analysis, the 2025 and 2040 scenarios used the same socioeconomic growth forecasts and commuter rail, rapid transit, light rail, and fixed-route bus service assumptions from the "no action" scenarios.

For each step, a Geographic Information System (GIS) overlay was used to aggregate county-level values within each reporting region and air basin. VMT and VHT totals by reporting region are displayed in Table I.1 for baseline and illustrative service plan assumptions. Each region experiences further reductions in VMT and VHT in successive analysis years. The only exception to this pattern is the Central Coast and Monterey Bay. In this reporting region, VMT and VHT are essentially unchanged in 2025 (as compared to reductions in both 2020 and 2040) due to statewide travel pattern changes that are unique to the 2025 illustrative service assumptions. These patterns are also exhibited in this reporting region's air quality and economic benefit results.

Three categories of emission changes were not accounted in this analysis:

1. Emission reductions from reduced aircraft operations due to air to rail modal shifts.
2. Emission reductions for changes to the State's goods movement system associated with freight rail improvements. It is assumed here that freight rail improvements will make the system more reliable, but not alter the quantity of goods shipped by rail enough to impact emissions.
3. Emissions increases associated with more passenger locomotive miles and emissions decreases associated with cleaner locomotives.

I.2 Results

Emission reduction benefits by six pollutant type are presented in the following tables:

- Table I.2: Carbon Dioxide (CO_2).
- Table I.3: Reactive Organic Gases (ROG).
- Table I.4: Oxides of Nitrogen (NO_x).
- Table I.5: Carbon Monoxide (CO).
- Table I.6: Large Particles ($PM_{10)}$.
- Table I.7: Small Particles ($PM_{2.5}$).

Emission reductions are presented for each of four service groupings:

- The *Pacific Surfliner*, south of Los Angeles.
- The *Coast Daylight* and *Pacific Surfliner*, north of Los Angeles.
- Combined HSR and connecting passenger rail service in northern and southern California.
- The entire illustrative service plan (see Section 10.1.1), including *Pacific Surfliner*, south of Los Angeles; *Pacific Surfliner*, north of Los Angeles; and HSR and connecting services.

For comparison purposes, the statewide on-road mobile source emission inventory from EMFAC2011-SG is also presented in each table. All units are in tons per year, and were annualized using a factor of 365 days per year.

The illustrative service plan is estimated to reduce total vehicle-related emissions for all air pollutants by about 0.02 percent in 2020, 0.3 percent in 2025 and 0.9 percent in 2040. The emission reduction benefits of the plan increase over time as HSR is built and the system connectivity is improved.

Table I.1: Daily VMT and VHT for Future Baseline and Illustrative Service Assumptions

Year	Region	Daily VMT			Daily VHT		
		Baseline	CSRP Illustrative Service Assumptions	Change from Baseline	Baseline	CSRP Illustrative Service Assumptions	Change from Baseline
2020	Sacramento	35,673,000	35,662,000	(11,000)	1,108,900	1,108,600	(300)
	Bay Area	157,642,000	157,610,000	(32,000)	4,637,800	4,637,100	(700)
	San Joaquin Valley	84,787,000	84,708,000	(79,000)	2,398,800	2,397,100	(1,700)
	Central Coast and Monterey Bay	32,834,000	32,808,000	(26,000)	840,000	839,300	(700)
	Greater Los Angeles	462,873,000	462,828,000	(45,000)	18,404,000	18,402,800	(1,200)
	San Diego	138,472,000	138,448,000	(24,000)	5,161,300	5,160,500	(800)
	Rest of California	69,182,000	69,180,000	(2,000)	1,822,900	1,822,900	–
	Statewide Total	981,463,000	981,245,000	(218,000)	34,373,700	34,368,200	(5,500)
2025	Sacramento	36,191,000	36,074,000	(117,000)	1,122,500	1,120,000	(2,500)
	Bay Area	163,567,000	163,474,000	(93,000)	4,808,700	4,802,800	(5,900)
	San Joaquin Valley	86,755,000	85,288,000	(1,467,000)	2,446,100	2,413,300	(32,800)
	Central Coast and Monterey Bay	33,499,000	33,504,000	5,000	856,600	856,100	(500)
	Greater Los Angeles	466,385,000	464,913,000	(1,472,000)	18,529,700	18,494,400	(35,300)
	San Diego	139,970,000	139,896,000	(74,000)	5,215,300	5,211,500	(3,800)
	Rest of California	70,171,000	70,039,000	(132,000)	1,847,100	1,844,400	(2,700)
	Statewide Total	996,538,000	993,187,000	(3,351,000)	34,826,000	34,742,600	(83,400)
2040	Sacramento	41,940,000	41,135,000	(805,000)	1,365,200	1,348,700	(16,500)
	Bay Area	183,015,000	179,833,000	(3,182,000)	5,468,700	5,400,000	(68,700)
	San Joaquin Valley	98,256,000	95,918,000	(2,338,000)	2,890,000	2,836,800	(53,200)
	Central Coast and Monterey Bay	36,528,000	36,135,000	(393,000)	948,000	938,700	(9,300)
	Greater Los Angeles	512,775,000	508,044,000	(4,731,000)	19,016,800	18,913,500	(103,300)
	San Diego	155,828,000	155,451,000	(377,000)	5,893,200	5,883,300	(9,900)
	Rest of California	76,915,000	76,678,000	(237,000)	2,138,500	2,133,500	(5,000)
	Statewide Total	1,105,257,000	1,093,194,000	(12,063,000)	37,720,400	37,454,500	(265,900)

Table I.2: CO_2 Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for Illustrative Service Plan Assumptions (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR and Northern/Southern California Connecting Services	TOTAL Emission Reduction	
2020	Sacramento	–	–	1,681	1,681	7,285,589
	Bay Area	<1	1,188	3,618	4,806	30,941,391
	San Joaquin Valley	8	1,195	14,574	15,776	25,218,416
	Central Coast and Monterey Bay	–	3,541	555	4,095	6,069,057
	Greater Los Angeles	2,811	1,285	3,095	7,191	81,411,927
	San Diego	3,302	294	36	3,632	13,946,906
	Rest of California	–	–	282	282	11,190,978
	Statewide Total	6,121	7,501	23,841	37,463	176,064,264
2025	Sacramento	18	–	16,760	16,778	7,330,885
	Bay Area	33	1,401	12,055	13,489	30,630,893
	San Joaquin Valley	1,147	1,630	278,953	281,730	26,889,497
	Central Coast and Monterey Bay	–	5,049	(5,827)	<1	6,034,012
	Greater Los Angeles	17,087	2,496	208,047	227,630	82,518,458
	San Diego	16,335	248	(5,745)	10,838	14,159,793
	Rest of California	–	–	23,417	23,417	11,518,071
	Statewide Total	34,621	10,823	527,659	573,103	179,081,609
2040	Sacramento	22	–	111,768	111,790	8,274,050
	Bay Area	40	2,419	446,579	449,038	33,194,061
	San Joaquin Valley	1,423	3,084	435,992	440,498	34,122,868
	Central Coast and Monterey Bay	–	7,775	50,113	57,887	6,506,767
	Greater Los Angeles	21,657	3,293	700,692	725,641	94,232,902
	San Diego	20,198	296	32,471	52,965	16,365,102
	Rest of California	–	–	41,217	41,217	13,359,842
	Statewide Total	43,340	16,866	1,818,831	1,879,036	206,055,591

Note: Table values are in tons per year.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table I.3: ROG Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for Illustrative Service Plan Assumptions (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR and Northern/Southern California Connecting Services	TOTAL Emission Reduction	
2020	Sacramento	–	–	1	1	3,704
	Bay Area	<1	1	2	3	19,137
	San Joaquin Valley	<1	1	7	7	11,294
	Central Coast and Monterey Bay	–	2	<1	2	3,227
	Greater Los Angeles	1	1	1	3	39,258
	San Diego	2	<1	<1	2	7,400
	Rest of California	–	–	<1	<1	7,081
	Statewide Total	3	4	12	19	91,101
2025	Sacramento	<1	–	7	7	3,246
	Bay Area	<1	1	7	7	16,693
	San Joaquin Valley	<1	1	107	108	10,271
	Central Coast and Monterey Bay	–	2	(3)	<1	2,722
	Greater Los Angeles	7	1	86	95	34,284
	San Diego	8	<1	(3)	5	6,583
	Rest of California	–	–	12	12	5,971
	Statewide Total	15	5	214	234	79,771
2040	Sacramento	<1	–	41	41	3,058
	Bay Area	<1	1	207	208	15,412
	San Joaquin Valley	<1	1	140	141	10,925
	Central Coast and Monterey Bay	–	3	18	21	2,392
	Greater Los Angeles	7	1	238	247	32,049
	San Diego	8	<1	13	21	6,535
	Rest of California	–	–	16	16	5,274
	Statewide Total	16	6	674	696	75,645

Note: Table values are in tons per year.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table I.4: NO_x Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for Illustrative Service Plan Assumptions (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR and Northern/Southern California Connecting Services	TOTAL Emission Reduction	
2020	Sacramento	–	–	2	2	7,587
	Bay Area	<1	1	4	5	34,780
	San Joaquin Valley	<1	2	21	23	36,349
	Central Coast and Monterey Bay	–	5	1	5	7,916
	Greater Los Angeles	3	1	4	8	93,138
	San Diego	3	<1	<1	4	13,932
	Rest of California	–	–	<1	<1	17,972
	Statewide Total	7	9	32	48	211,674
2025	Sacramento	<1	–	13	13	5,777
	Bay Area	<1	1	10	11	25,959
	San Joaquin Valley	1	2	282	285	27,178
	Central Coast and Monterey Bay	–	5	(6)	<1	5,734
	Greater Los Angeles	15	2	177	194	70,165
	San Diego	12	<1	(4)	8	10,702
	Rest of California	–	–	27	27	13,218
	Statewide Total	28	10	499	537	158,733
2040	Sacramento	<1	–	71	71	5,282
	Bay Area	<1	2	311	312	23,091
	San Joaquin Valley	1	3	388	392	30,365
	Central Coast and Monterey Bay	–	6	37	43	4,868
	Greater Los Angeles	16	2	515	534	69,325
	San Diego	13	<1	20	33	10,258
	Rest of California	–	–	37	37	12,132
	Statewide Total	30	13	1,381	1,423	155,320

Note: Table values are in tons per year.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table I.5: CO Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for Illustrative Service Plan Assumptions (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR and Northern/Southern California Connecting Services	TOTAL Emission Reduction	
2020	Sacramento	–	–	8	8	33,822
	Bay Area	<1	6	18	23	151,288
	San Joaquin Valley	<1	4	54	58	93,269
	Central Coast and Monterey Bay	–	18	3	21	31,621
	Greater Los Angeles	12	5	13	31	347,544
	San Diego	15	1	<1	16	63,086
	Rest of California	–	–	1	1	56,187
	Statewide Total	27	35	97	160	776,816
2025	Sacramento	<1	–	64	64	27,990
	Bay Area	<1	6	48	54	122,815
	San Joaquin Valley	3	5	830	838	80,006
	Central Coast and Monterey Bay	–	21	(24)	<1	24,812
	Greater Los Angeles	60	9	725	794	287,741
	San Diego	61	1	(22)	41	53,308
	Rest of California	–	–	88	88	43,444
	Statewide Total	125	41	1,711	1,876	640,117
2040	Sacramento	<1	–	353	353	26,149
	Bay Area	<1	8	1,478	1,486	109,835
	San Joaquin Valley	4	8	1,082	1,093	84,665
	Central Coast and Monterey Bay	–	25	160	185	20,837
	Greater Los Angeles	62	9	2,019	2,090	271,469
	San Diego	66	1	105	172	53,144
	Rest of California	–	–	118	118	38,331
	Statewide Total	132	51	5,315	5,498	604,430

Note: Table values are in tons per year.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table I.6: PM_{10} Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for Illustrative Service Plan Assumptions (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR and Northern/Southern California Connecting Services	TOTAL Emission Reduction	
2020	Sacramento	–	–	<1	<1	1,096
	Bay Area	<1	<1	1	1	4,700
	San Joaquin Valley	<1	<1	2	2	3,396
	Central Coast and Monterey Bay	–	1	<1	1	889
	Greater Los Angeles	<1	<1	<1	1	11,884
	San Diego	<1	<1	<1	1	2,021
	Rest of California	–	–	<1	<1	1,556
	Statewide Total	1	1	3	5	25,541
2025	Sacramento	<1	–	3	3	1,150
	Bay Area	<1	<1	2	2	4,865
	San Joaquin Valley	<1	<1	38	39	3,691
	Central Coast and Monterey Bay	–	1	(1)	<1	913
	Greater Los Angeles	3	<1	32	34	12,500
	San Diego	2	<1	(1)	2	2,155
	Rest of California	–	–	3	3	1,628
	Statewide Total	5	2	76	83	26,901
2040	Sacramento	<1	–	18	18	1,341
	Bay Area	<1	<1	73	73	5,430
	San Joaquin Valley	<1	<1	61	62	4,778
	Central Coast and Monterey Bay	–	1	8	9	1,013
	Greater Los Angeles	3	1	108	112	14,576
	San Diego	3	<1	5	8	2,586
	Rest of California	–	–	6	6	1,926
	Statewide Total	7	3	279	289	31,650

Note: Table values are in tons per year.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table I.7: $PM_{2.5}$ Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for Illustrative Service Plan Assumptions (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR and Northern/Southern California Connecting Services	TOTAL Emission Reduction	
2020	Sacramento	–	–	<1	<1	496
	Bay Area	<1	<1	<1	<1	2,144
	San Joaquin Valley	<1	<1	1	1	1,661
	Central Coast and Monterey Bay	–	<1	<1	<1	408
	Greater Los Angeles	<1	<1	<1	<1	5,526
	San Diego	<1	<1	<1	<1	914
	Rest of California	–	–	<1	<1	744
	Statewide Total	<1	1	2	3	11,892
2025	Sacramento	<1	–	1	1	517
	Bay Area	<1	<1	1	1	2,211
	San Joaquin Valley	<1	<1	18	19	1,781
	Central Coast and Monterey Bay	–	<1	<1	<1	414
	Greater Los Angeles	1	<1	15	16	5,809
	San Diego	1	<1	<1	1	971
	Rest of California	–	–	2	2	766
	Statewide Total	2	1	36	39	12,470
2040	Sacramento	<1	–	8	8	603
	Bay Area	<1	<1	33	33	2,471
	San Joaquin Valley	<1	<1	29	30	2,304
	Central Coast and Monterey Bay	–	1	4	4	460
	Greater Los Angeles	2	<1	51	52	6,805
	San Diego	1	<1	2	4	1,166
	Rest of California	–	–	3	3	904
	Statewide Total	3	1	130	134	14,712

Note: Table values are in tons per year.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

[This page intentionally blank]

Appendix J

ECONOMIC BENEFITS METHODOLOGY

[This page intentionally blank]

Appendix J. Economic Benefits Methodology

Passenger and freight rail improvements will benefit the State in many measurable ways. For example, travelers who shift from their cars to rail due to enhanced passenger rail service may experience shorter travel times, reduced travel expenses, and/or improved travel quality. Further, as more travelers shift to passenger rail, highway users enjoy the benefits of reduced congestion and shorter travel times. Finally, more passenger rail trips will also translate to reduced accidents and emissions. All of these benefits can be projected using ridership and revenue forecasting results. The methods of projecting benefits are detailed below.

J.1 User Benefits

Benefits are commonly divided into the general categories of "user benefits" and "non-user benefits." User benefits are those accruing to passenger rail riders as they shift from airplanes or personal vehicles to passenger rail. These passengers place a value (a monetizable benefit) on riding comfortable, reliable, and safe trains above and beyond the fares paid. User benefits in this analysis include intercity rail passengers who shift to rail for their trips, plus induced travel (i.e., new trips that would not have taken place otherwise if the rail improvements had not been made). The passenger rail user benefits reflect these advantages and are measured by consumer surplus, which is the difference between how much passengers are willing to pay and the actual train fare paid. User benefits were estimated through a process known as log-sum calculation,[41] which is derived from "values of time" and other mathematical equations in the ridership forecasting models.

Passenger rail user benefits are projected to total $47 million in 2020, $537 million in 2025, and $1.67 billion in 2040.

J.2 Non-User Benefits

Non-user benefits include highway delay reductions, safety improvements, and lower air pollution emissions that result from a less intensive use of motor vehicles on California's roadways. These benefits accrue to highway travelers (for delay reduction and some safety benefits) and all California residents (for other safety benefits and air pollution reduction). Monetized "non-user" benefits in this analysis include the following:

- Accident and fatality reductions resulting in lower costs for property damage, healthcare, lost work, and lost lives.
- Reduced air pollution resulting in lower public health, building and agriculture damage, and ecosystems costs.
- Time savings for highway travelers due to reduced delay.

[41] An explanation of the log-sum process and its application to this analysis is available in *Economic Growth Effects Analysis for the Bay Area to Central Valley Program-Level Environmental Impact Report and Tier 1 Environmental Impact Statement*, Appendix A, California High-Speed Rail Authority, July 2007.

J.2.1 Accident and Air Pollution Reduction Economic Benefits

Expanded passenger rail service will reduce vehicle miles traveled (VMT) and, by extension air pollution and crashes. For this analysis, the VMT reductions detailed in Appendix I were converted to monetary benefits using rates of 14.7 cents per mile for crash reduction[42] and 2.1 cents per mile for air pollution reduction[43] (both are in 2012 dollars). The monetized accident and pollution reduction benefits are shown by region in Tables J.1 and J.2, respectively.

The annual accident reduction benefits are estimated to value $11.7 million in 2020, $179.8 million in 2025, and $647 million in 2040. The magnitude of annual air pollution benefits are estimated to be smaller: $1.7 million in 2020, $25.7 million in 2025, and $92.5 million by 2040.

J.2.2 Highway Delay Benefits

Traffic congestion is a perennial problem in California and it imposes costs on the State's people in the form of lost time. Hours not spent at work, with family or other activities such as exercising or entertainment, translate to economic and social losses for the State. Improved rail service will reduce traffic delays and the resulting lost time by diverting personal vehicle travel to intercity passenger rail.

For this analysis, reductions in vehicle hours traveled (VHT) by trip purpose were forecasted as part of ridership and revenue process discussed in Chapter 10. The VHT changes are detailed in Appendix I. These values were monetized using values of time (in 2012 dollars per hour) for intercity business and nonwork trips of $72.36 and $20.97, respectively.[44] Table J.3 summarizes these results.

The year 2020 delay reduction benefit is forecast at $89.4 million, while the 2025 delay benefit is forecast at $1.96 billion and the 2040 benefit at $4.75 billion. Increases in ridership and the diversion of vehicles from California roadways result in a significant increase in highway delay benefits as high-speed rail (HSR) is implemented.

[42] The crash reduction benefits capture reductions in property damage, injury, and death resulting from fewer motor vehicle accidents. The values associated with injuries include lost income and medical costs. The values associated with fatalities are based on statistical estimates of peoples' willingness to pay for preventing a fatality. Source: Federal Highway Administration, Highway Economic Requirements System.

[43] Air pollution benefits monetize impacts to physical health (mortality and morbidity), building materials, grain crops, timber, and recreation resulting from reductions in "well to wheel" on-road mobile source emissions (includes pollutants emitted by fuel production, refining, vehicle manufacturing, and vehicle operations). The benefit value addresses the six criteria pollutants (particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead), but does not include carbon dioxide or other emissions associated with climate change. Source: National Research Council, Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use, Committee on Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption, 2009.

[44] The values of time were adjusted to 2012 dollars and sourced from, *Information Requested in Section 3.2-Validation and Documentation of the Independent Peer Review of the California High-Speed Rail Ridership and Revenue Forecasting Process, 2005-10, Draft Report for Internal Review*, Cambridge Systematics, February 7, 2011, available on California High-Speed Rail website.

Table J.1: Annual Crash Reduction Benefits for Highway Travelers

Region	2020	2025	2040
Sacramento	$0.6	$6.3	$43.2
Bay Area	$1.7	$5.0	$170.7
San Joaquin Valley	$4.3	$78.7	$125.4
Central Coast and Monterey Bay	$1.4	$(0.3)	$21.1
Greater Los Angeles	$2.4	$79.0	$253.8
San Diego	$1.3	$4.0	$20.3
Rest of California	$0.1	$7.1	$12.7
Statewide Total	$11.7	$179.8	$647.2

Note: Table values are in millions in year 2012 dollars.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table J.2: Annual Air Pollution Reduction Benefits

Region	2020	2025	2040
Sacramento	$0.1	$0.9	$6.2
Bay Area	$0.2	$0.7	$24.4
San Joaquin Valley	$0.6	$11.2	$17.9
Central Coast and Monterey Bay	$0.2	$(0.0)	$3.0
Greater Los Angeles	$0.3	$11.3	$36.3
San Diego	$0.2	$0.6	$2.9
Rest of California	$0.0	$1.0	$1.8
Statewide Total	$1.7	$25.7	$92.5

Note: Table values are in millions in year 2012 dollars.

Sources: AECOM and Cambridge Systematics, Inc., 2013.

Table J.3 Annual Delay Reduction Benefits

Region	2020	2025	2040
Sacramento	$3.3	$58.8	$294.4
Bay Area	$9.4	$138.9	$1,226.8
San Joaquin Valley	$20.6	$771.2	$951.1
Central Coast and Monterey Bay	$10.5	$11.5	$166.1
Greater Los Angeles	$23.6	$829.5	$1,846.3
San Diego	$21.4	$89.2	$176.9
Rest of California	$0.5	$63.3	$89.9
Statewide Total	$89.4	$1,962	$4,752

Note: Table values are in millions in year 2012 dollars.

Sources: AECOM and Cambridge Systematics, Inc. 2013.

J.3 Summary of User and Non-User Benefits

Table J.4 summarizes total benefits associated with the VMT reductions. Annual user and non-user benefits are projected to total $150 million in 2020, $2.7 billion in 2025, and almost $7.2 billion by 2040. The growth in annual benefits over time reflects inclusion of the HSR Initial Operating Section in the 2025 service plan assumptions and the HSR Phase 1 Blended in the 2040 service plan assumptions. The largest benefit category is for personal vehicle operators who continue to use California's roadways.

Table J.5 illustrates that year 2020 benefits are fairly evenly distributed across corridors. By 2025, the benefits increase markedly, and become much more concentrated in corridors served by HSR and connecting passenger rail service in northern and southern California.

While this analysis forecasts major benefit components for California's economy, data and analysis methods were not readily available to capture all potential benefits. Some examples are as follows:

- Increased rail usage may reduce highway maintenance.
- Reduced in-state air travel may lead to fewer in-state flights at California's congested airports. This situation might reduce delays for remaining flights or free up capacity for transcontinental and international flights.
- New highway-rail grade separations might reduce the projected number of train-vehicle crashes, further increasing the benefits shown in Table J-1.
- Improved rail operations might reduce fuel-related costs for freight and passenger rail operators.
- Potential economic development benefits from HSR that are expected to strengthen the competitiveness of California's industries, major metropolitan areas, and intermediate cities by more effectively connecting markets and encouraging business interactions that will further stimulate growth.

Table J.4 Summary of Annual User and Non-User Benefits

Region	Annual Benefits (in millions in 2012 dollars)		
	2020	**2025**	**2040**
User Benefits	$47	$537	$1,666
Non-User Benefits			
Accident Reduction	$12	$179	$647
Pollution Reduction	$2	$26	$92
Highway Delay Reduction	$89	$1,962	$4,752
Statewide Total	$150	$2,704	$7,157

Sources: AECOM and Cambridge Systematics Inc., 2013.

Table J.5 Summary of Annual Total Benefits by Corridor

Region	Annual Benefits (in millions in 2012 dollars)		
	2020	**2025**	**2040**
Pacific Surfliner, South of Los Angeles	$26	$162	$429
Pacific Surfliner, North of Los Angeles	$14	$81	$215
Coast Daylight	$14	$81	$215
HSR and **Northern/Southern California Connecting Services**	$96	$2,380	$6,298
Statewide Total	$150	$2,704	$7,157

Sources: AECOM and Cambridge Systematics Inc., 2013.

[This page intentionally blank]

Appendix K

BEST PRACTICES: SHORT LINE RAIL ASSISTANCE PROGRAMS

[This page intentionally blank]

K.1 Kansas State Rail Serve Improvement Fund

Kansas has the State Rail Service Improvement Fund (SRSIF),[45] which provides $5 million annually in low-interest loans to railroads and port authorities operating within the State in order to help them improve their service.[46] The intent of the program is to assist in the rehabilitation of railroad tracks, bridges, yards, rail shops, buildings, and sidings of short line railroads operating in Kansas. Since the program's inception in 2000, SRSIF has funded between two and nine projects each fiscal year. These projects have contributed to the protection of short line service in communities across the State.

Kansas also operates the Local Rail Freight Assistance (LRFA) Program. This program began in 1991 through the Federal Railroad Administration (FRA) to assist railroads in their rehabilitation efforts. Funds from the Federal LRFA Program are loaned to railroads at a rate below the prime interest rate, and payments on the loan (including principal and interest) are used to generate additional loans. The total number of dollars currently in this program for the State of Kansas is slightly more than $3 million. This loan program allows the railroads to improve and rehabilitate their systems for more profit and safety. Such service contributes to the State's economy, enhances market competitiveness, attracts new industry, and encourages expansion of current business.

K.2 ConnectOregon Program

The *Connect*Oregon[47] program is a lottery-bond-based initiative that generates revenues to invest in air, marine, rail, and transit infrastructure. These investments are intended to improve connections between the highway system and other modes of transportation, to facilitate the flow of commerce, and to reduce delays. In 2005, the Oregon State Legislature authorized $100 million of lottery-backed bonds to fund the program, and the Oregon Transportation Commission approved funding for 39 projects; a number of which are completed or nearing completion. In 2007, the legislature authorized another $100 million of funding in lottery-backed bonds, and the Oregon Transportation Commission approved 30 projects for funding. In 2009, the legislature approved another $100 million in funding and, in 2011, $40 million was authorized. Public- and private-sector entities can apply for grants or loans under the ConnectOregon program, and are required to provide a match of at least 20 percent of the project cost if applying for grants.

Several short line rail projects were recipients of *Connect*Oregon awards in 2010, including a $4.7 million project for the Portland and Western Railroad, a $2.1 million project for the Prineville Railway, and a $2.6 million award for the Albany and Eastern Railroad Company.

K.3 The Wisconsin Freight Rail Infrastructure Improvement Program

The Wisconsin Freight Rail Infrastructure Improvement Program (FRIIP)[48] is one of two freight rail assistance programs Wisconsin Department of Transportation (DOT) administers. Wisconsin's original rail assistance program was created in 1977 to help preserve freight rail service during an era when widespread railroad bankruptcies and line abandonments threatened the availability of rail service in Wisconsin. In 1992, the FRIIP loan program was added to the State's rail assistance program. FRIIP loans enable the State to encourage a broader array of improvements to the rail system, particularly on privately owned lines. It also provides funding for other rail-related projects, such as loading and transloading facilities.

[45] http://www.ksdot.org/burrail/rail/loans/srsif.asp.

[46] http://www.ksdot.org/burRail/rail/loans/srsif.asp.

[47] http://cms.oregon.egov.com/ODOT/TD/TP/Pages/ConnectOR.aspx.

[48] http://www.dot.wisconsin.gov/localgov/aid/friip.htm.

Since 1992, $112 million in FRIIP loans have been awarded to projects that demonstrate that they: 1) help connect an industry to the national railroad system; 2) make improvements to enhance transportation efficiency, safety, and intermodal freight movement; 3) accomplish line rehabilitation; and 4) develop the economy.

K.4 The Wisconsin Freight Rail Preservation Program

Wisconsin DOT administers the Freight Rail Preservation Program (FRPP).[49] In 1992, this program replaced the original rail assistance grant program, providing grants to local units of government, industries, and railroads for the purpose of preserving essential rail lines and rehabilitating them following purchase.

Since 1980, under both the original rail assistance program and FRPP, $155 million in grants have been awarded for rail acquisition and rehabilitation projects. The FRPP provides grants up to 80 percent of the cost in order to: 1) purchase abandoned rail lines in an effort to continue freight service, or for the preservation of the opportunity for future service; and 2) to rehabilitate facilities, such as tracks or bridges, on publicly owned rail lines. The 2011 to 2013 DOT budget provides bonding authority for $30 million.

K.5 Iowa's Railroad Revolving Loan and Grant Program

Iowa's Railroad Revolving Loan and Grant program[50] provides assistance in different ways to projects that demonstrate benefits. For example, for targeted job creation projects (those that provide immediate, direct job opportunities, the program can provide assistance as either loans or grants, but grant funding is limited to 50 percent (with a 50 percent local match), and loans require a 20 percent matching contribution. Projects that will provide demonstrated rail network improvements, on the other hand, are only eligible for loans offered at 0 percent interest, provided that there is a 20 percent local matching contribution. For Fiscal Year (FY) 2013, the program has a minimum of $2 million available for projects and, for the first time, will offer a minimum $200,000 for rail port planning and development studies.

The program is administered by the Iowa Rail Finance Authority (IRFA) Board with staff assistance from the Iowa DOT. The program is funded by appropriations and the repayments from previous Iowa DOT and IRFA loans.

Industries, railroads, local governments, or economic development agencies may apply for financial assistance for projects that build rail spurs to new or expanding development, build or rebuild sidings to accommodate growth, purchase or rehabilitate existing rail infrastructure, rehabilitate existing rail lines to increase capacity, or other targeted job creation of rail network improvement projects.

K.6 The Indiana Industrial Rail Service Fund

The Indiana Industrial Rail Service Fund (IRSF)[51] assists in the rehabilitation of railroad infrastructure or railroad construction of Class II and Class III railroads. These grants help maintain and increase existing business shipping levels on the rail lines, and also assist with the funding needed improvements related to maintaining rail service in Indiana. Eligible applicants are limited to Class II and Class III railroads and port authorities. Grants through the IRSF program can be used for the rehabilitation of railroad infrastructure or railroad construction. Examples of projects include bridge deck repair, new ties and ballast, and track upgrades. Railroads are limited to a grant award that does not exceed 75 percent of the total cost of the project. Grants totaled $1.5 million in FY 2011.

[49] http://www.dot.wisconsin.gov/localgov/aid/frpp.htm.

[50] http://www.iowadot.gov/iowarail/assistance/rrlgp.htm.

[51] http://www.in.gov/indot/files/Rail_IRSFApplication_111012.pdf.

[This page intentionally blank]

PREPARED FOR:
California Department of Transportation
1120 N Street
P.O. Box 942874
Sacramento, CA 95814

PREPARED BY:
AECOM
2101 Webster Street #1900
Oakland, CA 94612
with Cambridge Systematics
& Arellano Associates