

Figure 3-6

2020 Project AM & PM Peak Hour Intersection LOS, Zone 1

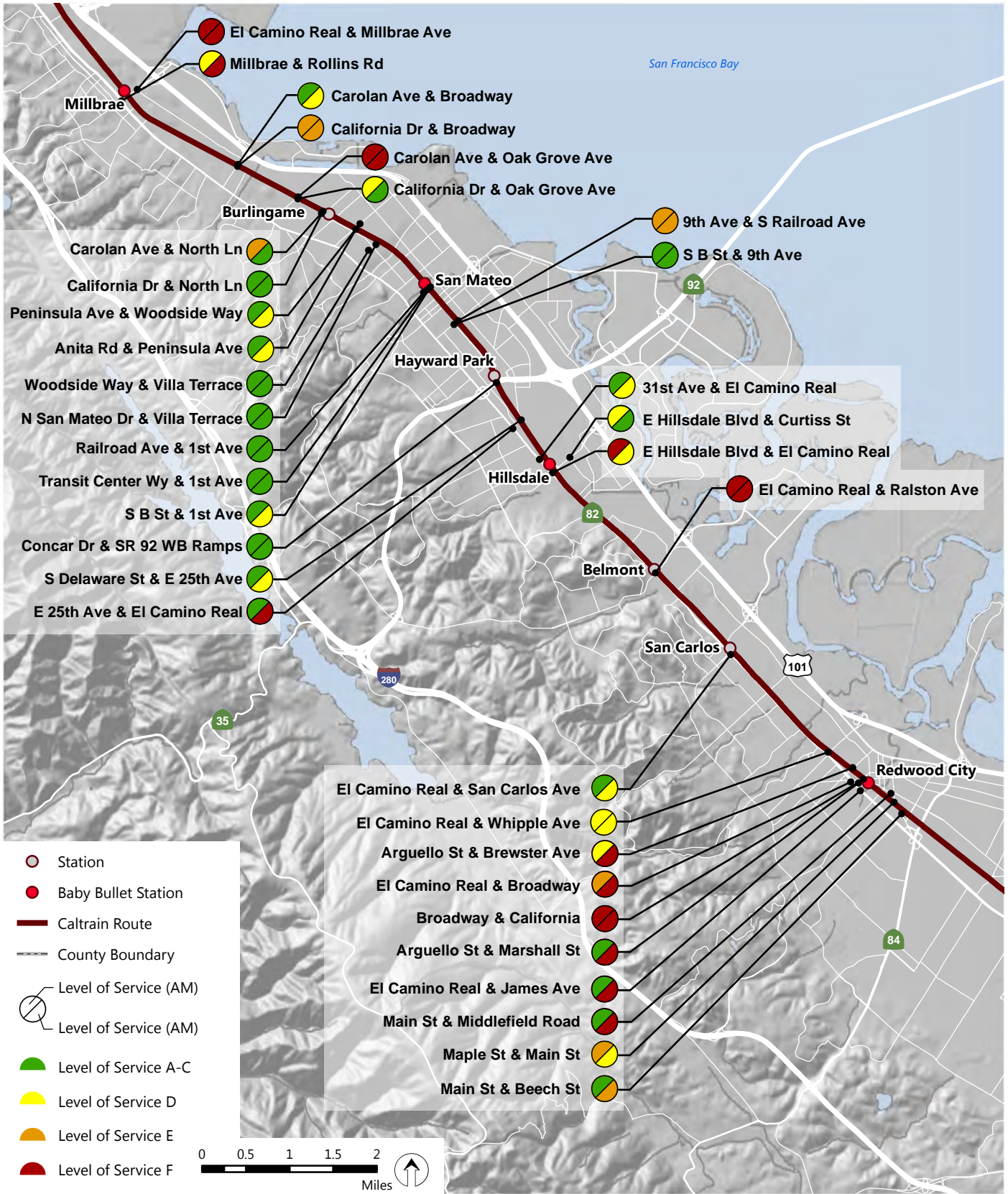


Figure 3-7

2020 Project AM & PM Peak Hour Intersection LOS, Zone 2

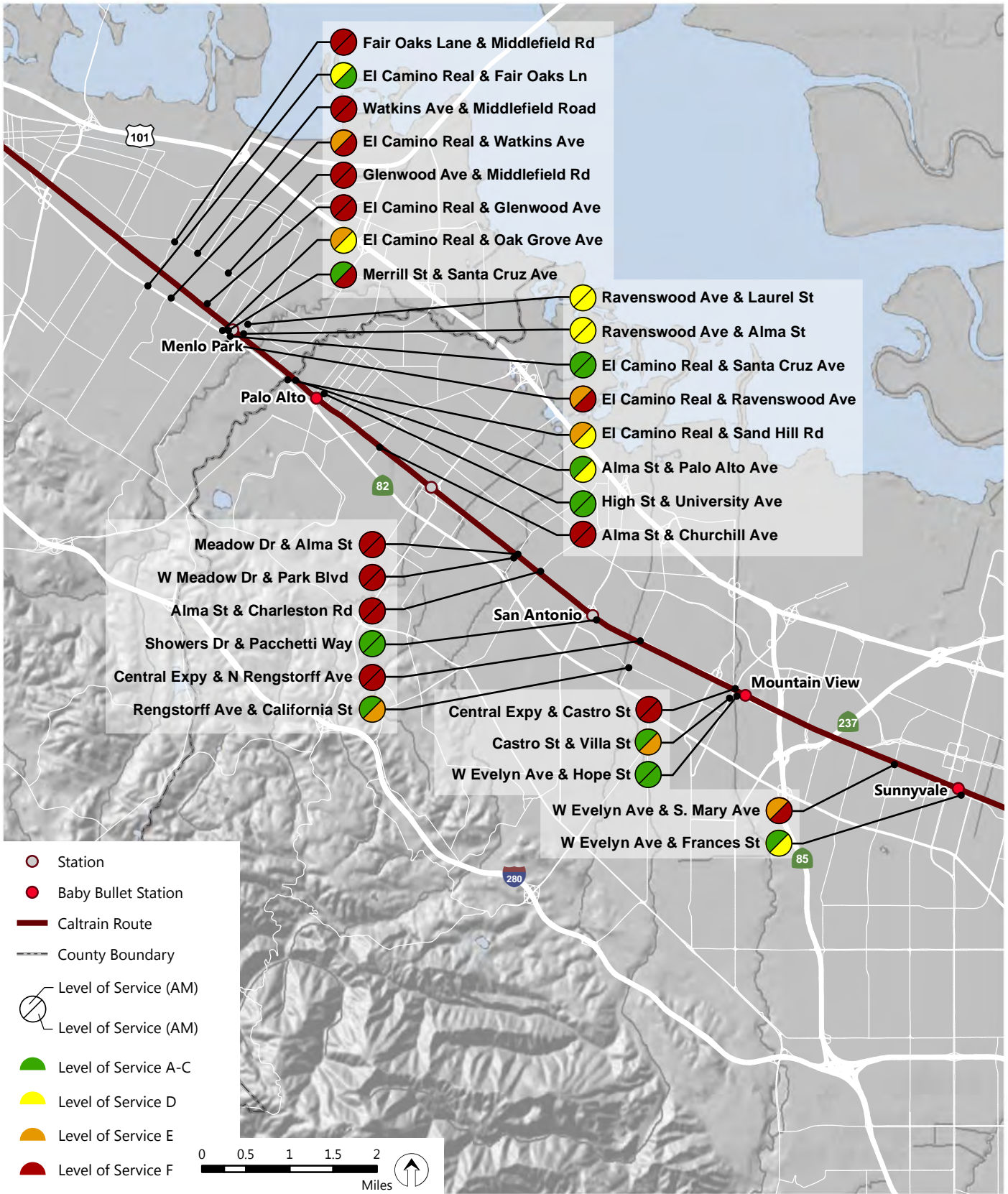


Figure 3-8

2020 Project AM & PM Peak Hour Intersection LOS, Zone 3

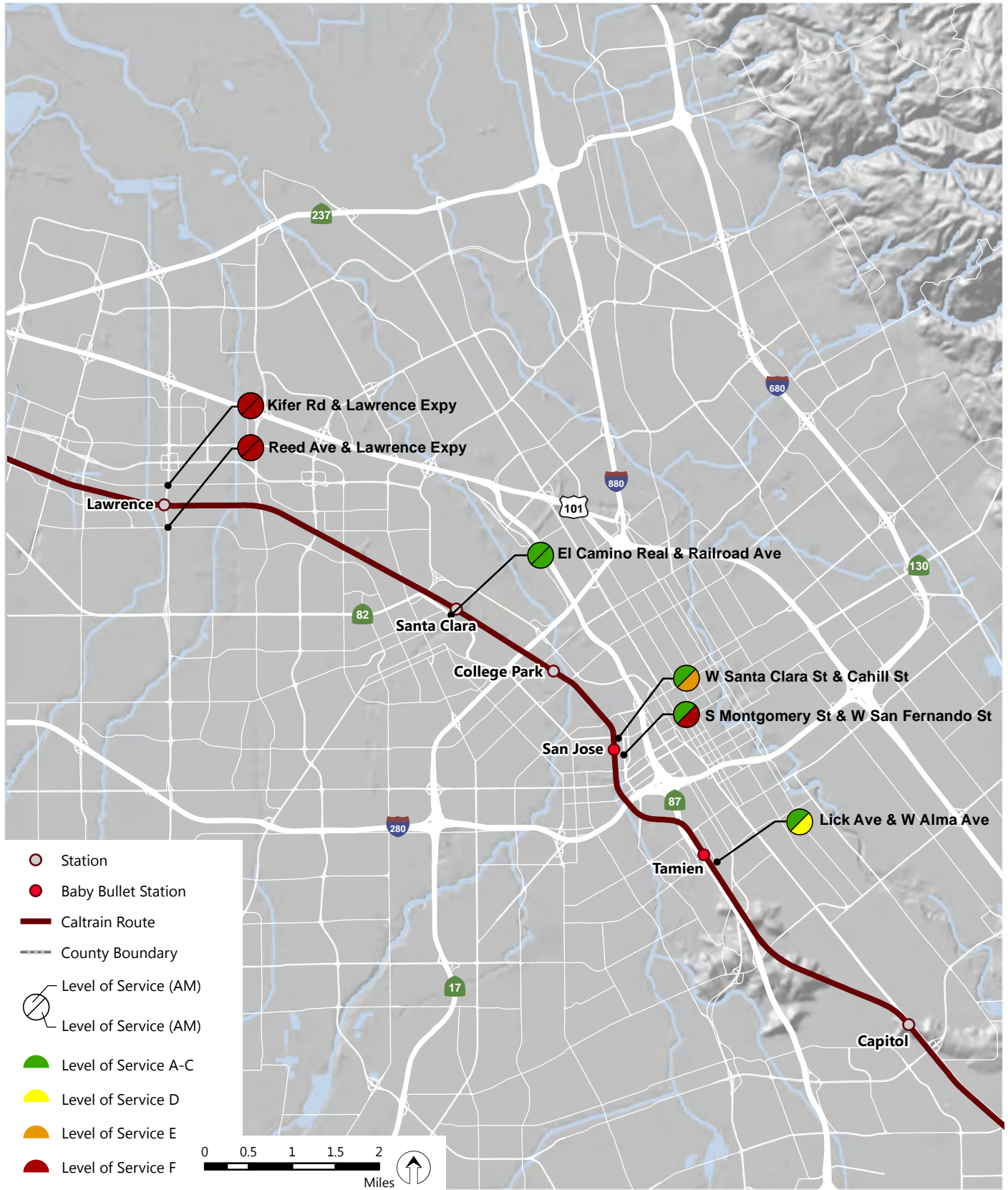


Figure 3-9

2020 Project AM & PM Peak Hour Intersection LOS, Zone 4

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 Date: January, 2014



3.6.5.2 2040 Intersection Volumes and Level of Service Analysis

This section presents the results of the intersection level of service analysis for the 2040 No Project and 2040 Project scenarios. Table 3-24 displays the 2040 No Project scenario and the 2040 Project scenario levels of service and calculated delay during the morning and evening peak at all study intersections.

3.6.5.2.1 2040 No Project Scenario

Figure 3-10 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 1. Figure 3-11 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 2. Figure 3-12 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 3. Figure 3-13 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 4.

- In Zone 1, which includes San Francisco County and a portion of San Mateo County, the majority of study intersections would operate at LOS C or better. However, some intersections would operate below LOS C. Both 4th Street and King Street and 4th and Townsend are points of severe congestion (LOS E or F) and would operate at LOS E in the AM and F during AM and PM peak hours. The intersection of 7th Street and 16th Street would operate at LOS F in the AM peak and PM peaks. The intersection of Tunnel Avenue and Blanken Avenue in South San Francisco would operate at LOS F in peak hours.
- In Zone 2, which includes northern and central San Mateo County, points of severe congestion (LOS E and LOS F) would occur at major intersections, including El Camino Real, Alma Street, Carolan Avenue, and Middlefield Road. The intersection of Carolan Avenue and Oak Grove Avenue would operate at LOS F in both the AM and PM peak hours.
- In Zone 3, which includes parts of San Mateo and Santa Clara Counties, congestion would be clustered along El Camino Real, Broadway, Alma Street, and Middlefield Road in addition to Central Expressway. Overall, points of severe congestion would mostly be clustered in the cities of Atherton, Palo Alto and Mountain View.
- In Zone 4, which includes central Santa Clara County, about half of the intersections would operate at LOS C or better. Points of severe congestion occur in the City of Santa Clara at the intersections of Kifer Road and Lawrence Expressway and Reed Avenue and Lawrence Expressway. Both of these intersections would operate at LOS F in the AM and PM peak hours.

3.6.5.2.2 2040 Project Scenario

Figure 3-10 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 1. Figure 3-11 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 2. Figure 3-12 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 3. Figure 3-13 illustrates the geographic location of each study intersection and the associated AM and PM peak hour LOS in Zone 4.

- In Zone 4, which includes San Francisco County and a portion of San Mateo County, about half of the study intersections would operate at LOS C or better. However, points of severe congestion



exist at 4th Street and King Street, 4th and Townsend Street, and Tunnel Avenue and Blanken Avenue. All of these intersections would operate at LOS F in the AM and F in the PM. In the AM peaks, the intersection of Linden Avenue and Herman Street would operate at LOS F. 16th Street and Owens Street in San Francisco would operate at LOS E in the AM peak. S Linden Avenue and San Mateo Avenue in South San Francisco and Scott Street and Herman Street in San Bruno would operate at LOS E in the PM peak hour.

- In Zone 3, which includes northern and central San Mateo County, points of severe congestion, generally in the AM and PM peak hours, would be clustered in Millbrae, Burlingame and near the Redwood City Station.
- In Zone 2, which includes parts of San Mateo and Santa Clara Counties, congestion would occur along El Camino Real, Alma Street, Middlefield Road, and Central Expressway. Overall, points of severe congestion would mostly be clustered in the cities of Atherton, Menlo Park, and some parts of Palo Alto.
- In Zone 4, which includes central Santa Clara County, points of severe congestion would occur at the intersections of Kifer Road and Lawrence Expressway and Reed Avenue and Lawrence Expressway. Both of these intersections would operate at LOS F in the AM and PM peak hours. West Santa Clara Street and Cahill Street, near the San Jose Diridon Station, would operate at LOS F in the AM peaks. South Montgomery Street and West San Fernando Street would operate at LOS F in the PM peak hour. Near the Tamien Station the intersection of Lick and West Alma Street would operate at LOS E in both the AM and PM peak hours.

Similar to what would occur under the 2020 Project scenario, traffic congestion under the 2040 Project scenario would worsen at some intersections along the corridor and around stations, other locations would have improved traffic operations due to the project. Several major travel corridors parallel to the Caltrain line would experience reduced travel volumes due to the project, including El Camino Real, US-101 and I-280. Countywide vehicle miles travelled that would be reduced due to the project in 2040. While some intersections would experience increased congestion, regional congestion and vehicle travel would decrease.

Potential mitigation measures for impacted intersections under 2040 scenarios are discussed in the following section.



**TABLE 3-24
INTERSECTION DELAY AND LEVELS OF SERVICE, 2040 NO PROJECT AND PROJECT SCENARIOS**

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	2040 No Project		2040 Project		Change in Delay
					Delay	LOS	Delay	LOS	
ZONE 1									
1	4th Street and King Street	SF	AM PM	Signal	>120 >120	F F	<u>>120</u> >120	F F	<u>36.7</u> <u>-10.3</u>
2	4th Street and Townsend Street	SF	AM PM	Signal	>120 >120	F F	>120 >120	F F	-20.3 -0.3
3	Mission Bay Drive and 7th Street	SF	AM PM	Signal	12.5 16.2	B B	16.6 17.0	B B	4.1 0.8
4	Mission Bay Drive and Berry Street	SF	AM PM	Signal	3.7 8.8	A A	2.1 8.6	A A	-1.6 -0.2
5	7th Street and 16th Street	SF	AM PM	Signal	>120 119.9	F F	<u>>120</u> <u>>120</u>	F F	<u>14.2</u> <u>14.4</u>
6	16th Street and Owens Street	SF	AM PM	Signal	11.3 40.2	B D	10.6 55.8	B E	-0.7 <u>15.6</u>
7	22nd Street and Pennsylvania Street	SF	AM PM	All-way Stop	13.5 9.6	B A	14.2 11.2	B B	0.7 1.6
8	22nd Street and Indiana Street	SF	AM PM	All-way Stop	7.4 6.4	A A	7.1 6.4	A A	-0.3 0.0
9	Tunnel Avenue and Blanken Avenue	SF	AM PM	All-way Stop	>120 >120	F F	<u>>120</u> <u>>120</u>	F F	<u>>60.0</u> <u>>60.0</u>
10	Linden Avenue and Dollar Avenue	SSF	AM PM	Signal	81.8 41.6	F D	<u>>120</u> 46.1	F D	<u>>60.0</u> 4.5
11	East Grand Avenue and Dubuque Way	SSF	AM PM	Signal	12.4 13.8	B B	13.2 15.1	B B	0.8 1.3
12	S Linden Avenue and San Mateo Avenue	SSF	AM PM	Signal	27.9 10.6	C B	<u>74.9</u> 13.4	E B	<u>47.0</u> 2.8
13	Scott Street and Herman Street	SB	AM PM	Side-Street Stop	26.3 18.2	D C	45.9 18.4	E C	19.6 0.2
14	Scott Street and Montgomery Avenue	SB	AM PM	Side-Street Stop	7.2 7.1	A A	8.8 6.8	A A	1.6 -0.3
15	San Mateo Avenue and San Bruno Avenue	SB	AM PM	Signal	33.3 24.6	C C	40.7 32.5	D C	7.4 7.9
ZONE 2									
16	El Camino Real and Millbrae Avenue	MB	AM PM	Signal	112.0 68.5	F E	<u>>120</u> <u>84.7</u>	F F	<u>11.1</u> <u>16.2</u>
17	Millbrae Avenue and Rollins Road	MB	AM PM	Signal	74.9 110.2	E F	<u>84.4</u> <u>>120</u>	F F	<u>9.5</u> <u>29.3</u>
18	California Drive and Broadway	BG	AM PM	Signal	89.0 60.8	F E	71.9 63.0	E E	-17.1 2.2



**TABLE 3-24
INTERSECTION DELAY AND LEVELS OF SERVICE, 2040 NO PROJECT AND PROJECT SCENARIOS**

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	2040 No Project		2040 Project		Change in Delay
					Delay	LOS	Delay	LOS	
19	Carolan Avenue and Broadway	BG	AM PM	Signal	72.9	E	<u>90.8</u>	F	<u>17.9</u>
					67.2	E	60.0	E	-7.2
20	California Drive and Oak Grove Avenue	BG	AM PM	Signal	> 120	F	91.2	F	-34.1
					76.9	E	<u>99.1</u>	F	<u>22.2</u>
21	Carolan Avenue and Oak Grove Avenue	BG	AM PM	Side-Street Stop	> 120	F	<u>>120</u>	F	<u>>60.0</u>
					> 120	F	<u>>120</u>	F	<u>>60.0</u>
22	California Drive and North Lane	BG	AM PM	Side-Street Stop	28.4	D	20.4	C	-8.0
					18.4	C	21.4	C	3.0
23	Carolan Avenue and North Lane ¹⁶	BG	AM PM	Side-Street Stop	> 120	F	> 120	F	>-60.0
					43.7	E	69.4	F	25.7
24	Anita Road and Peninsula Avenue	BG	AM PM	Side-Street Stop	29.1	D	31.9	D	28
					67.6	F	36.1	E	-31.5
25	Woodside Way and Villa Terrace	SM	AM PM	Side-Street Stop	5.1	A	5.0	A	-0.1
					5.5	A	5.3	A	-0.2
26	North San Mateo Drive and Villa Terrace	SM	AM PM	Side-Street Stop	12.2	B	11.8	B	-0.4
					17.2	C	10.2	B	-7.0
27	Railroad Avenue and 1st Avenue	SM	AM PM	Side-Street Stop	> 120	F	15.0	B	>-60.0
					> 120	F	<u>>120</u>	F	>-60.0
28	S B Street and 1st Avenue	SM	AM PM	Signal	48.4	D	20.7	C	-27.7
					66.9	F	<u>>120</u>	F	<u>193.2</u>
29	9th Avenue and S Railroad Avenue	SM	AM PM	Side-Street Stop	> 120	F	<u>>120</u>	F	<u>>60.0</u>
					> 120	F	91.6	F	-37.7
30	S B Street and 9th Avenue	SM	AM PM	Signal	34.3	C	<u>67.7</u>	E	<u>33.4</u>
					51.5	D	<u>69.3</u>	E	<u>17.8</u>
31	Transit Center Way and 1st Avenue	SM	AM PM	Uncontrolled	49.0	E	9.2	A	-39.8
					88.2	F	69.3	F	-18.9
32	Concar Drive and SR 92 Westbound Ramps	SM	AM PM	Signal	20.8	C	35.3	D	14.5
					13.4	B	12.3	B	-1.1

¹⁶ Intersection 23 does not meet signal warrants for the PM peak hour and is therefore not a significant impact under 2040 Project conditions.



**TABLE 3-24
INTERSECTION DELAY AND LEVELS OF SERVICE, 2040 NO PROJECT AND PROJECT SCENARIOS**

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	2040 No Project		2040 Project		Change in Delay
					Delay	LOS	Delay	LOS	
33	S Delaware Street and E 25th Avenue	SM	AM PM	Signal	55.7	E	25.6	C	-30.1
					> 120	F	> 120	F	-5.3
34	E 25th Avenue and El Camino Real	SM	AM PM	Signal	84.4	F	63.4	E	-21.0
					> 120	F	> 120	F	-0.3
35	31st Avenue and El Camino Real	SM	AM PM	Signal	77.7	E	32.6	C	-45.1
					117.7	F	> 120	F	19.0
36	E Hillsdale Boulevard and El Camino Real	SM	AM PM	Signal	> 120	F	45.6	D	>-60.0
					92.0	F	> 120	F	> 60.0
37	E Hillsdale Blvd. and Curtiss Street	SM	AM PM	Signal	55.6	E	22.5	C	-33.1
					66.7	E	> 120	F	48.5
38	Peninsula Avenue and Arundel Road and Woodside Way	SM	AM PM	Side-Street Stop	22.0	C	24.3	C	2.3
					47.4	E	30.2	D	-17.2
39	El Camino Real and Ralston Avenue	BL	AM PM	Signal	> 120	F	> 120	F	41.4
					> 120	F	> 120	F	0.2
40	El Camino Real and San Carlos Avenue	SC	AM PM	Signal	20.0	B	24.5	C	4.5
					46.1	D	46.9	D	0.8
41	Maple Street and Main Street+	RC	AM PM	Side-Street Stop	42.7	E	22.2	C	-20.5
					>120	F	>120	F	>60.0
42	Main Street and Beech Street	RC	AM PM	Side-Street Stop	19.7	C	15.0	B	4.7
					> 120	F	> 120	F	>-60.0
43	Main Street and Middlefield Road+	RC	AM PM	Signal	30.3	C	>120	F	>60.0
					>120	F	>120	F	-1.6
44	Broadway Street and California Street+	RC	AM PM	Side-Street Stop	>120	F	>120	F	>-60.0
					>120	F	>120	F	>-60.0
45	El Camino Real and Whipple Avenue	RC	AM PM	Signal	71.7	E	109.2	F	37.5
					85.0	F	88.3	F	3.3
46	Arguello Street and Brewster Avenue+	RC	AM PM	Signal	>120	F	83.4	F	>-60.0
					115.9	F	112.1	F	-3.8
47	El Camino Real and Broadway Street+	RC	AM PM	Signal	>120	F	>120	F	-41
					>120	F	>120	F	1.3
48	Arguello Street and Marshall Street+	RC	AM PM	Signal	>120	F	>120	F	>-60.0
					>120	F	>120	F	14.1



**TABLE 3-24
INTERSECTION DELAY AND LEVELS OF SERVICE, 2040 NO PROJECT AND PROJECT SCENARIOS**

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	2040 No Project		2040 Project		Change in Delay
					Delay	LOS	Delay	LOS	
49	El Camino Real and James Avenue+	RC	AM PM	Signal	>120	F	>120	F	-22.8
					>120	F	>120	F	4.6
ZONE 3									
50	El Camino Real and Fair Oaks Lane	AT	AM PM	Signal	>120 104.2	F F	≥120 103.5	F F	46.1 -0.7
51	El Camino Real and Watkins Avenue	AT	AM PM	Side-street stop	>120 >120	F F	>120 >120	F F	>-60.0 >-60.0
52	Fair Oaks Lane and Middlefield Road	AT	AM PM	Side-Street Stop	>120 >120	F F	≥120 >120	F F	≥60.0 >-60.0
53	Watkins Avenue and Middlefield Road	AT	AM PM	Side-Street Stop	75.4 >120	F F	≥120 >120	F F	≥60.0 >-60.0
54	Glenwood Avenue and Middlefield Road	AT	AM PM	Side-Street Stop	>120 >120	F F	>120 >120	F F	>-60.0 >-60.0
55	El Camino Real and Glenwood Avenue	MP	AM PM	Signal	93.9 >120	F F	≥120 >120	F F	≥60.0 >-60
56	El Camino Real and Oak Grove Avenue	MP	AM PM	Signal	81.3 94.6	F F	96.9 84.0	F F	15.6 -10.6
57	El Camino Real and Santa Cruz Avenue	MP	AM PM	Signal	46.9 78.4	D E	37.7 ≥120	D F	-9.2 ≥60.0
58	Merrill St and Santa Cruz Avenue	MP	AM PM	All-way Stop	14.5 >120	B F	9.8 ≥120	A F	-4.7 45.9
59	Ravenswood Avenue and Alma Street	MP	AM PM	Side-Street Stop	75.8 >120	F F	66.4 >120	F F	-9.4 >-60
60	El Camino Real and Ravenswood Avenue	MP	AM PM	Signal	>120 >120	F F	99.1 >120	F F	-21.0 -4.9
61	Ravenswood Avenue and Laurel Street	MP	AM PM	Signal	89.2 >120	F F	83.4 >120	F F	-5.8 >-60.0
62	Alma Street and Palo Alto Avenue	PA	AM PM	Side-Street Stop	39.5 24.3	E C	21.9 28.5	C D	-17.6 4.2
63	Meadow Drive and Alma Street	PA	AM PM	Signal	>120 >120	F F	≥120 ≥120	F F	43.3 8.5



**TABLE 3-24
INTERSECTION DELAY AND LEVELS OF SERVICE, 2040 NO PROJECT AND PROJECT SCENARIOS**

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	2040 No Project		2040 Project		Change in Delay
					Delay	LOS	Delay	LOS	
64	El Camino Real and Alma and Sand Hill Road	PA	AM PM	Signal	62.1	E	85.8	F	23.7
					>119.2	F	>120	F	28.0
65	High Street and University Avenue	PA	AM PM	Signal	10.1	B	13.6	B	3.5
					24.5	C	24.5	C	0
66	Alma Street and Churchill Avenue	PA	AM PM	Signal	>120	F	>120	F	10.5
					>120	F	>120	F	-0.7
67	W Meadow Drive and Park Boulevard ¹⁷	PA	AM PM	Side-Street Stop	>120	F	>120	F	>60
					>120	F	>120	F	22.6
68	Alma Street and Charleston Road	PA	AM PM	Signal	>120	F	>120	F	>60
					>120	F	>120	F	-30.4
69	Showers Drive and Pacchetti Way	MV	AM PM	Signal	5.2	A	5.2	A	0.0
					4.9	A	6.4	A	1.5
70	Central Expressway and N Rengstorff Avenue	MV	AM PM	Signal	>120	F	>120	F	11.1
					>120	F	>120	F	2.8
71	Central Expressway and Moffett Boulevard and Castro Street	MV	AM PM	Signal	>120	F	>120	F	7.7
					>120	F	>120	F	>60
72	W Evelyn Avenue and Hope Street	MV	AM PM	Signal	2.8	A	2.6	A	-0.2
					4.7	A	4.9	A	0.2
73	Rengstorff Avenue and California Street	MV	AM PM	Signal	>120	F	>120	F	28.3
					>120	F	>120	F	>60
74	Castro Street and Villa Street	MV	AM PM	Signal	41.6	D	71.4	E	29.8
					112.5	F	116.8	F	4.3
75	W Evelyn Avenue and S Mary Avenue	SV	AM PM	Signal	92.1	F	110.2	F	18.8
					88.8	F	96.8	F	8.0
76	W Evelyn Avenue and Frances Street	SV	AM PM	Signal	47.5	D	287.9	F	>60.0
					51.7	D	98.1	F	46.4
ZONE 4									
77	Kifer Road and Lawrence Expressway*	SCL/ SV	AM PM	Signal	>120	F	>120	F	55.4
					>120	F	>120	F	-47.4
78	Reed Avenue and Lawrence Expressway	SCL/ SV	AM PM	Signal	>120	F	>120	F	9.1
					>120	F	>120	F	>-60

¹⁷ Intersection 67 does not meet signal warrants for the PM peak hour and is therefore not a significant impact under 2040 Project conditions.



**TABLE 3-24
INTERSECTION DELAY AND LEVELS OF SERVICE, 2040 NO PROJECT AND PROJECT SCENARIOS**

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	2040 No Project		2040 Project		Change in Delay
					Delay	LOS	Delay	LOS	
79	El Camino Real and Railroad Avenue*	SCL	AM	Signal	20.4	C	<u>69.5</u>	<u>E</u>	<u>49.1</u>
			PM		35.5	D	39.2	D	3.7
80	W Santa Clara Street and Cahill Street	SJ	AM	Signal	89.4	F	84.5	F	-4.9
			PM		92.2	F	54.7	D	-37.5
81	S Montgomery Street and W San Fernando Street	SJ	AM	Signal	31.3	C	51.6	D	20.3
			PM		>120	F	86.3	F	>-60
82	Lick Avenue and W Alma Avenue	SJ	AM	Signal	24.6	C	<u>62.1</u>	<u>E</u>	<u>37.5</u>
			PM		65.5	E	63.0	E	-2.5

Notes:

Jurisdictions:

SF	San Francisco	SM	San Mateo	MV	Mountain View
SSF	South San Francisco	BL	Belmont	SV	Sunnyvale
SB	San Bruno	SC	San Carlos	SCL	Santa Clara
MB	Millbrae	RC	Redwood City	SCC	Santa Clara County
BG	Burlingame	AT	Atherton	SJ	San Jose
MP	Menlo Park	PA	Palo Alto		

Bold font represents an LOS that is below the established threshold of significance as per the Significance Criteria

Bold Underline font represents an LOS that is below the established threshold of significance as per the Significance Criteria compared to the No Project scenario

+Downtown Redwood City has no level of service standard for intersections in the Downtown Precise Plan Area (Policy BE-29.4).
*The City of Santa Clara allows level of service exemptions on a case by case basis to facilitate alternate transportation in Station Focus Areas. If exemption is allowed, this intersection may not be impacted.

AM = morning peak hour, PM = afternoon peak hour

LOS designation as per 2010 Highway Capacity Manual

Delay measured in seconds



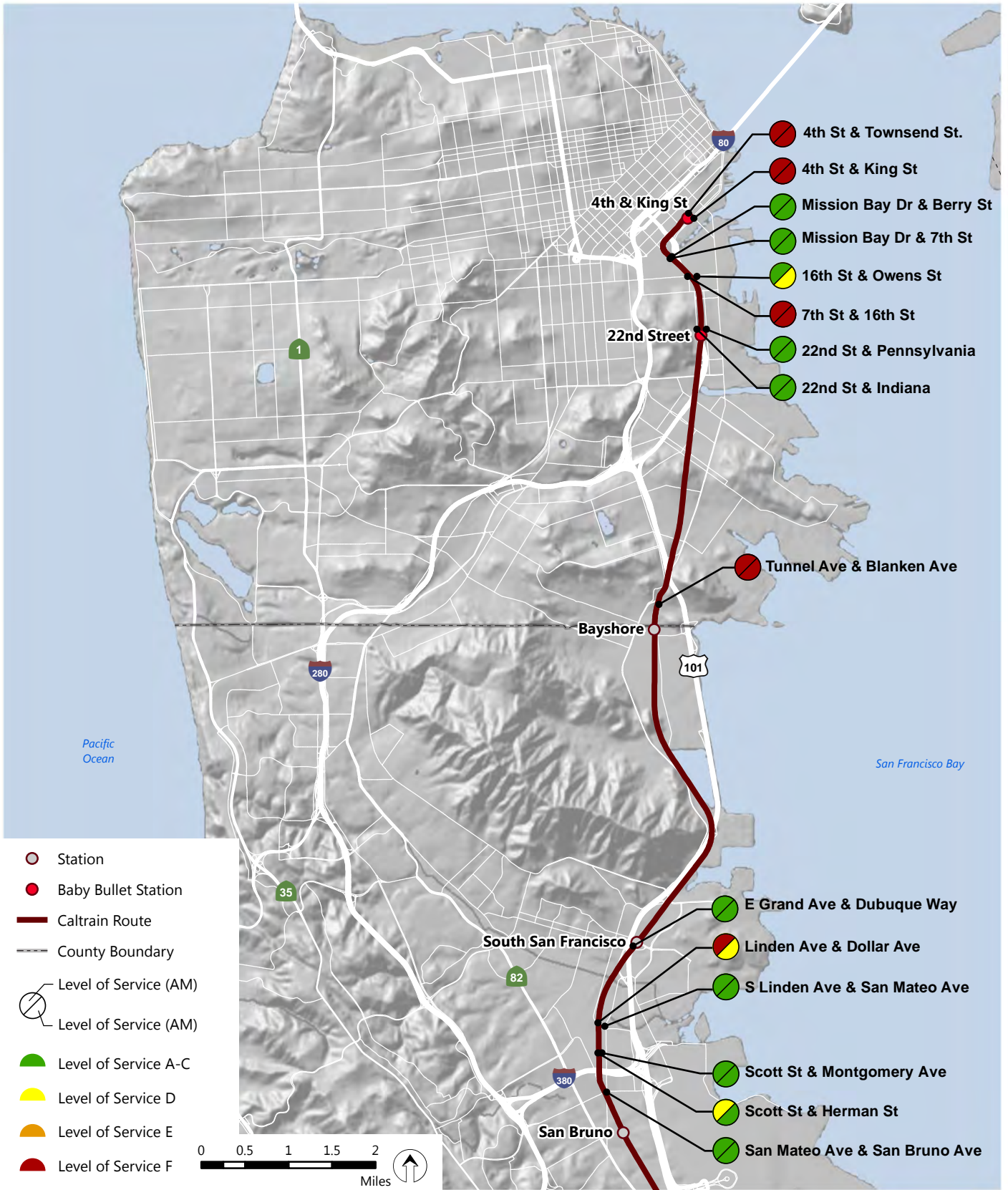


Figure 3-10

2040 No Project AM & PM Peak Hour Intersection LOS, Zone 1

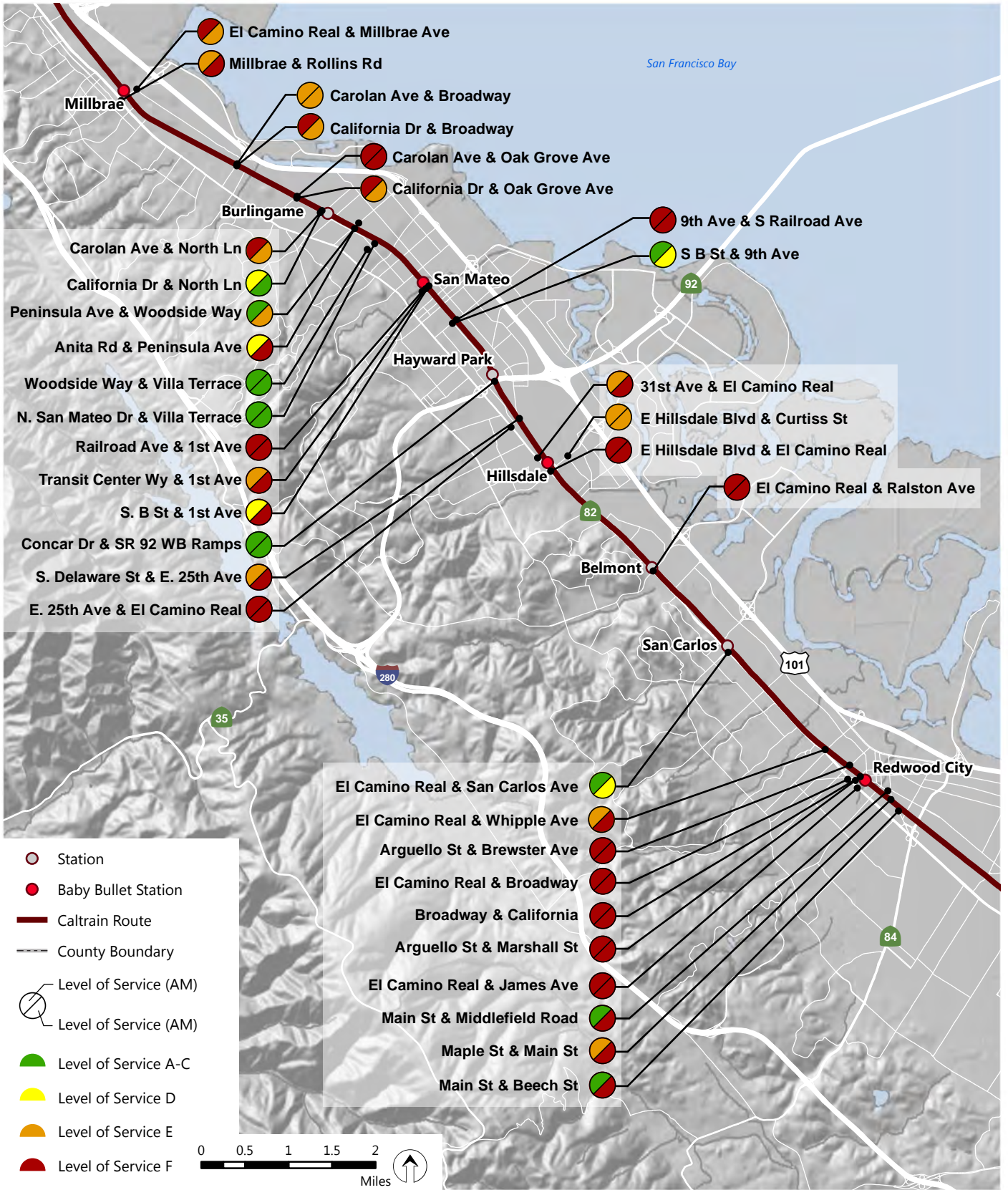


Figure 3-11

2040 No Project AM & PM Peak Hour Intersection LOS, Zone 2

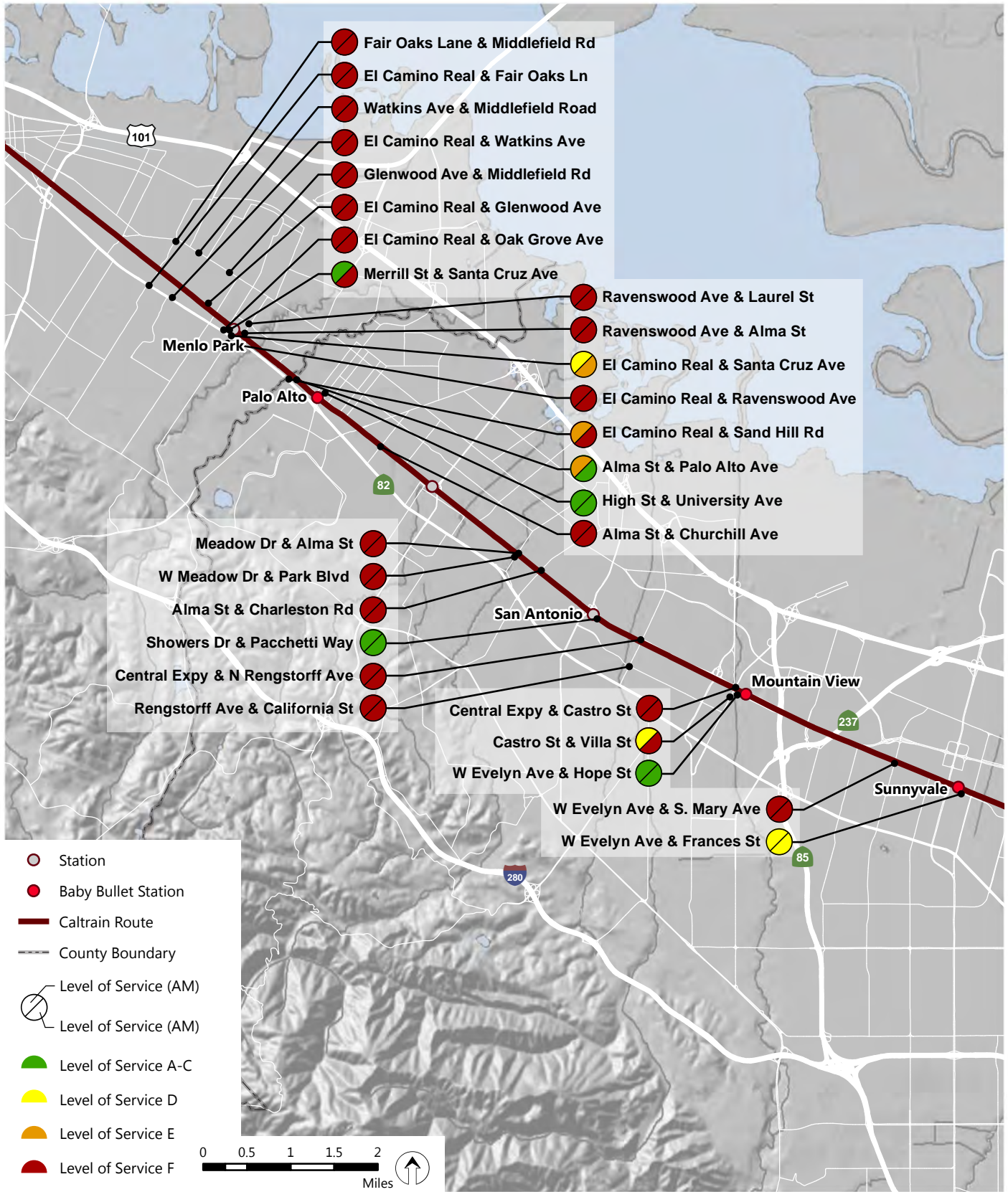


Figure 3-12

2040 No Project AM & PM Peak Hour Intersection LOS, Zone 3

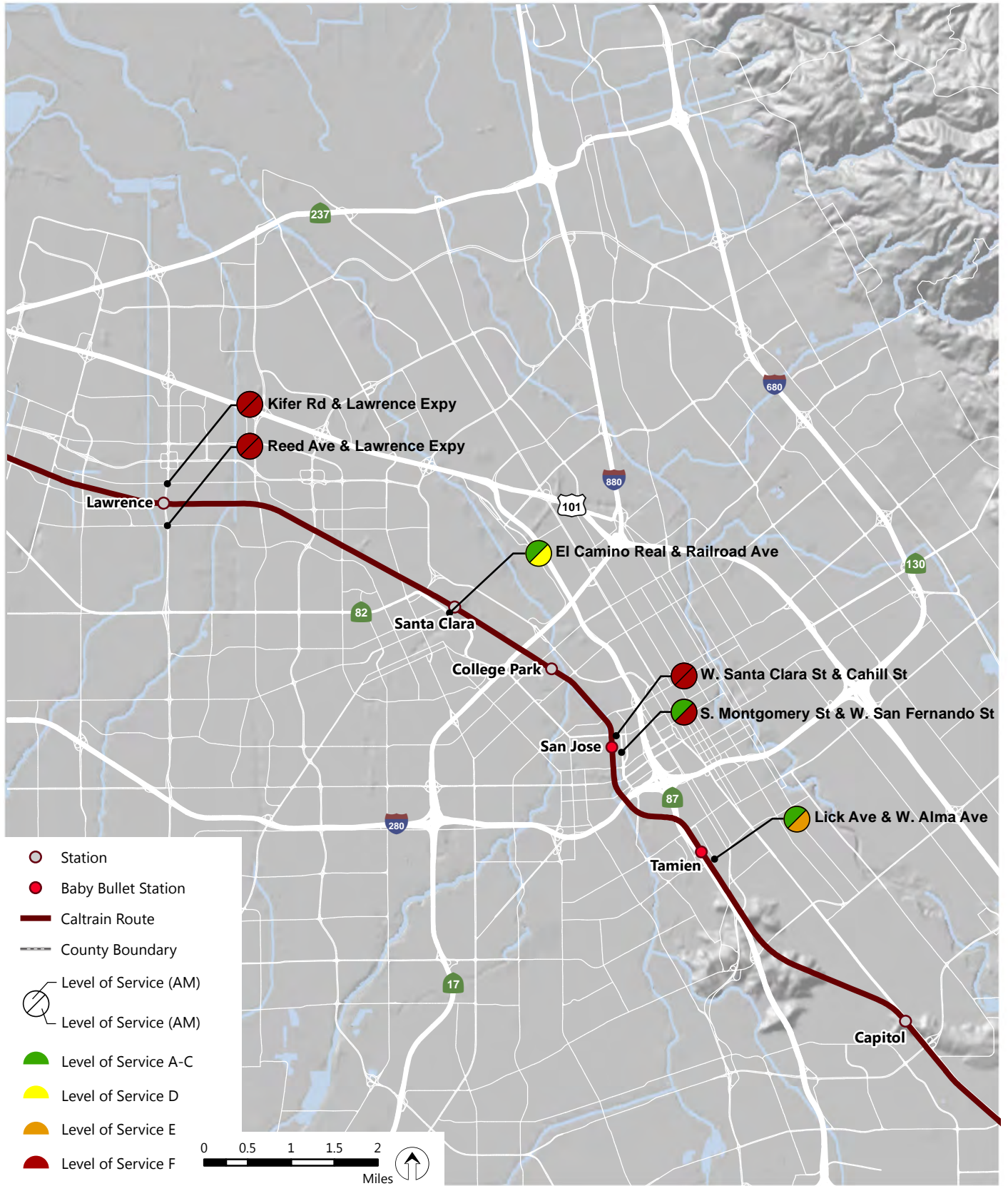


Figure 3-13

2040 No Project AM & PM Peak Hour Intersection LOS, Zone 4

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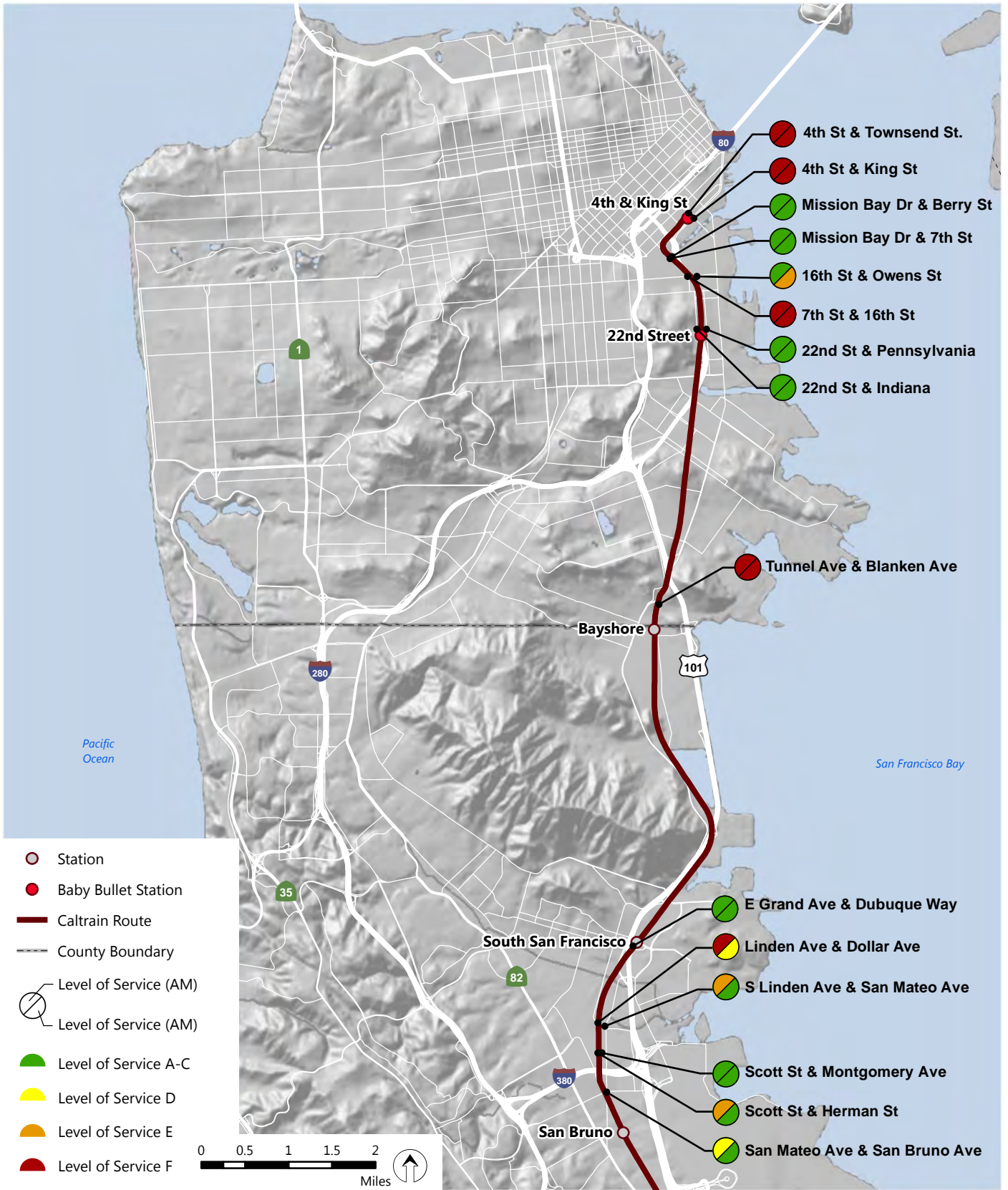


Figure 3-14

2040 Project AM & PM Peak Hour Intersection LOS, Zone 1

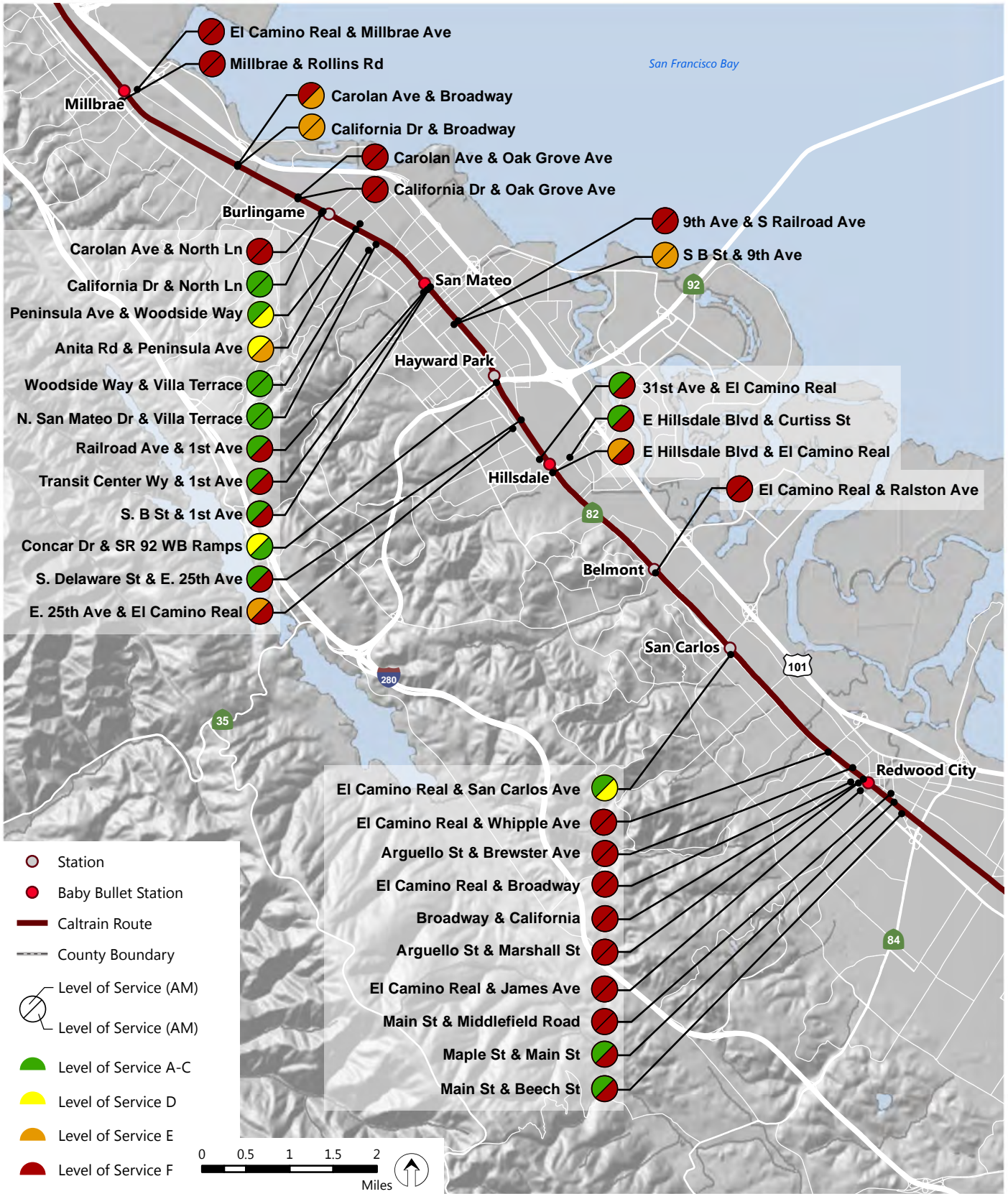


Figure 3-15

2040 Project AM & PM Peak Hour Intersection LOS, Zone 2

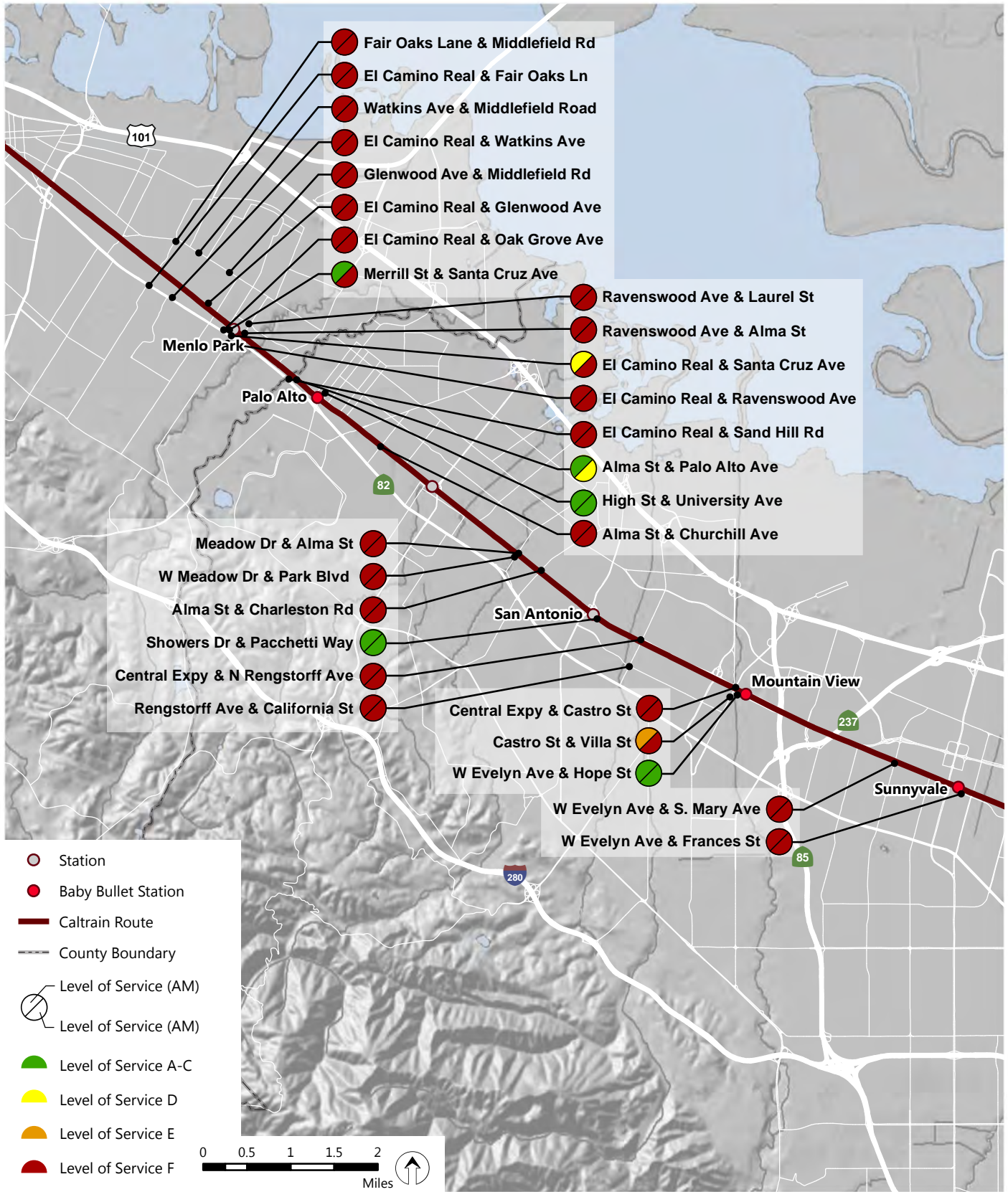


Figure 3-16

2040 Project AM & PM Peak Hour Intersection LOS, Zone 3

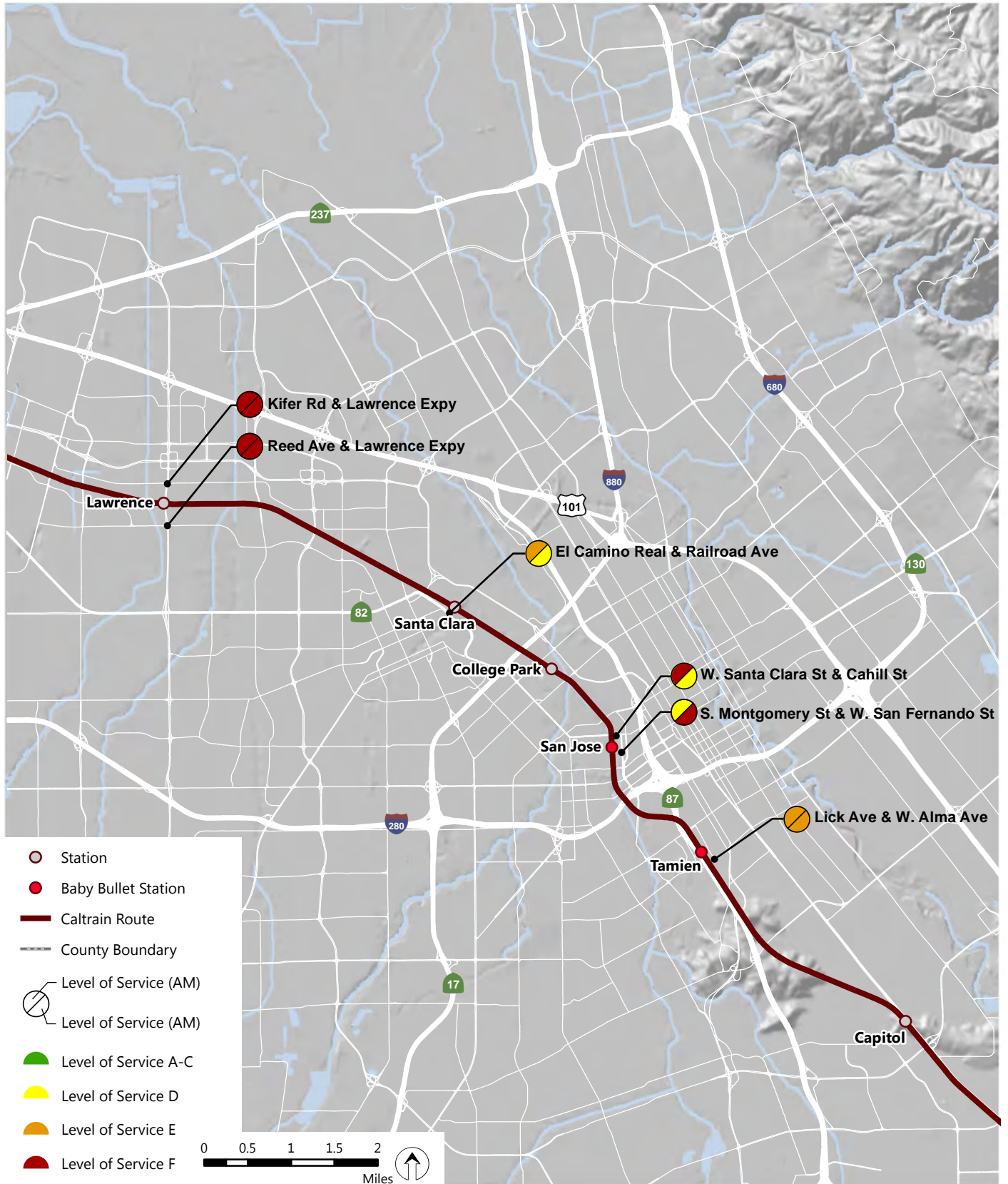


Figure 3-17

2040 Project AM & PM Peak Hour Intersection LOS, Zone 4

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3.6.6 INTERSECTION IMPACTS AND MITIGATIONS

This section introduces the results of the 2020 and 2040 intersection impacts and mitigations analysis. These impacts are related to impact criterion TR-6, which is concerned with disruptions to traffic operations as detailed in Section 3.5.6.1. Mitigation measures are measures that when implemented would mitigate the impact at an intersection to less-than-significant levels.

3.6.6.1 2020 Project Scenario

Based on impact criterion TR-6 listed in Section 3.5.6.1, the 2020 Project Scenario will have a significant impact at the following 21 study intersections during the AM and or PM peak hours:

- Intersection #1 – 4th Street and King Street (PM peak hour)
- Intersection #2 – 4th Street and Townsend Street (PM peak hour)
- Intersection #5 – 7th Street and 16th Street (AM peak hour)
- Intersection #16– El Camino Real and Millbrae Avenue (AM and PM peak hours)
- Intersection #17 – Millbrae Avenue and Rollins Road (PM peak hour)
- Intersection #18 – California Drive and Broadway (AM and PM peak hours)
- Intersection #21 (unsignalized) – Carolan Avenue and Oak Grove Avenue (AM and PM peak hours)
- Intersection #36 – E Hillsdale Boulevard and El Camino Real (AM peak hour)
- Intersection #51 (unsignalized) – El Camino Real and Watkins Avenue (AM and PM peak hours)
- Intersection #54 (unsignalized) – Glenwood Avenue and Middlefield Road (AM and PM peak hours)
- Intersection #55 – El Camino Real and Glenwood Avenue (AM and PM peak hours)
- Intersection #56 – El Camino Real and Oak Grove Avenue (AM peak hour)
- Intersection #63 – Meadow Drive and Alma Street (AM and PM peak hour)
- Intersection #64 – El Camino Real and Alma Street and Sand Hill Road (AM peak hour)
- Intersection #66 – Alma Street and Churchill Avenue (AM and PM peak hours)
- Intersection #68 – Alma Street and Charleston Road (AM and PM peak hours)
- Intersection #70 – Central Expressway and N Rengstorff Avenue (PM peak hour)
- Intersection #71 – Central Expressway and Moffett Boulevard and Castro Street (AM and PM peak hours)
- Intersection #75 – W Evelyn and S Mary Avenue (PM peak hour)
- Intersection #80 – W Santa Clara Street and Cahill Street (PM peak hour)
- Intersection #81 – S Montgomery Street and W San Fernando Street (PM peak hour)

Of these 21 intersections, 9 present significant and unavoidable impacts under the 2020 Project scenario. These are intersection impacts for which no feasible mitigation is available to reduce to a less-than-significant level. These intersections are as follows:

- Intersection #21 – Carolan Avenue and Oak Grove Avenue (PM peak hour)



- Intersection #55 – El Camino Real and Glenwood Avenue (AM and PM peak hours)
- Intersection #56 – El Camino Real and Oak Grove Avenue (AM peak hour)
- Intersection #63 – Meadow Drive and Alma Street (AM and PM peak hour)
- Intersection #66 – Churchill Avenue and Alma Street (AM and PM peak hour)
- Intersection #68 – Charleston Road and Alma Street (AM and PM peak hour)
- Intersection #70 – Central Expressway and N Rengstorff Avenue (PM peak hour)
- Intersection #71 – Central Expressway and Moffett Boulevard and Castro Street (AM and PM peak hours)
- Intersection #75 – W Evelyn and S Mary Avenue (PM peak hour)

Table 3-25 identifies the intersection impacts and the associated mitigation measures proposed to minimize these identified impacts to less-than-significant levels. The less-than-significant levels are as follows:

- If the intersection operates at LOS A-D under the no project scenario, the mitigation measures must allow the intersection to continue operating at LOS A-D under the project scenario.
- If the intersection operates at LOS E or F under the no project scenario, the mitigation measures must ensure that the delay under the project scenario does not increase by four (4) seconds or more.

While grade separations are a technically feasible way to reduce traffic impacts at the at-grade locations, it is a highly expensive mitigation strategy. Caltrain has supported past and present grade separation projects (such as the current San Bruno Grade Separation project) and will support future efforts at grade separation where acceptable to local communities and where local, state, and federal funding can be obtained to fund these improvements. However, using an average assumed cost of \$50 million to \$100 million per crossing (grade separations can cost much more sometimes); grade separating the 11 nearest at-grade crossings near the 11 significantly affected intersections would cost \$550 million to \$1.1 billion. The budget for the Proposed Project is \$1.225 billion by comparison. Thus, Caltrain cannot commit to a comprehensive program of grade separations at this time to address all significantly affected intersections and this impact is considered **significant and unavoidable**.



**TABLE 3-25
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2020 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
SIGNALIZED INTERSECTIONS				
1	4 th Street and King Street	PM	<ul style="list-style-type: none"> Revise signal timing and phasing to better coordinate with 4th Street and Townsend Street 	Less-than-significant after mitigation (LTS)
2	4 th Street and Townsend Street	PM	<ul style="list-style-type: none"> Revise signal timing and phasing to better coordinate with 4th Street and King Street 	Less-than-significant after mitigation (LTS)
5	7 th Street and 16 th Street	AM	<ul style="list-style-type: none"> Widen northbound approach to lengthen left turn pocket Remove parking lane to create a third lane for the eastbound approach Revise signal timing and phasing to better coordinate with 16th Street and Owens Street 	Less-than-significant after mitigation (LTS)
16	El Camino Real and Millbrae Avenue	AM and PM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
17	Millbrae Avenue and Rollins Road	PM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
18	California Drive and Broadway	AM and PM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
36	E Hillsdale Boulevard and El Camino Real	AM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
55	El Camino Real and Glenwood Avenue	AM and PM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Significant and unavoidable ² (SU)
56	El Camino Real and Oak Grove Avenue	AM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Significant and unavoidable ² (SU)
63	Meadow Drive and Alma Street	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist³ 	Significant and unavoidable (SU)



**TABLE 3-25
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2020 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
64	El Camino Real and Alma Street and Sand Hill Road	AM	<ul style="list-style-type: none"> Widen west leg of Sand Hill Road by adding one lane to allow southbound right turns on red Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
66	Alma Street and Churchill Avenue	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist³ 	Significant and unavoidable (SU)
68	Alma Street and Charleston Road	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist³ 	Significant and unavoidable (SU)
70	Central Expressway and N Rengstorff Avenue	PM	<ul style="list-style-type: none"> No feasible mitigations exist³ 	Significant and unavoidable (SU)
71	Central Expressway and Moffett Boulevard and Castro Street	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist³ 	Significant and unavoidable (SU)
75	W Evelyn and S Mary Avenue	PM	<ul style="list-style-type: none"> No feasible mitigations exist⁴ 	Significant and unavoidable (SU)
80	W Santa Clara Street and Cahill Street	PM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
81	South Montgomery Street and W San Fernando Street	PM	<ul style="list-style-type: none"> Adjust signal timings to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)



**TABLE 3-25
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2020 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
UNSIGNALIZED INTERSECTIONS				
21	Carolan Avenue and Oak Grove Avenue	AM and PM	<ul style="list-style-type: none"> Signalize intersection 	Significant and unavoidable ⁵ (SU)
51	El Camino Real and Watkins Avenue	AM and PM	<ul style="list-style-type: none"> Signalize intersection 	Less-than-significant after mitigation (LTS)
54	Glenwood Avenue and Middlefield Road	AM and PM	<ul style="list-style-type: none"> Signalize intersection 	Less-than-significant after mitigation (LTS)

¹Less-than-significant after mitigation but secondary impacts are produced at Intersection #44 (Broadway and California) and Intersection #48 (Arguello Street and Marshall Street). After mitigation, the delay increases by more than four seconds at both Intersection #44 and Intersection #48.

²Less-than-significant after mitigation but a secondary impact is produced at Intersection #61 (Ravenswood Avenue and Laurel Street). After mitigation, the delay increases by more than four seconds at Intersection #61.

³Addition of through lanes along Central Expressway and Alma Street may reduce the impact at this location, but the addition of through lanes is subject to right-of-way constraints and is therefore infeasible.

⁴Implementation of a grade separated crossing may reduce the impact but is subject to fiscal constraints. Therefore this mitigation is considered infeasible for purposes of this document.

⁵Intersection impacts would be less than significant after mitigation, but a secondary impact is produced at Intersection #20 (California Drive and Oak Grove Avenue) with the signalization of Carolan Avenue/Oak Grove Avenue. After mitigation, average vehicle delay increases by more than four seconds at Intersection #20.



4th Street / King Street (Intersection #1) – Implementation of signal timing revisions to reduce conflicts between high pedestrian volumes and turning vehicles at 4th Street/Townsend Street and 4th Street/King Street would reduce the change in intersection delay to a less-than-significant level.

4th Street / Townsend Street (Intersection #2) – Implementation of signal timing revisions to reduce conflicts between high pedestrian volumes and turning vehicles at 4th Street/Townsend Street and 4th Street/King Street would reduce the change in intersection delay at Intersection #2 to a less-than-significant level.

7th Street / 16th Street (Intersection #5) – Widening the northbound approach to lengthen the left turn pocket, removing the existing parking lane to create a third lane for eastbound traffic, and adjusting signal timing at 7th Street/16th Street would reduce the change in intersection delay to a less-than-significant level.

El Camino Real / Millbrae Avenue (Intersection #16) – Implementation of signal timing adjustments to optimize signal coordination and phasing at El Camino Real/Millbrae Avenue would reduce the change in intersection delay to a less-than-significant level.

Millbrae Avenue / Rollins Road (Intersection #17) – Implementation of signal timing adjustments to optimize signal coordination and phasing at Millbrae Avenue/Rollins Road reduces the change in intersection delay to a less-than-significant level.

California Drive / Broadway (Intersection #18) – Implementation of signal timing adjustments to optimize signal coordination and phasing at California Drive/Broadway reduces the change in intersection delay to a less-than-significant level.

E Hillsdale Boulevard / El Camino Real (Intersection #36) – Implementation of signal timing adjustments to optimize signal coordination and phasing at E Hillsdale Boulevard/El Camino Real reduces the change in intersection delay to a less-than-significant level.

El Camino Real / Glenwood Avenue (Intersection #55) – Implementation of the proposed mitigation measure of signal timing revisions at El Camino Real/Glenwood Avenue reduces the change in intersection delay to a less-than-significant level. However, a secondary impact is produced at Ravenswood Avenue/Laurel Street (Intersection #61). Therefore the impact at this location is considered significant and unavoidable.

El Camino Real / Oak Grove Avenue (Intersection #56) – Implementation of the proposed mitigation measure of signal timing revisions at El Camino Real/Oak Grove Avenue reduces the change in intersection delay to a less-than-significant level. However, secondary impacts are produced at Ravenswood Avenue/Laurel Street (Intersection #61). Therefore the impact at this location is considered significant and unavoidable.

Meadow Drive / Alma Street (Intersection #63) – Potential mitigation measures that would reduce intersection delay at this intersection include widening Alma Street to provide additional traffic capacity or constructing a grade separation of the Caltrain railroad tracks from Meadow Drive. However, these measures would require additional right-of-way to accomplish and would have a substantial cost associated with planning, designing, and constructing such improvements. Widening of Alma Street would also potential have secondary impacts due to increased pedestrian crossing distances resulting



from a wider intersection. Due to the potential high cost of acquiring new right-of-way and potential secondary impacts, mitigations at this intersection are not considered feasible. Therefore the impact would remain significant and unavoidable.

El Camino Real / Alma Street / Sand Hill Road (Intersection #64) – Implementation of the proposed mitigation measures of restriping westbound Sand Hill Road to allow southbound right turns on red and adjusting signal timing would reduce the change in intersection delay to a less-than-significant level.

Alma Street / Churchill Avenue (Intersection #66) – Potential mitigation measures that would reduce intersection delay at this intersection include widening Alma Street to provide additional traffic capacity or constructing a grade separation of the Caltrain railroad tracks from Meadow Drive. However, these measures would require additional right-of-way to accomplish and would have a substantial cost associated with planning, designing, and constructing such improvements. Widening of Alma Street would also potential have secondary impacts due to increased pedestrian crossing distances resulting from a wider intersection. Due to the potential high cost of acquiring new right-of-way and potential secondary impacts, mitigations at this intersection are not considered feasible. Therefore the impact would remain significant and unavoidable.

Alma Street / Charleston Road (Intersection #68) – Potential mitigation measures that would reduce intersection delay at this intersection include widening Alma Street to provide additional traffic capacity or constructing a grade separation of the Caltrain railroad tracks from Meadow Drive. However, these measures would require additional right-of-way to accomplish and would have a substantial cost associated with planning, designing, and constructing such improvements. Widening of Alma Street would also potential have secondary impacts due to increased pedestrian crossing distances resulting from a wider intersection. Due to the potential high cost of acquiring new right-of-way and potential secondary impacts, mitigations at this intersection are not considered feasible. Therefore the impact would remain significant and unavoidable.

Central Expressway / N Rengstorff Avenue (Intersection #70) – Potential mitigation measures that would reduce intersection delay, such as widening Central Expressway or constructing a grade separation, are infeasible due to right-of-way constraints and given that full funding is not currently approved or funded. Therefore the impact at this location is considered significant and unavoidable.

Central Expressway / Moffett Boulevard / Castro Street (Intersection #70) – Potential mitigation measures that would reduce intersection delay, such as widening Central Expressway or constructing a grade separation, are infeasible due to right-of-way constraints and given that full funding is not currently approved or funded. Therefore the impact at this location is considered significant and unavoidable.

W Evelyn Avenue / S Mary Avenue (Intersection #75) – Potential mitigation measures that would reduce intersection delay would likely require a grade separated crossing of Mary Avenue with the railroad tracks. A new grade separation at this location would require additional right-of-way to accomplish and would have a substantial cost associated with planning, designing, and constructing such improvements. Due to the potential high cost of acquiring new right-of-way and lack of available funding, mitigation measures at this intersection are not considered feasible. Therefore the impact would remain significant and unavoidable.



W Santa Clara Street / Cahill Street (Intersection #80) – Implementation of the proposed mitigation measure of signal timing adjustments at W Santa Clara Street/Cahill Street reduces the change in intersection delay to a less-than-significant level.

South Montgomery Street / W San Fernando Street (Intersection #81) – Implementation of the proposed mitigation measure of signal timing adjustments at South Montgomery Street/W San Fernando Street reduces the change in intersection delay to a less-than-significant level.

Carolan Avenue / Oak Grove Avenue (Intersection #21, unsignalized¹⁸) – Implementation of the proposed mitigation measure of signalizing the intersection at El Camino Real/Oak Grove Avenue would reduce the change in intersection delay to a less-than-significant level. However, a secondary impact is produced at California Drive/Oak Grove Avenue (Intersection #20) due to periodic vehicle queues that extend from a signalized Carolan Avenue / Oak Grove Avenue intersection. As a result, the implementation of this mitigation measure has the potential to not fully mitigate impacts along Oak Grove Avenue. While signalization of the Carolan Avenue / Oak Grove Avenue intersection would somewhat improve traffic conditions along the corridor, the impact would remain significant and unavoidable.

El Camino Real and Watkins Avenue (Intersection #51, unsignalized) – Implementation of the proposed mitigation measure of signalizing the intersection at El Camino Real/Watkins Avenue would reduce the change in intersection delay to a less-than-significant level.

Glenwood Avenue and Middlefield Road (Intersection #54, unsignalized) – Implementation of the proposed mitigation measure of signalizing the intersection at Glenwood Avenue/Middlefield Road would reduce the change in intersection delay to a less-than-significant level.

3.6.6.2 2040 Project Scenario

Based on impact criteria TR-6 listed in Section 3.5.6.1, the 2040 Project Scenario will have a significant impact at the following 39 study intersections during the AM and/or PM peak hours:

- Intersection #1 – 4th Street and King Street (AM peak hour)
- Intersection #5 – 7th Street and 16th Street (AM and PM peak hours)
- Intersection #6 – 16th Street and Owens Street (PM peak hour)
- Intersection #9 (unsignalized) – Tunnel Avenue and Blanken Avenue (AM and PM peak hours)

¹⁸ This signal warrant analysis is intended to examine the general correlation between the planned level of future traffic and the need to install new traffic signals. It estimates future development-generated traffic compared against a sub-set of the standard traffic signal warrants developed by the Federal Highway Administration (FHWA) and have been adapted for use within California by Caltrans, as described in the 2012 California Manual of Uniform Traffic Control Devices (CA MUTCD). These warrants correlate the need for a traffic signal at an intersection with pedestrian and vehicle volumes. This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured, rather than forecast, traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. Furthermore, the decision to install a signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. The responsible state or local agency should undertake regular monitoring of actual traffic conditions and collision data, and timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.



- Intersection #10 – Linden Avenue and Dollar Avenue (AM peak hour)
- Intersection #12 – S Linden Avenue and San Mateo Avenue (AM peak hour)
- Intersection #16 – El Camino Real and Millbrae Avenue (AM and PM peak hours)
- Intersection #17 – Millbrae Avenue and Rollins Road (AM and PM peak hours)
- Intersection #19 – Carolan Avenue and Broadway (AM peak hour)
- Intersection #20 – California Drive and Oak Grove Avenue (PM peak hour)
- Intersection #21 (unsignalized) – Carolan Avenue and Oak Grove Avenue (AM and PM peak hours)
- Intersection #28 – S B Street and 1st Avenue (PM peak hour)
- Intersection #30 – S B Street and 9th Avenue (AM and PM peak hours)
- Intersection #35 – 31st Avenue and El Camino Real (PM peak hour)
- Intersection #36 – E Hillsdale Boulevard and El Camino Real (PM peak hour)
- Intersection #37 – E Hillsdale Boulevard and Curtiss Street (PM peak hour)
- Intersection #39 – El Camino Real and Ralston Avenue (AM peak hour)
- Intersection #45 – El Camino Real and Whipple Avenue (AM peak hour)
- Intersection #50 – El Camino Real and Fair Oaks Lane (AM peak hour)
- Intersection #52 (unsignalized) – Fair Oaks Lane and Middlefield Road (AM peak hour)
- Intersection #53 (unsignalized) – Watkins Avenue and Middlefield Road (AM and PM peak hours)
- Intersection #55 – El Camino Real and Glenwood Avenue (AM peak hour)
- Intersection #56 – El Camino Real and Oak Grove Avenue (AM peak hour)
- Intersection #57 – El Camino Real and Santa Cruz Avenue (PM peak hour)
- Intersection #58 (unsignalized) – Merrill Street and Santa Cruz Avenue (PM peak hour)
- Intersection #63 – Meadow Drive and Alma Street (AM and PM peak hours)
- Intersection #64 – El Camino Real and Alma Street and Sand Hill Road (AM and PM peak hours)
- Intersection #66 – Alma Street and Churchill Avenue (AM peak hour)
- Intersection #68 – Alma Street and Charleston Road (AM peak hour)
- Intersection #70 – Central Expressway and N Rengstorff Avenue (AM peak hour)
- Intersection #71 – Central Expressway and Moffett Boulevard and Castro Street (AM and PM peak hours)
- Intersection #73 – Rengstorff Avenue and California Street (AM and PM peak hours)
- Intersection #74 – Castro Street and Villa Street (AM and PM peak hours)
- Intersection #75 – W Evelyn Avenue and S Mary Avenue (AM and PM peak hours)
- Intersection #76 – W Evelyn Avenue and Frances Street (AM and PM peak hours)
- Intersection #77 – Kifer Road and Lawrence Expressway (AM peak hour)
- Intersection #78 – Reed Avenue and Lawrence Expressway (AM peak hour)
- Intersection #79 – El Camino Real and Railroad Avenue (AM peak hour)
- Intersection #82 – Lick Avenue and W Alma Avenue (AM peak hour)



Of these 38 intersections, 17 present significant and unavoidable impacts under the 2040 Project scenario. These are intersection impacts for which no feasible mitigation is available to reduce to a less-than-significant level. These intersections are as follows:

- Intersection #1 – 4th Street and King Street (AM peak hour)
- Intersection #16 – El Camino Real and Millbrae Avenue (PM peak hour)
- Intersection #21 (unsignalized) – Carolan Avenue and Oak Grove Avenue (AM peak hour)
- Intersection #30 – S B Street and 9th Avenue (PM peak hour)
- Intersection #45 – El Camino Real and Whipple Avenue (AM peak hour)
- Intersection #55 – El Camino Real and Glenwood Avenue (AM peak hour)
- Intersection #63 – Meadow Drive and Alma Street (AM and PM peak hours)
- Intersection #64 – El Camino Real and Alma Street and Sand Hill Road (AM peak hour)
- Intersection #66 – Alma Street and Churchill Avenue (AM peak hour)
- Intersection #68 – Alma Street and Charleston Road (AM peak hour)
- Intersection #70 – Central Expressway and N Rengstorff Avenue (AM peak hour)
- Intersection #71 – Central Expressway and Moffett Boulevard and Castro Street (AM and PM peak hours)
- Intersection #73 – Rengstorff Avenue and California Street (AM and PM peak hours)
- Intersection #75 – W Evelyn Avenue and S Mary Avenue (AM and PM peak hours)
- Intersection #76 – W Evelyn Avenue and Frances Street (AM and PM peak hours)
- Intersection #77 – Kifer Road and Lawrence Expressway (AM peak hour)
- Intersection #78 – Reed Avenue and Lawrence Expressway (AM peak hour)

Table 3-26 identifies the intersection impacts and the associated mitigation measures proposed to minimize these identified impacts to less-than-significant levels. The less-than-significant levels are as follows:

- If the intersection operates at LOS A-D under the no project scenario, the mitigation measures must allow the intersection to continue operating at LOS A-D under the project scenario.
- If the intersection operates at LOS E or F under the no project scenario, the mitigation measures must ensure that the delay under the project scenario does not increase by four (4) seconds or more.

As noted above, while grade separations are a technically feasible way to reduce traffic impacts at the at-grade locations, it is a highly expensive mitigation strategy. Using an average assumed cost of \$50 million per crossing (grade separations can cost much more sometimes), grade separating the 19 nearest at-grade crossings near the 19 significantly affected intersections would cost \$950 million. The budget for the Proposed Project is \$1.225 billion by comparison. Thus, Caltrain cannot commit to a comprehensive program of grade separations at this time to address all significantly affected intersections and this impact is considered significant and unavoidable.



**TABLE 3-26
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2040 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
SIGNALIZED INTERSECTIONS				
1	4 th Street and King Street	AM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario 	Significant and unavoidable (SU)
5	7 th Street and 16 th Street	AM and PM	<ul style="list-style-type: none"> Same mitigation measures proposed under 2020 Project scenario with the exception of parking removal on the eastbound approach 	Less-than-significant after mitigation (LTS)
6	16 th Street and Owens Street	PM	<ul style="list-style-type: none"> Revise signal timing and phasing to better coordinate with 7th Street and 16th Street 	Less-than-significant after mitigation (LTS)
10	Linden Avenue and Dollar Avenue	AM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
12	S Linden Avenue and San Mateo Avenue	AM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
16	El Camino Real and Millbrae Avenue	AM and PM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario 	Less-than-significant after mitigation (LTS) in AM Significant and unavoidable (SU) in PM
17	Millbrae Avenue and Rollins Road	AM and PM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario 	Less-than-significant after mitigation (LTS)
19	Carolan Avenue and Broadway	AM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
20	California Drive and Oak Grove Avenue	PM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
28	S B Street and 1 st Avenue	PM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
30	S B Street and 9 th Avenue	AM and PM	<ul style="list-style-type: none"> Extend southbound left-turn pocket Remove parking to add eastbound left-turn pocket Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS) in AM Significant and unavoidable ¹ (SU) in PM
35	31 st Avenue and El Camino Real	PM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)



**TABLE 3-26
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2040 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
36	E Hillsdale Boulevard and El Camino Real	PM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario with the addition of reconfiguring the westbound to two through lanes and one shared through/right-turn lane 	Less-than-significant after mitigation (LTS)
37	E Hillsdale Boulevard and Curtiss Street	PM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
39	El Camino Real and Ralston Avenue	AM	<ul style="list-style-type: none"> Restripe westbound shared through/left-turn lane into a through lane Revise signal timing and phasing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
45	El Camino Real and Whipple Avenue	AM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Significant and unavoidable (SU)
50	El Camino Real and Fair Oaks Lane	AM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
55	El Camino Real and Glenwood Avenue	AM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario with the addition of widening the westbound approach to provide right-turn pocket 	Significant and unavoidable (SU)
56	El Camino Real and Oak Grove Avenue	AM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario 	Less-than-significant after mitigation (LTS)
57	El Camino Real and Santa Cruz Avenue	PM	<ul style="list-style-type: none"> Adjust signal timing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
63	Meadow Drive and Alma Street	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist² 	Significant and unavoidable (SU)
64	El Camino Real and Alma Street and Sand Hill Road	AM and PM	<ul style="list-style-type: none"> Same mitigation measures proposed under 2020 Project scenario 	Significant and unavoidable (SU) in AM Less-than-significant after mitigation (LTS) in PM
66	Alma Street and Churchill Avenue	AM	<ul style="list-style-type: none"> No feasible mitigations exist² 	Significant and unavoidable (SU)



**TABLE 3-26
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2040 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
68	Alma Street and Charleston Road	AM	<ul style="list-style-type: none"> No feasible mitigations exist² 	Significant and unavoidable (SU)
70	Central Expressway and N Rengstorff Avenue	AM	<ul style="list-style-type: none"> No feasible mitigations exist² 	Significant and unavoidable (SU)
71	Central Expressway and Moffett Boulevard and Castro Street	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist² 	Significant and unavoidable (SU)
73	Rengstorff Avenue and California Street	AM and PM	<ul style="list-style-type: none"> Revise signal timing and phasing to better serve traffic after project implementation 	Significant and unavoidable (SU)
74	Castro Street and Villa Street	AM and PM	<ul style="list-style-type: none"> Remove parking to stripe one left-turn pocket and one through lane for the eastbound and westbound directions Revise signal timing and phasing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
75	W Evelyn Avenue and S Mary Avenue	AM and PM	<ul style="list-style-type: none"> No feasible mitigations exist³ 	Significant and unavoidable (SU)
76	W Evelyn Avenue and Frances Street	AM and PM	<ul style="list-style-type: none"> Stripe westbound as one through lane and one shared through/right-turn lane Revise signal timing and phasing to better serve traffic after project implementation 	Significant and unavoidable (SU)
77	Kifer Road and Lawrence Expressway	AM	<ul style="list-style-type: none"> No feasible mitigations exist⁶ 	Significant and unavoidable (SU)
78	Reed Avenue and Lawrence Expressway	AM	<ul style="list-style-type: none"> No feasible mitigations exist⁴ 	Significant and unavoidable (SU)



**TABLE 3-26
SUMMARY OF INTERSECTION IMPACTS AND MITIGATION MEASURES, 2040 PROJECT**

Int. ID	Intersection	Impacted Peak Hour(s)	Mitigation Strategies	Impact Significance after Mitigation
79	El Camino Real and Railroad Avenue	AM	<ul style="list-style-type: none"> Revise signal timing and phasing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
82	Lick Avenue and W Alma Avenue	AM	<ul style="list-style-type: none"> Revise signal timing and phasing to better serve traffic after project implementation 	Less-than-significant after mitigation (LTS)
UNSIGNALIZED INTERSECTIONS				
9	Tunnel Avenue and Blanken Avenue	AM and PM	<ul style="list-style-type: none"> Signalize intersection 	Less-than-significant after mitigation (LTS)
21	Carolan Avenue and Oak Grove Avenue	AM and PM	<ul style="list-style-type: none"> Same mitigation measure proposed under 2020 Project scenario 	Significant and unavoidable ⁵ (SU) in AM Less-than-significant after mitigation (LTS) in PM
52	Fair Oaks Lane and Middlefield Road	AM	<ul style="list-style-type: none"> Signalize intersection 	Less-than-significant after mitigation (LTS)
53	Watkins Avenue and Middlefield Road	AM and PM	<ul style="list-style-type: none"> Signalize intersection 	Less-than-significant after mitigation (LTS)
58	Merrill Street and Santa Cruz Avenue	PM	<ul style="list-style-type: none"> Signalize intersection 	Less-than-significant after mitigation (LTS)

¹Less-than-significant after mitigation but a secondary impact is produced at Intersection #29 (9th Avenue and S Railroad Avenue). After mitigation, the delay increases by more than four seconds at Intersection #29.

²Addition of through lanes along Central Expressway and Alma Street may reduce the impact, but the addition of through lanes is subject to right-of-way constraints and is therefore infeasible.

³Implementation of a grade separated crossing may reduce the impact but is subject to fiscal and temporal constraints. Therefore this mitigation is considered infeasible for purposes of this document.

⁴Grade separated interchanges are under study but have yet to be approved or funded.

⁵Less-than-significant after mitigation but a secondary impact is produced at Intersection #20 (California Drive and Oak Grove Avenue). After mitigation, the delay increases by more than four seconds at Intersection #20.



4th Street / King Street (Intersection #1) – Implementation of the same mitigation measure proposed under 2020 Project scenario does not reduce the change in intersection delay to a less-than-significant level. Therefore the impact at this location is considered significant and unavoidable.

7th Street / 16th Street (Intersection #5) – Implementation of the same mitigation measures proposed under 2020 Project scenario (with the exception of the parking removal on the eastbound approach) reduces the change in intersection delay to a less-than-significant level.

16th Street / Owens Street (Intersection #6) – Implementation of the proposed mitigation measure of signal timing revisions at 16th Street/Owens Street reduces the change in intersection delay to a less-than-significant level.

Linden Avenue / Dollar Avenue (Intersection #10) – Implementation of the proposed mitigation measure of signal timing revisions at Linden Avenue/Dollar Avenue reduces the change in intersection delay to a less-than-significant level.

S Linden Avenue / San Mateo Avenue (Intersection #12) – Implementation of the proposed mitigation measure of signal timing revisions at S Linden Avenue/San Mateo Avenue reduces the change in intersection delay to a less-than-significant level.

El Camino Real / Millbrae Avenue (Intersection #16) – Implementation of the same mitigation measure proposed under 2020 Project scenario reduces the change in intersection delay to a less-than-significant level during the AM peak hour but does not reduce the change in intersection delay to a less-than-significant level during the PM peak hour. Therefore the impact at this location is considered significant and unavoidable only during the PM peak hour.

Millbrae Avenue / Rollins Road (Intersection #17) – Implementation of the same mitigation measure under 2020 Project scenario reduces the change in intersection delay to a less-than-significant level.

Carolan Avenue / Broadway (Intersection #19) – Implementation of the proposed mitigation measure of signal timing revisions at Carolan Avenue/Broadway reduces the change in intersection delay to a less-than-significant level.

California Drive / Oak Grove Avenue (Intersection #20) – Implementation of the proposed mitigation measure of signal timing revisions at California Drive/Oak Grove Avenue reduces the change in intersection delay to a less-than-significant level.

S B Street / 1st Avenue (Intersection #28) – Implementation of the proposed mitigation measure of signal timing revisions at S B Street/1st Avenue reduces the change in intersection delay to a less-than-significant level.

S B Street / 9th Avenue (Intersection #30) – Implementation of the proposed mitigation measures of extending the southbound left-turn pocket, removing parking to add an eastbound left-turn pocket, and adjusting signal timing at S B Street/9th Avenue reduces the change in intersection delay to a less-than-significant level. However, a secondary impact is produced at 9th Avenue/S Railroad Avenue (Intersection #29) during the PM peak hour due to traffic queues extending from the B Street / 9th Avenue intersection. Therefore the impact at this location is considered significant and unavoidable only during the PM peak hour.



31st Avenue / El Camino Real (Intersection #35) – Implementation of the proposed mitigation measure of signal timing revisions at S B Street/9th Avenue reduces the change in intersection delay to a less-than-significant level.

E Hillsdale Boulevard / El Camino Real (Intersection #36) – Implementation of the same mitigation measure proposed under 2020 Project scenario with the addition of restriping the westbound approach reduces the change in intersection delay to a less-than-significant level.

E Hillsdale Boulevard / Curtiss Street (Intersection #37) – Implementation of the proposed mitigation measure of signal timing revisions at E Hillsdale Boulevard/Curtiss Street reduces the change in intersection delay to a less-than-significant level.

El Camino Real / Ralston Avenue (Intersection #39) – Implementation of the proposed mitigation measures of restriping the westbound approach and adjusting signal timing at El Camino Real/Ralston Avenue reduces the change in intersection delay to a less-than-significant level.

El Camino Real / Whipple Avenue (Intersection #45) – Implementation of the proposed mitigation measure of signal timing revisions at El Camino Real/Whipple Avenue does not reduce the change in intersection delay to a less-than-significant level. Therefore the impact at this location is considered significant and unavoidable.

El Camino Real / Fair Oaks Lane (Intersection #50) – Implementation of the proposed mitigation measure of signal timing revisions at El Camino Real/Fair Oaks Lane reduces the change in intersection delay to a less-than-significant level.

El Camino Real / Glenwood Avenue (Intersection #55) – Implementation of the same mitigation measure proposed under 2020 Project scenario with the addition of widening the westbound approach improves traffic operations but does not reduce the change in intersection delay to a less-than-significant level. Therefore the impact at this location is considered significant and unavoidable.

El Camino Real / Oak Grove Avenue (Intersection #56) – Implementation of the same mitigation measure proposed under 2020 Project scenario reduces the change in intersection delay to a less-than-significant level.

El Camino Real / Santa Cruz Avenue (Intersection #56) – Implementation of the proposed mitigation measure of signal timing revisions at El Camino Real/Santa Cruz Avenue reduces the change in intersection delay to a less-than-significant level.

Meadow Drive / Alma Street (Intersection #63) – Measures, such as widening Alma Street, are infeasible due to right-of-way constraints and are not currently approved nor funded. Therefore the impact at this location is considered significant and unavoidable.

El Camino Real / Alma Street / Sand Hill Road (Intersection #64) – Implementation of the same mitigation measures proposed under 2020 Project scenario does not reduce the change in intersection delay to a less-than-significant level during the AM peak hour but reduces the change in intersection delay to a less-than-significant level during the PM peak hour. Therefore the impact at this location is considered significant and unavoidable only during the AM peak hour.



Alma Street / Churchill Avenue (Intersection #66) – Mitigation measures, such as widening Alma Street or constructing a grade separation, are infeasible due to right-of-way constraints and are not currently approved nor funded. Therefore the impact at this location is considered significant and unavoidable.

Alma Street / Charleston Road (Intersection #68) – Mitigation measures, such as widening Alma Street or constructing a grade separation, are infeasible due to right-of-way constraints and are not currently approved nor funded. Therefore the impact at this location is considered significant and unavoidable.

Central Expressway / N Rengstorff Avenue (Intersection #70) – Mitigation measures, such as widening Central Expressway or constructing a grade separation, are infeasible due to right-of-way constraints and are not currently approved nor funded. Therefore the impact at this location is considered significant and unavoidable.

Central Expressway / Moffett Boulevard and Castro Street (Intersection #70) – Mitigation measures, such as widening Central Expressway or constructing a grade separation, are infeasible due to right-of-way constraints and are not currently approved nor funded. Therefore the impact at this location is considered significant and unavoidable.

Rengstorff Avenue / California Street (Intersection #73) – Implementation of the proposed mitigation measure of signal timing revisions at Rengstorff Avenue/California Street does not reduce the change in intersection delay to a less-than-significant level. Therefore the impact at this location is considered significant and unavoidable.

Castro Street / Villa Street (Intersection #74) – Implementation of the proposed mitigation measures of removing parking on the eastbound and westbound approaches to add an additional travel lane and adjusting signal timing at Castro Street/Villa Street reduces the change in intersection delay to a less-than-significant level.

W Evelyn Avenue / S Mary Avenue (Intersection #75) – Mitigation measures, such as implementation of a grade separated crossing, are not currently approved nor funded. Therefore the impact at this location is considered significant and unavoidable.

W Evelyn Avenue / Frances Street (Intersection #76) – Implementation of the proposed mitigation measures of restriping the westbound approach and adjusting signal timing at W Evelyn Avenue/Frances Street does not reduce the change in intersection delay to a less-than-significant level. Therefore the impact at this location is considered significant and unavoidable.

Kifer Road / Lawrence Expressway (Intersection #77) – A grade-separated interchange at this intersection is currently under study but has yet to be approved or funded. Therefore the impact at this location is considered significant and unavoidable.

Reed Avenue / Lawrence Expressway (Intersection #78) – A grade-separated interchange at this intersection is currently under study but has yet to be approved or funded. Therefore the impact at this location is considered significant and unavoidable.

El Camino Real / Railroad Avenue (Intersection #79) – Implementation of the proposed mitigation measure of signal timing revision at El Camino Real/Railroad Avenue reduces the change in intersection delay to a less-than-significant level. Additionally, the City of Santa Clara allows level of service exemptions on a case



by case basis to facilitate alternate transportation in Station Focus Areas. If exemption is allowed, this intersection impact would be considered less than significant.

Lick Avenue / W Alma Avenue (Intersection #82) – Implementation of the proposed mitigation measure of signal timing revision at Lick Avenue/W Alma Avenue reduces the change in intersection delay to a less-than-significant level.

Tunnel Avenue / Blanken Avenue (Intersection #9, unsignalized) – Implementation of the proposed mitigation measure of signalizing the intersection at Tunnel Avenue/Blanken Avenue reduces the change in intersection delay to a less-than-significant level.

Carolan Avenue / Oak Grove Avenue (Intersection #21, unsignalized) – Implementation of the same mitigation measure proposed under 2020 Project scenario reduces the change in intersection delay to a less-than-significant level. However, secondary impacts are produced at California Drive/Oak Grove Avenue (Intersection #20) during the AM peak hour to traffic queues extending from the Carolan Avenue / Oak Grove Avenue intersection. Therefore the impact at this location is considered significant and unavoidable only during the AM peak hour.

Fair Oaks Lane / Middlefield Road (Intersection #52, unsignalized) – Implementation of the proposed mitigation measure of signalizing the intersection at Fair Oaks Lane/Middlefield Road reduces the change in intersection delay to a less-than-significant level.

Watkins Avenue / Middlefield Road (Intersection #53, unsignalized) – Implementation of the proposed mitigation measure of signalizing the intersection at Watkins Avenue/Middlefield Road reduces the change in intersection delay to a less-than-significant level.

Merrill Street and Santa Cruz Avenue (Intersection #58, unsignalized) – Implementation of the proposed mitigation measure of signalizing the intersection at Merrill Street/Santa Cruz Avenue reduces the change in intersection delay to a less-than-significant level.



3.6.7 OVERALL TRAFFIC IMPACTS EVALUATION AND MITIGATION MEASURES

This section summarizes the impacts of the traffic significance criteria for each scenario in 2020 and 2040.

3.6.7.1 2020 Project Scenario

The 2020 Project Scenario would exceed some of the significance thresholds for traffic. However, the majority these significant impacts can be mitigated through measures described in this section.

Impact TR-1: The project would generate an impact if it were to result in an increase in VMT per service population in the Study Area (e.g., San Francisco, San Mateo, and Santa Clara Counties)

Level of Impact: Less than significant

Regional VMT projections for 2020 are discussed in Section 3.6.2. As presented in Table 3-16, total regional VMT under the 2020 Project scenario are less than total regional VMT under the 2020 No Project scenario (195,141,522 miles and 195,376,103 miles, respectively). Consequently, VMT per service population would also decrease with the Proposed Project. As a result, this impact would be less than significant.

Impact TR-2: The project would interfere with, conflict with, or preclude other planned improvements such as transit projects, roadway extensions and expansions, and pedestrian or bicycle facility improvements

Level of Impact: Less than Significant with Mitigation

As described below and in Section 4.1, Cumulative Impacts in the main text of the EIR, with mitigation, the project is consistent with other planned improvements such as transit projects, roadway extensions and expansions, and pedestrian or bicycle facility improvements.

Impact TR-3: The project would conflict or create inconsistencies with adopted regional transportation plans

Level of Impact: Less than Significant

Because the Proposed Project would shift travel demand from driving trips to transit trips and reduce the regional vehicle traffic and VMT on major highways and arterials in the Study Area, the Proposed Project would not substantially disrupt future regional traffic operations. Many adopted regional transportation plans take into consideration the electrification of the Caltrain system when developing their respective plans. In the *Plan Bay Area*, MTC identifies the electrification of the Caltrain system as one of the major transit project expected for the future; therefore, the Proposed Project would not conflict or create inconsistencies with regional traffic plans. As a result, the level of impact is **less than significant**.

Impact TR-5: The project conflicts or creates inconsistencies with local traffic plans

Level of Impact: Less than Significant



Cities along the Caltrain route take into consideration the electrification of the Caltrain system when developing their respective plans. As a result, the level of impact is **less than significant**.

Impact TR-6: The project would disrupt existing traffic operations

Level of Impact: Significant and Unavoidable with Mitigation

Although the Proposed Project would reduce regional vehicle miles travelled, the Proposed Project would also affect local traffic operations along the Caltrain corridor in several ways. First, the number of trains would increase, increasing the number of gate down occurrences relative to the No Project scenario. Second, the increased train service and added train capacity would change traffic patterns resulting in potential increases in traffic near stations coupled with reduced traffic on parallel roads.

For the study grade crossing intersections overall, the average gate-down time per event is reduced at many crossings under the Project scenario compared with the No Project scenario in 2020. However, the increase in the number of trains is expected to result in an increase in the aggregate gate-down time over the peak hour at 14 locations compared to the No Project scenario in 2020. Gate-down time during the peak hour would improve relative to the No Project scenario at 7 locations. Gate-down time during the peak hour would be higher in one peak hour and lower in the other peak hour compared to the No Project scenario at 8 locations (for example at the Villa Terrace grade crossing in San Mateo, the Proposed Project would have less gate-down time in the AM peak hour, but more gate-down time in the PM peak hour compared to the No Project scenario).

The increase in number of gate-down events, along with increasing the number of corresponding signal preemption events, may degrade intersection operations even though the gate-down time per event is lower. While grade separations are a technically feasible way to reduce traffic impacts at the at-grade locations, it is a highly expensive mitigation strategy. Caltrain has supported past and present grade separation projects (such as the current San Bruno Grade Separation project) and will support future efforts at grade separation where acceptable to local communities and where local, state, and federal funding can be obtained to fund these improvements. However, using an average assumed cost of \$50 million to \$100 million per crossing (grade separations can cost much more sometimes), grade separating the 11 nearest at-grade crossings to the 11 significantly affected intersections (after mitigation in Mitigation TRA-1c) would cost \$550 million to \$1.1 billion. The budget for the Proposed Project is \$1.225 billion by comparison. Thus, Caltrain cannot commit to a comprehensive program of grade separations at this time to address all significantly affected intersections. As a result, the level of impact at these locations is **significant and unavoidable**.

Mitigation Measure TRA-6a: Implement signal optimization and roadway geometry improvements at impacted intersections for the 2020 Project Conditions to reduce traffic delays

Table 3-25 summarizes the intersection impacts and the associated mitigation measures proposed to minimize localized traffic impacts.

Possible mitigation measures include signal optimization and roadway geometry improvements, as discussed below:

- Implement signal optimization to reduce delay at intersections: Signal timing optimization could be performed to reduce delay at signalized intersections. This can include optimizing the cycle



time, splits, and phasing. In addition, for closely spaced intersections, optimizing the offset and better signal coordination will also reduce delay.

- Implement roadway geometry changes: Changing the roadway geometry could help reduce intersection delay. This would include changing the roadway width by widening the street or changing the existing geometry configuration through restriping. Intersection #43 (Main Street and Middlefield Road) and Intersection #64 (El Camino Real and Alma Street and Sand Hill Road) are examples of where roadway geometry could be altered as a mitigation measure to reduce intersection delay.

Impact TR-7: The project would generate an impact if it were to create a temporary but prolonged impact due to lane closures, need for temporary signals, emergency vehicle access, traffic hazards to bikes and pedestrians, damage to roadbed, and truck traffic on roadways not designated as truck routes

Level of Impact: Less than Significant with Mitigation

The electrification of the Caltrain system may require temporary lane closures and signals during construction but appropriate traffic control will be implemented per **Mitigation Measure TRA-7** below to allow the orderly movement of vehicles, pedestrians, and bicyclists. As a result, the impact is **less than significant with mitigation**.

Mitigation Measure TRA-7: Construction Road Traffic Control Plan

The JPB would coordinate with the traffic departments of local jurisdictions and with all corridor emergency service providers to develop a Traffic Control Plan (TCP) to mitigate construction impacts on transit service, roadway operations, emergency responses, pedestrian and bicycle facilities, and public safety. Measures that will be implemented throughout the course of project construction, will include, but not limited to, the following:

- Maintain acceptable response times and performance objectives for emergency response services.
- Limit number of simultaneous street closures and consequent detours of transit and vehicular traffic within each immediate vicinity, with closure time frame limited as much as feasible for each closure, unless alternative traffic routings are available.
- Implement traffic control measures to minimize traffic conflicts and delays to the traveling public for local roadways where lane closures and restricted travel speeds will be required for longer periods.
- Provide advance notice of all construction-related street closures, durations, and detours to local jurisdictions, emergency service providers, and motorists.
- Provide safety measures for vehicles, bicyclists and pedestrians to transit through construction zones safely.
- Limit sidewalk, bicycle, and pedestrian walkway closures to one location within each vicinity at a time, with a closure time frame limited as much as feasible 48 for each closure unless alternative routings for pedestrian and bicycle transit are available.

Provide designate areas for construction worker parking wherever feasible to minimize use of parking in residential or business areas.



3.6.7.2 2040 Project Scenario

Impact TR-1: The project would result in an increase in VMT per service population in the Study Area (e.g., San Francisco, San Mateo and Santa Clara Counties)

Level of Impact: Less than significant

Regional VMT projections for 2020 are discussed in Section 3.6.2. As presented in Table 3-17, total regional VMT under the 2040 Project scenario are less than total regional VMT under the 2040 No Project scenario (225,903,910 miles and 226,522,817 miles respectively). While certain locations near the stations or on the Caltrain corridor may experience increases in traffic due to more automobiles driving to and from stations (see discussion below under Impact TRA-1c), numerous roadways along the Caltrain corridor would see reduced traffic volumes as a result of the Proposed Project. In particular, major arterials, such as El Camino Real, SR 84, SR 92, I-280, and US 101 and other roadways, would see reductions in overall vehicle traffic, as the Proposed Project would shift travel demand from driving trips to transit trips.

Impact TR-2: The project would interfere with, conflict with, or preclude other planned improvements such as transit projects, roadway extensions and expansions, and pedestrian or bicycle facility improvements

Level of Impact: Less than Significant with Mitigation

As described below and in Section 4.1, *Cumulative Impacts* in the main text of the EIR, with mitigation, the project is consistent with other planned improvements such as transit projects, roadway extensions and expansions, and pedestrian or bicycle facility improvements

Impact TR-3: The project would conflict or create inconsistencies with adopted regional transportation plans

Level of Impact: Less than Significant

The 2020 Project impacts described in Section 3.6.7.1 Impact TR-3 are also applicable to the 2040 Project Scenario.

Impact TR-5: The project conflicts or creates inconsistencies with local traffic plans

Level of Impact: Less than Significant

The 2020 Project impacts described in Section 3.6.7.1 Impact TR-5 are also applicable to the 2040 Project Scenario.

Impact TR-6: The project would disrupt existing traffic operations

Level of Impact: Significant and Unavoidable with mitigation



Project impacts on traffic operation would be significant due to the increased frequency of Caltrain service that could potentially cause increased delay at grade crossings for vehicles, pedestrians, and bicycles and increased traffic around Caltrain stations due to increased ridership. Implementation of certain mitigation measures would reduce or eliminate the localized impact at certain locations.

However, due to financial limitations, it is infeasible to implement grade separations at all impacted locations. Due to lane configurations, traffic volumes, and traffic patterns at individual locations, it is infeasible to reduce the delay at all impacted locations with the signal optimization improvement. Although the Project would reduce VMT and VHT at the regional level; at local level, the impact would be significant and unavoidable at locations with traffic impacts that cannot be mitigated. As a result, the level of impact at these locations is **significant and unavoidable**.

Mitigation Measure TRA-6b: Implement a phased program to provide traffic improvements to reduce traffic delays near at-grade crossings and Caltrain stations

Table 3-26 summarizes the intersection impacts and the associated mitigation measures proposed to minimize localized traffic impacts in the 2040 condition.

Caltrain, in cooperation with local agencies and other parties, will support a phased program seeking to improve local roadway conditions along the Caltrain corridor near at-grade crossings and Caltrain stations where cumulative impacts have been identified and where the Proposed Project makes an adverse contribution to traffic delays. Given that there are multiple contributors to cumulative traffic conditions, Caltrain is only responsible to fund its fair share for necessary improvements with local jurisdictions, future land use development as well as other rail services responsible to fund their fair share as well. Fair share shall be determined by cumulative contributions to future traffic levels at identified significant cumulatively affected intersections and roadways determined using traffic modeling

In the long run, where adequate funding is available, there are a variety of technically feasible traffic improvements that would help to reduce cumulative traffic delays at intersections near at-grade crossings and Caltrain stations including, but not limited to the following options:

- **Traffic signal optimization:** Signal timing optimization can be performed to reduce delay at grade crossings. This can include optimizing the cycle time, splits, and phasing. In addition, for closely spaced intersections, optimizing the offset and better signal coordination can also reduce delay. Signal optimization was considered as a mitigation measure at a number of study intersections as shown in Table 3-26.
- **Roadway Geometry Changes:** Changing the roadway geometry can also help reduce intersection delay. This can include changing the roadway width by widening the street or changing the existing geometry configuration through restriping. Intersection #43 (Main Street and Middlefield Road) and Intersection #64 (El Camino Real and Alma Street and Sand Hill Road) are examples of where roadway geometry could be altered as a mitigation measure to reduce intersection delay. More detailed information can be found in Table 3-26.
- **Grade Separations:** Given the costs and disruption of major roadway widenings and grade separations, Caltrain cannot commit at this time to a comprehensive program of improvements that would address all cumulative impacts in the future, because it does not have the identified



funding and does not expect to receive sufficient funding in the foreseeable future. However, Caltrain, in cooperation with local jurisdictions, transportation funding agencies, and state and federal agencies, will support incremental roadway improvements grade separations at locations of cumulative traffic impacts over time as funding becomes available. Caltrain will work with local, state, and federal partners to establish priorities for roadway improvements grade separations to be implemented as funding becomes available. Caltrain will also work with other rail parties to seek funding participation from multiple parties on a fair-share basis in proportion to traffic contributions.

This mitigation is funding limited and will likely take many decades to implement.

Impact TR-7: The project would create a temporary but prolonged impact due to lane closures, need for temporary signals, emergency vehicle access, traffic hazards to bikes and pedestrians, damage to roadbed, and truck traffic on roadways not designated as truck routes

Level of Impact: No impact.

The electrification project is planned to be completed by 2019. Therefore there would be no impact in 2040 due to construction.

3.7 FUTURE TRANSIT SYSTEM

This section describes transit ridership projections for all No Project and Project scenarios. These projections were derived from the models described in Section 3.5.1. Future ridership estimates for transit systems connecting to Caltrain are also presented, as well as results of the Mode of Access and Mode of Egress Models for all No Project and Project scenarios. At the close of this section, 2020 and 2040 Project scenarios are measured against the transit system significance criteria.

3.7.1 CALTRAIN RIDERSHIP

This section describes ridership projections for 2020 No Project, 2020 Project scenario, 2040 No Project, and 2040 Project scenario. Ridership projections for 2020 are discussed, followed by 2040. Ridership is measured as total weekday passenger boardings.

3.7.1.1 2020 Ridership Projections

This section presents ridership projections for the 2020 No Project and 2020 Project scenarios. Total system ridership would increase more for the 2020 Project than 2020 No Project. In addition, ridership at the majority of stations would also experience greater increases under the 2020 Project scenario than the 2020 No Project scenario. Capacity on the Caltrain system in 2020 was analyzed alongside ridership projections. Capacity in 2020 is adequate for No Project and Project scenarios. A detailed capacity analysis was necessary for 2040. A summary of this analysis is in Section 3.7.1.3.



3.7.1.1.1 2020 No Project Scenario

The assumptions that form the foundation of the 2020 No Project scenario ridership projections are detailed in Section 3.2.1. Table 3-27 displays ridership projections for the 2020 No Project scenario. Compared to current conditions, overall ridership increases by 20% in 2020 under the No Project scenario, reaching almost 56,000 daily passenger trips. The change is not evenly distributed across all stations, with higher land use growth and connectivity producing ridership increases of the 50% or more at 22nd Street, Bayshore, South SF and Tamien Stations. The greatest increases in absolute terms, over 700 boardings each, occur at San Francisco, Millbrae, Palo Alto, Mountain View and Diridon Stations. These ridership gains are consistent with the steady growth in Caltrain ridership since 2006. Demand for Caltrain service would rise even though system infrastructure and capacity under this scenario would not.

3.7.1.1.2 2020 Project Scenario

The assumptions that form the foundation of the 2020 Project scenario ridership projections are detailed in Section 3.2.2. The cornerstone of the 2020 Project scenario is the electrification of Caltrain tracks and fleet to include EMU vehicles. Table 3-12 and Figure 3-18 display ridership projections for the 2020 Project scenario as compared to the 2020 No Project scenario. System-wide ridership for the 2020 Project scenario would be 67,730 passenger boardings. The 2020 Project scenario would add about 11,900 more passengers to the Caltrain system than the 2020 No Project scenario. Unlike the No Project scenario, the Project would add capacity to the Caltrain system mainly through more frequent service and vehicles. The number of trains in the peak period per direction would increase to six, and the number of passenger cars would increase from 118 to 150. Section 3.2.2 includes more detailed comparisons of service frequencies and schedules between the No Project and Project scenarios.

The Project increases train frequencies overall, with differences in trains-per-hour and the travel time efficiency with which certain trains reach their destinations varying by station. Overall ridership is projected to increase to almost 68,000 passengers per day, which is 21% higher than the 2020 No Project scenario ridership and 43% higher than 2013 system patronage. Stations with the greatest increases in ridership between the 2020 No Project scenario and the 2020 Project scenario include Bayshore, South San Francisco, Hayward Park, and Tamien, with increases ranging from 46% to 116%. Compared with the 2020 No Project scenario, small decreases in ridership are projected for Burlingame, Menlo Park, and California Ave due to minor reductions in train frequency relative to neighboring stations and shifting of some riders to stations with relatively higher service levels. San Francisco, Millbrae, Palo Alto, Mountain View, and Diridon will all experience increases of more than 1,100 daily riders relative to the 2020 No Project scenario.



**TABLE 3-27
DAILY RIDERSHIP FORECASTS BY STATION, 2020 NO PROJECT AND PROJECT SCENARIOS**

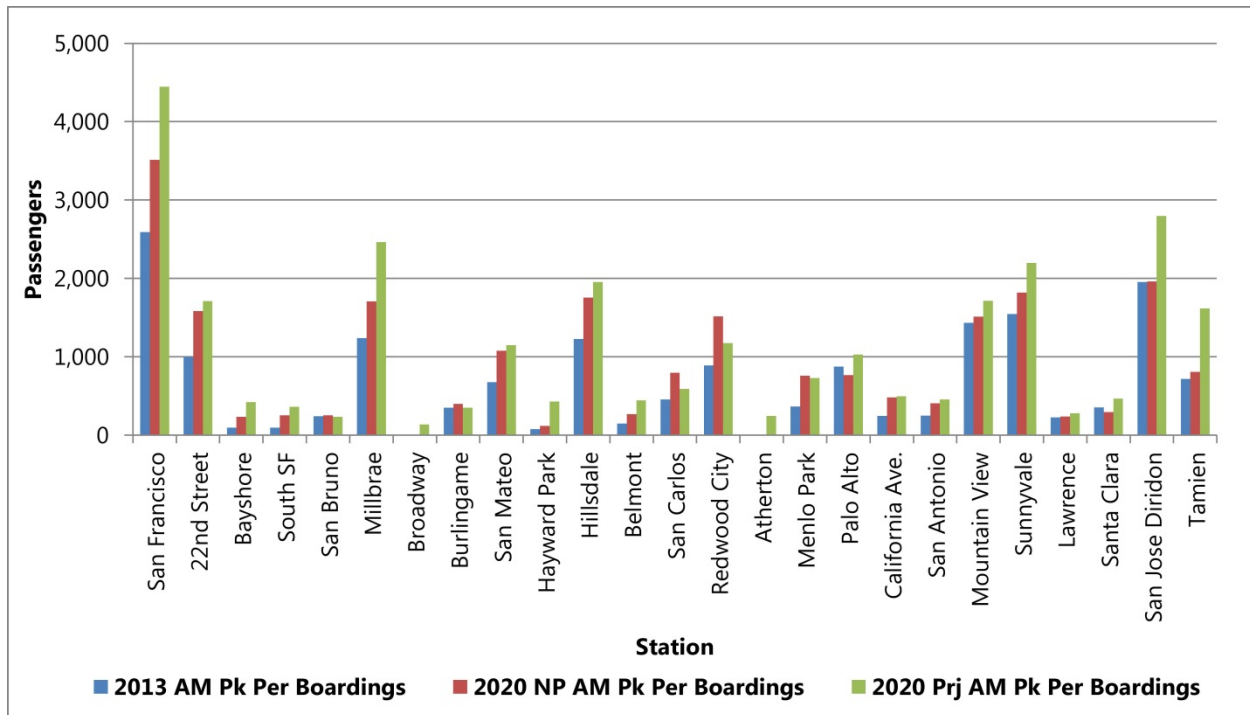
Station	Existing Conditions	2020 No Project	2020 Project
4 th and King	10,790	13,000	14,340
22nd Street	1,310	1,950	2,310
Bayshore	200	440	730
South SF	360	550	800
San Bruno	440	480	500
Millbrae	3,260	3,970	5,130
Broadway	-	0	390
Burlingame	790	890	760
San Mateo	1,570	1,740	1,910
Hayward Park	330	490	1,070
Hillsdale	2,320	2,740	3,370
Belmont	510	510	750
San Carlos	1,140	1,370	1,440
Redwood City	2,620	2,970	3,180
Atherton	-	0	280
Menlo Park	1,500	1,580	1,520
Palo Alto	5,470	6,380	7,910
California Avenue	1,290	1,410	1,380
San Antonio	680	750	840
Mountain View	3,880	4,580	5,920
Sunnyvale	2,270	2,720	3,280
Lawrence	700	920	1,160
Santa Clara	820	890	1,090
San Jose Diridon	3,490	4,270	5,600
Tamien*	810	1,230	2,100
Total	46,560	55,830	67,730

*Excludes ridership south of Tamien Station,

Note: Numbers may not match totals due to rounding. No service increases are proposed at the College Park Station and ridership at this station is very low at present (118 boardings/day). While College Park boardings are included in overall system ridership estimates, no analysis of localized traffic around this station was conducted given the low level of boardings and lack of proposed service increases.



Figure 3-18 AM Ridership Forecasts by Station, 2020 No Project and Project Scenarios



Note: AM ridership represents boardings between 5:00 to 9:00 AM on weekdays.

3.7.1.2 2040 Ridership Projections

This section presents ridership projections for the 2040 No Project and Project scenarios. Total system ridership would increase more for the 2040 Project scenario than the 2040 No Project scenario. In addition, ridership at the majority of stations would also experience greater increases under the 2040 Project scenario than the 2020 No Project scenario.

3.7.1.2.1 2040 No Project Scenario

The assumptions that form the foundation of the 2040 No Project scenario ridership projections are detailed in Section 3.3. Table 3-28 and Figure 3-19 display ridership projections for the 2040 No Project scenario. Daily patronage is projected to reach almost 82,000 in 2040 and about 108,000 with the Project, increases over 2013 levels of 76% and 115% respectively.

3.7.1.2.2 2040 Project Scenario

The assumptions that form the foundation of the 2020 Project scenario ridership projections are detailed in Section 3.3. Table 3-12 and Figure 3-19 display ridership projections for the 2040 Project scenario as compared to the 2040 No Project scenario. Under the No Project scenario, corridor population and employment growth accompanied by changes to other transit connections and increases in highway congestion are forecast to increase Caltrain ridership by 47% between 2020 and 2040. Stations experiencing the greatest effects will be Bayshore, South San Francisco, San Bruno, and Hayward Park, all with increases of more than 75% over the 20-year period. In percentage terms, 4th and King will be one of the lowest growth stations, reflecting a redistribution of the trip origins and destinations to shorter



intra-Peninsula travel over the period. The 4th and King, Millbrae, Redwood City, Palo Alto, Mountain View and Diridon Stations are all expected to experience increases of more than 2,000 daily riders compared with the 2020 No Project scenario.

The addition of the Project will raise 2040 ridership by 32% over the 2040 No Project scenario; 2040 Project ridership will be 62% higher than 2020 Project ridership. As a partial result of Project service redistribution, stations where, in 2040, the Project will add the greatest amount of ridership compared with the No Project scenario will be Bayshore, Hillsdale, Mountain View, and Diridon, each with increases of at least 40%. Total ridership generated near downtown San Francisco, combining 4th and King with the new Transbay Terminal station, will also be greater than 40% higher in 2040 with the Project scenario than without. Millbrae, Palo Alto, Mountain View, and Diridon will all experience increases of more than 2,400 daily riders compared with the 2040 No Project scenario.



**TABLE 3-28
DAILY RIDERSHIP PROJECTIONS, 2040 NO PROJECT AND PROJECT SCENARIOS**

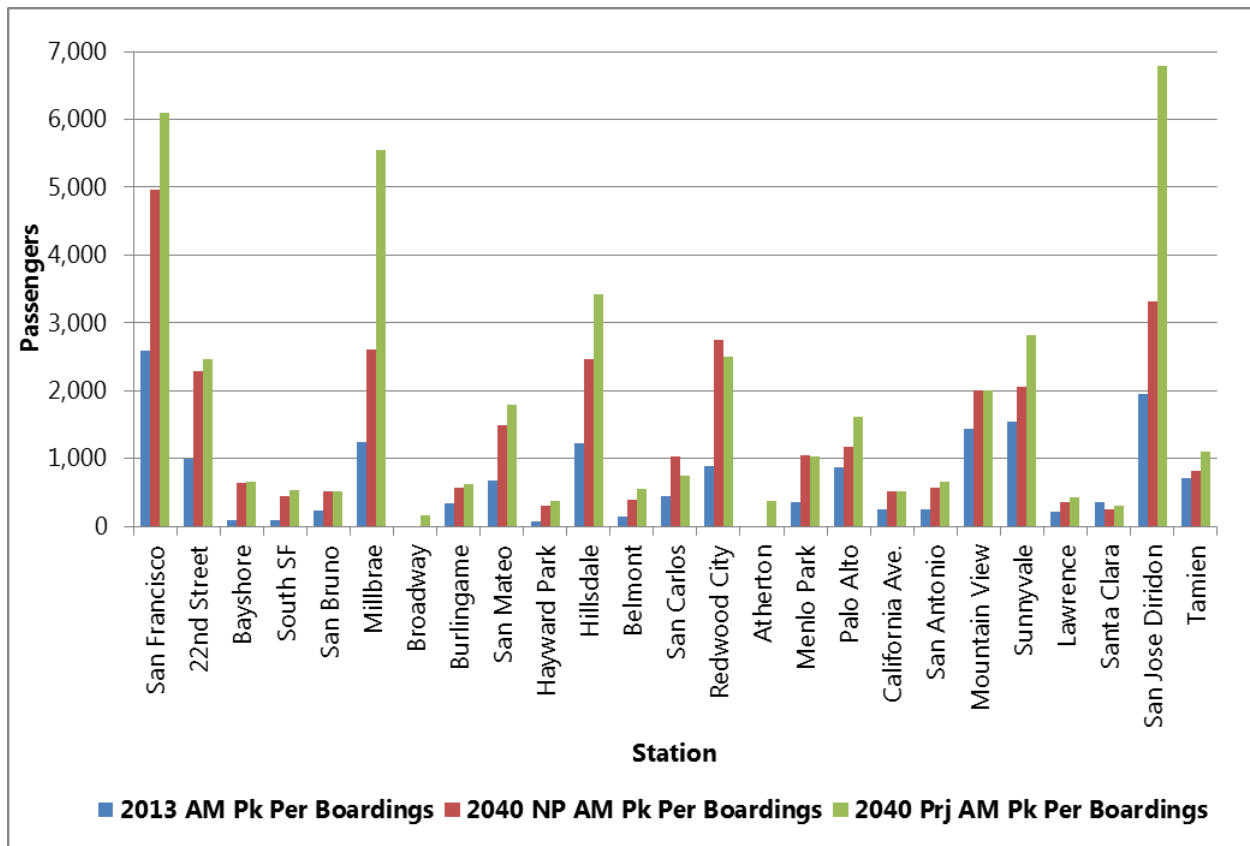
Station	Existing Conditions	2020 No Project	2020 Project	2040 No Project	2040 Project
Transbay Center	N/A	N/A	N/A	N/A	8,530
4 th and King	10,790	13,000	14,340	16,560	15,230
22nd Street	1,310	1,950	2,310	2,860	3,290
Bayshore	200	440	730	1,040	1,700
South SF	360	550	800	1,000	1,200
San Bruno	440	480	500	960	1,200
Millbrae	3,260	3,970	5,130	6,500	8,960
Broadway	-	0	390	0	440
Burlingame	790	890	760	1,320	1,440
San Mateo	1,570	1,740	1,910	2,530	3,280
Hayward Park	330	490	1,070	1,510	1,420
Hillsdale	2,320	2,740	3,370	4,040	6,000
Belmont	510	510	750	820	1,090
San Carlos	1,140	1,370	1,440	1,890	1,900
Redwood City	2,620	2,970	3,180	5,170	5,670
Atherton	-	0	280	0	430
Menlo Park	1,500	1,580	1,520	2,180	2,140
Palo Alto	5,470	6,380	7,910	9,820	13,540
California Avenue	1,290	1,410	1,380	1,990	1,500
San Antonio	680	750	840	1,110	1,280
Mountain View	3,880	4,580	5,920	6,700	9,570
Sunnyvale	2,270	2,720	3,280	3,480	4,630
Lawrence	700	920	1,160	1,410	1,750
Santa Clara	820	890	1,090	950	930
San Jose Diridon	3,490	4,270	5,600	6,640	10,600
Tamien*	810	1,230	2,100	1,360	1,880
Total	46,560	55,830	67,730	81,820	109,590

*Excludes boardings south of Tamien Station.

Note: Numbers may not match totals due to rounding. No service increases are proposed at the College Park Station and ridership at this station is very low at present (118 boardings/day). While College Park boardings are included in overall system ridership estimates, no analysis of localized traffic around this station was conducted given the low level of boardings and lack of proposed service increases.



Figure 3-19 AM Ridership Forecasts by Station, 2040 No Project and Project Scenarios



Note: AM ridership represents boardings between 5:00 to 9:00 AM on weekdays.

3.7.1.3 2040 System Capacity Analysis

A detailed capacity analysis for 2040 was necessary due to the growth in Caltrain ridership. In 2040, Caltrain ridership will approach the system’s capacity during peak periods. However, careful examination of how demand will shift over that time period leads to a conclusion that demand will reach but not exceed peak capacity in both the No Project and Project scenarios. Table 3-29 displays system capacity for 2040 No Project and Project scenarios.

The main assumptions and methodological approach used in the 2040 capacity analysis are summarized below:

- For purposes of capacity analysis, the “passenger load factor” was calculated as the total ridership for a period divided by the maximum passenger load at any point along the route. In addition, it is estimated that an additional 20 percent of passengers above seated capacity can be accommodated as standees if necessary.
- For the traditional peak direction (AM northbound and PM southbound), the passenger load factor is currently 1.6, and forecast to increase to 2.0 by 2040, indicating shorter trips; particularly the addition of trips which do not extend all the way to the peak load point at the 4th and King Station.



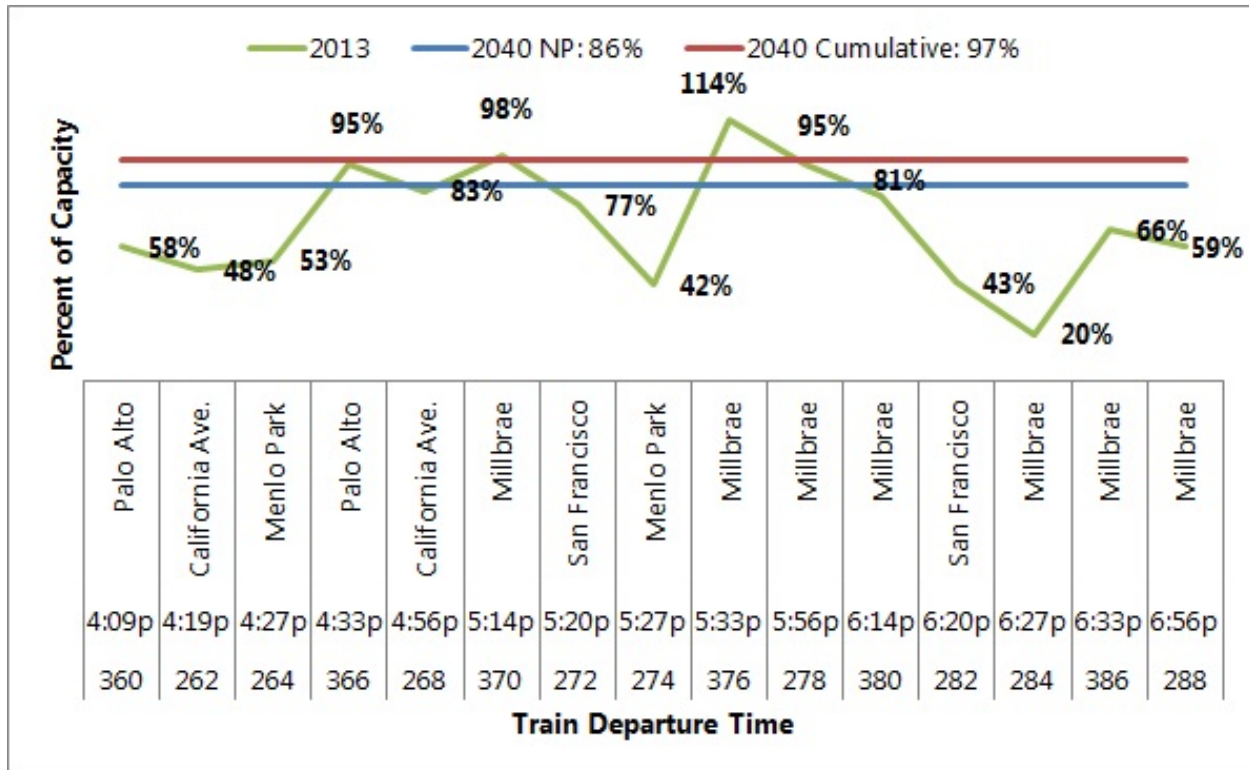
- For the reverse peak direction (AM southbound and PM northbound), the passenger load factor is currently 1.3, and is not forecasted to change significantly by 2040. Trips in this direction already tend to be longer, and this is also not forecasted to change by 2040. The peak load point in this direction is Palo Alto, rather than the San Jose Diridon Station, leaving less room for short trips to be added which avoid the peak segment.

Based on the 2040 analysis of the Caltrain system under the No Project and Project scenarios, the following trends are forecasted to emerge by 2040 for both the No Project and Project scenarios:

- Trips will become shorter, with an increase in ridership within the Peninsula that is greater than the increase in riders that traverse the point of maximum line loading heading into San Francisco.
- The distribution of boardings and alightings will allow that, compared with today, seat occupancy will turnover more often as the trains travel the full corridor, for example serving both a rider between Tamien and Mountain View, another rider travelling between Palo Alto and Millbrae, and perhaps a third between Millbrae and San Francisco.
- Passengers will shift their travel schedules within the peak period to trains with sufficient capacity, avoiding trains that, even today, are loaded to near capacity. Figure 3-20 illustrates the shift to maximum utilization of peak capacity from a condition in 2013 where one peak train is overcapacity and three are at or near capacity to a the 2040 No Project and Project scenarios where all peak period trains operate at 86% and 97% of capacity, respectively. Also, it is estimated that about 5% of riders will shift to outside the peak period entirely, a trend that is already apparent in existing conditions.
- Lastly, the number of standees per train will increase to about 30 standees per car at the maximum load point, lasting for a maximum of about 20 minutes based on an estimated turnover rates of two (2). This combination of peak spreading, trip shortening, turnover rates and a higher percentage of standees will allow Caltrain to accommodate more riders per line mile than in 2013 and just meet the projected 2040 demand.



Figure 3-20 Comparison of 2013 and 2040 Maximum Capacity Utilization (PM Peak Southbound)



Note: Text box beneath Station titles indicates which station the train reaches its peak load point.

**TABLE 3-29
SYSTEM CAPACITY, 2040 NO PROJECT AND PROJECT**

Scenario	Southbound AM	Northbound AM	Southbound PM	Northbound PM
2040 No Project projected AM ridership	12,400	17,000	17,000	12,400
2040 No Project projected capacity	12,800	19,700	19,700	12,800
2040 No Project Capacity Level	97%	86%	86%	97%
2040 Project projected AM ridership	15,500	23,200	23,200	15,500
2040 Project projected capacity	15,600	24,000	24,000	15,600
2040 Project Capacity Level	99%	97%	97%	99%

Notes: AM period includes all trains departing between 6:00 – 9:00 AM. PM period includes all trains departing between 4:00 – 7:00 PM.



3.7.2 CORRIDOR TRAVEL PATTERNS

As discussed in Section 2.1.3, Caltrain passengers connect to and depart from Caltrain stations via a variety of modes: including: bicycle, car, walking, other transit systems, public and private shuttles, motorcycle and moped, or taxi. This section describes modes of access to and modes of egress from Caltrain stations under each No Project and Project scenario.

EMUs have better acceleration/deceleration than diesel locomotives and the Proposed Project will also increase service frequencies. Thus in future service planning, Caltrain will have more options in providing service including adding additional station stops without lowering transit travel times and/or lowering transit times. For Caltrain riders overall, transit travel times along the Caltrain corridor are anticipated to decrease somewhat with the Proposed Project in the long run due to a combination of increased frequencies, better acceleration/deceleration with EMUs, more stops and more reliable connections to other modes at stations. Travel patterns along the corridor are also influenced by corresponding automobile travel times, which are expected to increase over time. Travel times by automobile are also highly variable because traffic conditions are affected by weather, collisions, time of day, travel direction, and season. By 2040, automobile travel times are expected to be higher than comparable transit travel times between many stations, meaning Caltrain service will be seen as an increasingly attractive travel option compared to automobile travel.

Fehr & Peers developed models to forecast modes of access and modes of egress at stations, using the 2013 Intercept Survey of the actual proportions of riders accessing and egressing by automobile (park-ride, kiss-ride), transit, walking, and bicycling. The analysis found the following factors to be directly associated with actual access and egress mode shares: parking supply and price, frequency of feeder bus, rail, and private shuttle service to station, street network intersection density, percent coverage of bike lanes surrounding stations, local population and employment density, and Caltrain service frequencies. More detailed information on the development and results of the station modes of access and egress forecasts can be found in Attachment D.

3.7.2.1 2020 Modes of Access

This section describes modes of access to Caltrain stations under the 2020 No Project and Project scenarios. Figure 3-21 displays AM modes of access for the 2020 No Project and Project Scenarios side-by-side for comparison.

3.7.2.1.1 2020 No Project Scenario

Independent of the electrification project, modes used to reach Caltrain stations in the AM peak period are projected to shift as indicated Figure 3-21. Due to the region's planned focus growth at transit-oriented development areas, most stations are expected to progress toward higher proportions of walk and bike access between 2013 and 2020. The projection is for lower proportions of, though generally not lower absolute amounts of, park-ride and kiss-ride access. For example, at 4th and King, walk mode share is projected to increase under both Project and No Project scenarios due to increased development in the station vicinity, with a greater proportion of passengers walking under the No Project scenario. This same shift also occurs for biking. At some stations, transit use increases considerably, including at the Millbrae Station, a station with a BART connection and high projected ridership, Santa Clara, and San Jose Diridon Stations. At 4th and King, transit use is predicted to decrease compared to Existing Conditions under No



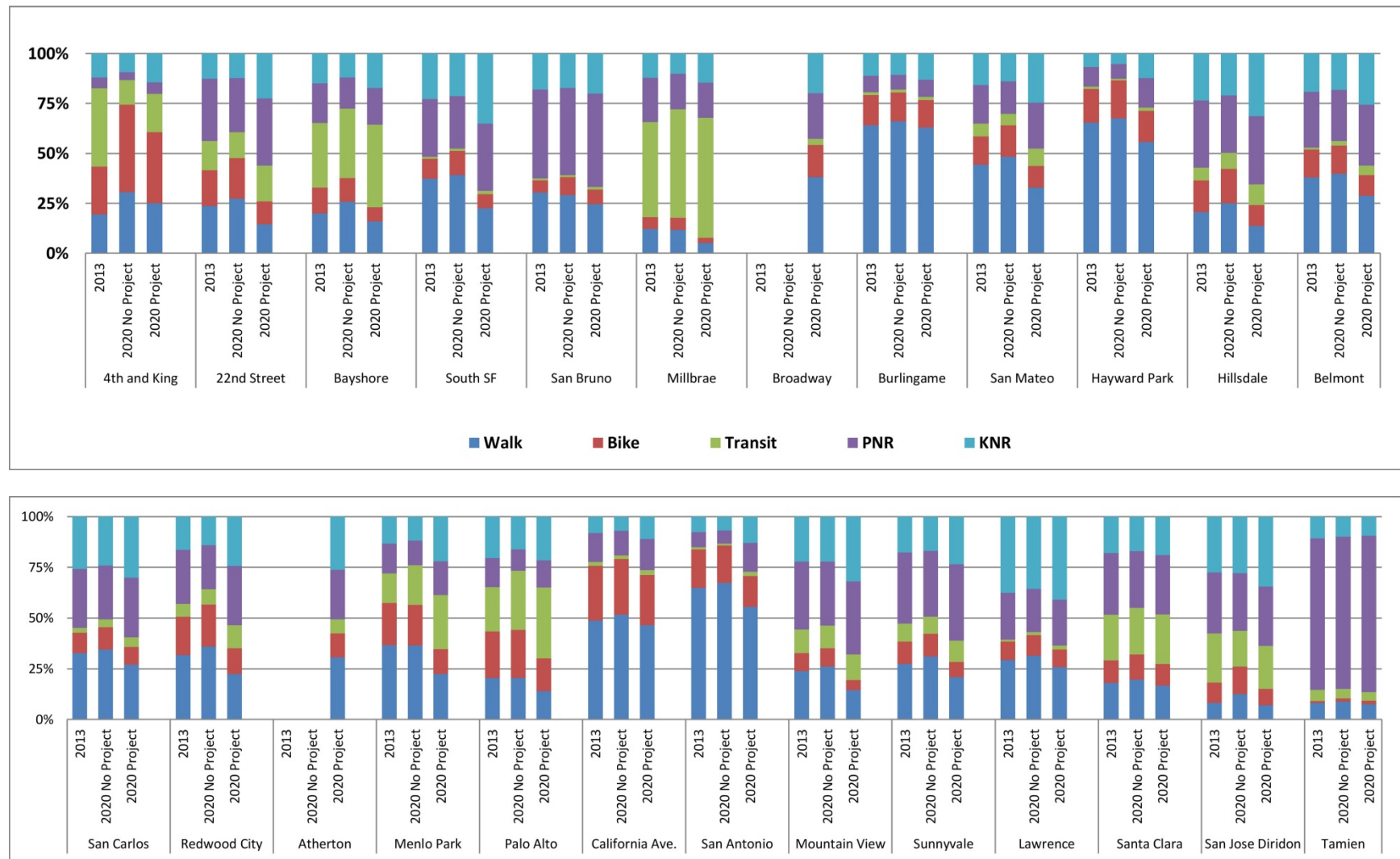
Project and Project scenarios, as more passengers shift to other modes to reach the station (biking, walking, and kiss-and-ride). Some high-ridership stations under the No Project scenario experience higher shares of park-and-ride and kiss-and-ride access than non-motorized modes and transit. Hillsdale, San Jose Diridon, Redwood City, Mountain View, and Sunnyvale Stations experience shifts toward higher park-and-ride and walk access.

3.7.2.1.2 2020 Project Scenario

As shown in Figure 3-21, access mode choice undergoes a different transition in the Project scenario than the No Project scenario. In the 2020 Project scenario, walking is projected to decrease proportionally by 2020 in comparison to existing conditions, while auto access (park-and-ride and kiss-and-ride) is projected to increase as a proportion of the total. This is partly due to shifts in train service frequencies and destination travel times drawing some riders to stations that might not be the nearest ones to their point of trip origination. The effect is most noticeable at stations in northern San Mateo County and San Francisco. High ridership stations, including 4th and King, Millbrae, Sunnyvale, and San Jose Diridon, also see a shift toward slightly higher kiss-and-ride (including taxi) auto access in 2020 Project conditions in comparison to 2020 No Project.



Figure 3-21 AM Modes of Access, 2020 No Project and Project Scenarios



Notes: AM period defined as 6:30 to 10:30 AM (weekday); AM mode of access is for weekdays only, as a result there is no data for Broadway and Atherton Stations (weekend-only service)



3.7.2.2 2020 Modes of Egress

This section describes modes of egress from Caltrain stations under the 2020 No Project and Project scenarios. Figure 3-22 displays modes of egress for the 2020 No Project and Project scenarios side-by-side for comparison. In general, non-motorized modes and transit are dominant egress modes for both No Project and Project scenarios.

3.7.2.2.1 2020 No Project Scenario

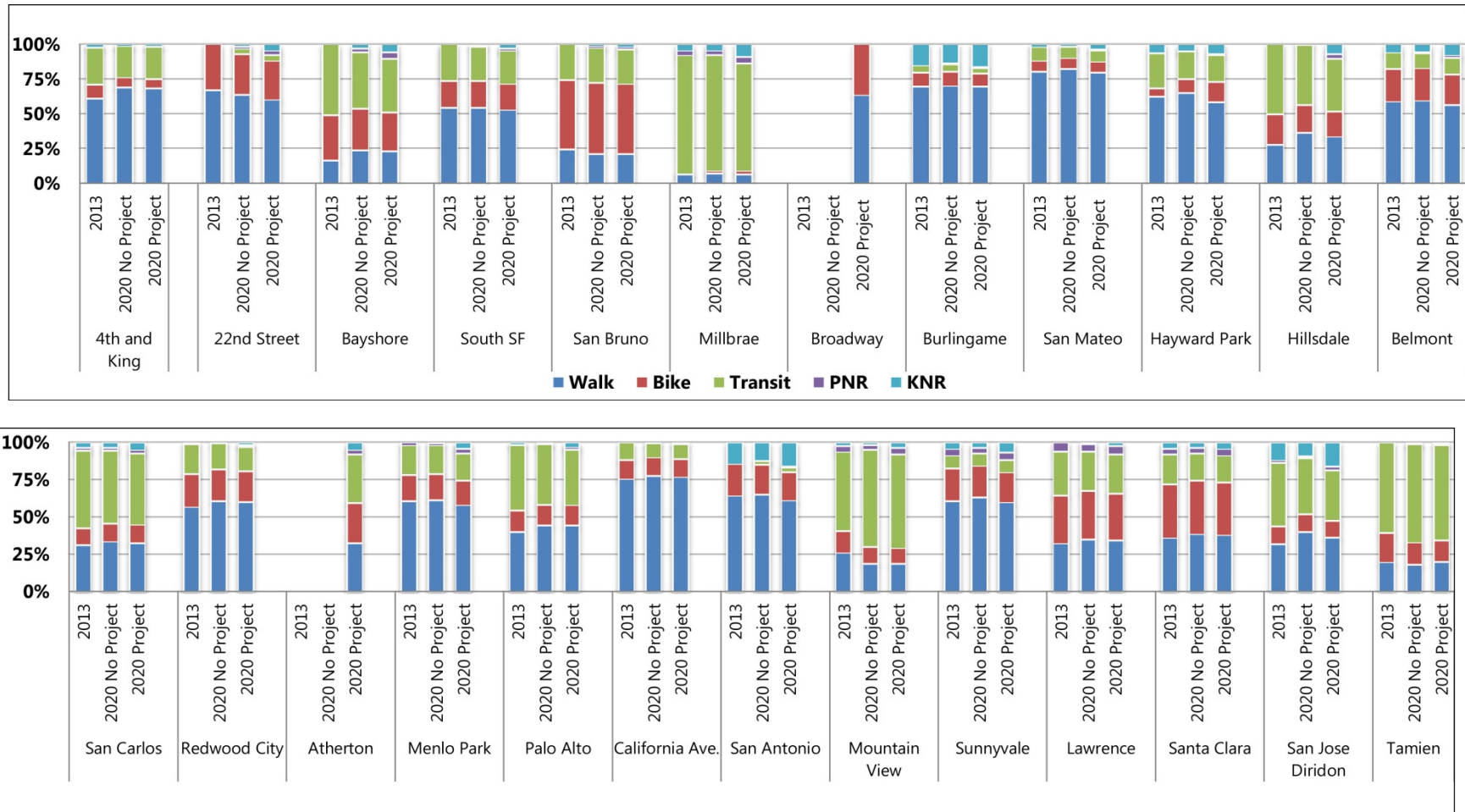
Under the No Project scenario, station AM peak period egress modes are projected to follow similar patterns as access modes discussed previously. Most stations show a progression toward higher proportions of walking and less driving in 2020 as compared to 2013. At high-ridership stations, walking, biking, and transit dominate. Large gains in transit use occur at Mountain View and Tamien Stations under the No Project scenario. Transit egress is expected to remain high at Millbrae and San Jose Diridon Stations, two stations with high transit egress under existing conditions. Walk and bike egress are projected to increase from 2013 to 2020 at the Sunnyvale and Hillsdale Stations. Walking as an egress mode is similar for 2020 No Project and Project scenarios at stations in San Francisco and northern San Mateo counties.

3.7.2.2.2 2020 Project Scenario

Station egress mode shares under the Project scenario also exhibit higher proportions of walking and less driving by 2020. Unlike Project access modes, which shift toward driving in 2020, AM peak egress modes are not as affected by travelers selecting more distant stations with higher service levels. Egress modes steadily progress toward less driving by 2020, as a proportion. Driving egress mode shares in the AM peak are less than 16 percent. At high-ridership stations under the 2020 Project scenario, walking and transit use tends to dominate as egress modes, with biking also capturing a large share of passengers at the San Bruno Station.



Figure 3-22 AM Mode of Egress to Caltrain Stations, 2020 No Project and Project Scenarios



Notes: AM period defined as 6:30 to 10:30 AM (weekday); AM mode of access is for weekdays only, as a result there is no data for Broadway and Atherton Stations (weekend-only service)



3.7.2.3 2040 Modes of Access

In 2040, some notable changes in station area access would occur. Stations expected to exhibit notable increases in transit connectivity by 2040 include Millbrae, and Diridon and Santa Clara due to the South Bay BART extension. Relative to 2020, local proportions of transit service to the 4th and King Station are expected to reduce by 2040 when Caltrain is extended all the way to Transbay Center and the financial district, providing access to BART connections on Market Street. Figure 3-23 displays AM mode of access for 2040 No Project and Project Scenarios.

3.7.2.3.1 2040 No Project Scenario

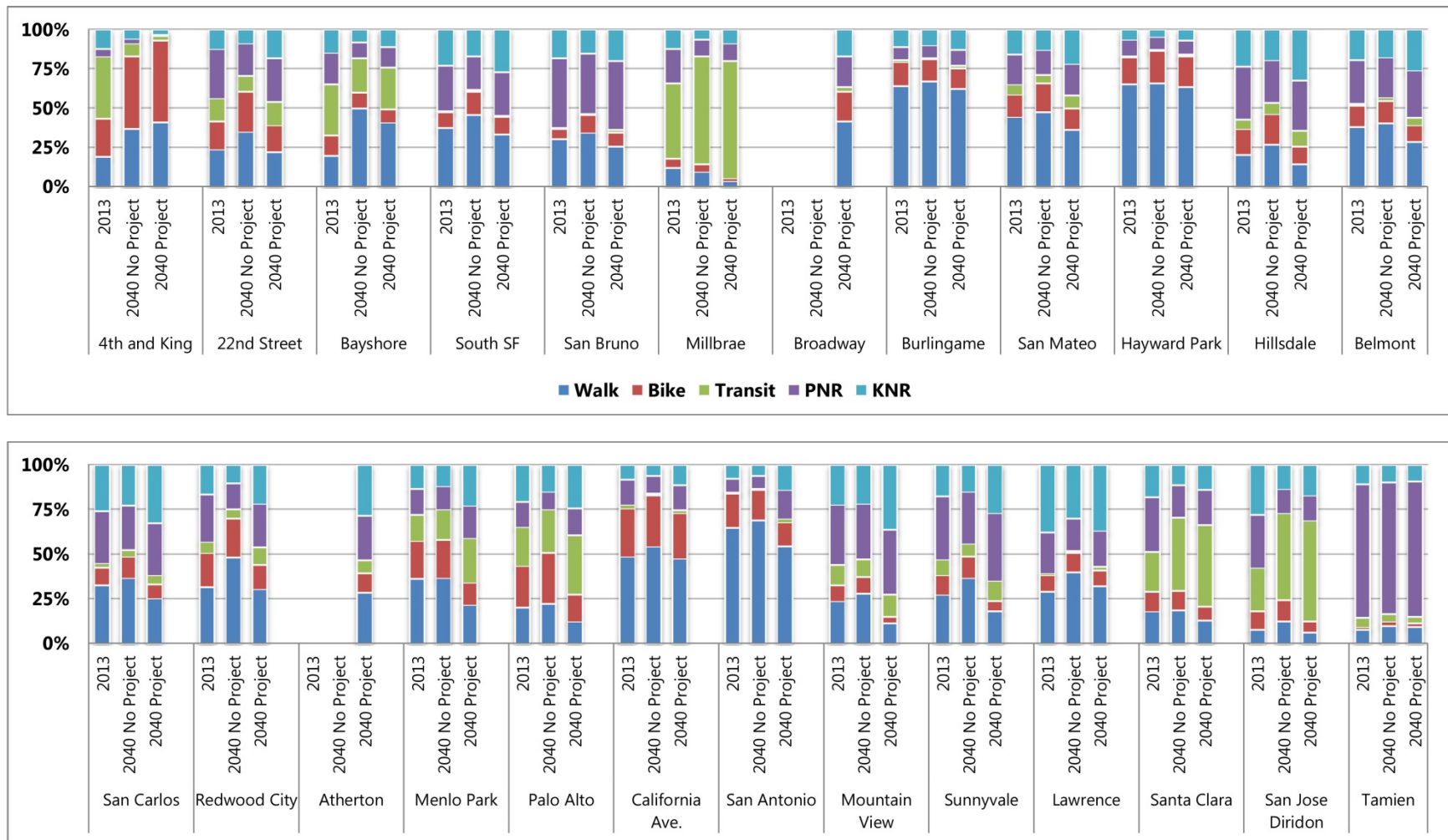
Due to the region's planned focus growth at transit-oriented development areas, most stations are expected to progress toward higher proportions of walk and bike access between 2020 and 2040. The projection is for lower proportions of, though generally not lower absolute amounts of, park-ride and kiss-ride access. Exceptions to the pattern are Diridon and Santa Clara in 2040, where the planned BART South Bay extension will dramatically increase the proportion of those arriving at Caltrain via transit under both No Project and Project scenarios. Millbrae is also projected to experience a higher proportion of access via transit by 2040 due to area transit service frequency improvements. At other high-ridership stations, transit and non-motorized modes tend to dominate. At Hillsdale Station, park-and-ride dominates, but walking as an access mode increases more under the 2040 No Project scenario than the 2040 Project scenario.

3.7.2.3.2 2040 Project Scenario

As shown in Figure 3-23, new station-area development begins to take effect as many stations see an increase in walk and bike access under the 2040 Project scenario. At many stations, the proportion of trips accessing Caltrain by auto (park-ride or kiss-ride) is projected to be lower in 2040 than in 2013. Exceptions, where driving access is projected to be proportionally higher in 2040, are: San Mateo, Hillsdale, Belmont, San Carlos, Menlo Park, Palo Alto, San Antonio, Mountain View, and Sunnyvale. As in the No Project scenario, 2040 Project access is projected to be highly oriented toward transit at BART service stations (San Jose Diridon, Santa Clara, and Millbrae). At San Jose Diridon Station, as transit ridership increases to 56 percent, other modes decrease. At Millbrae and Palo Alto, and Sunnyvale – all high ridership stations – transit access is higher under the Project than the No Project scenario. At Hillsdale Station, park-and-ride and kiss-and-ride are projected to be the most popular access modes. Bicycle access at 4th and King Station increases under the 2040 Project scenario, but given that overall ridership at this station decreases with the Proposed Project due to a shift in demand to the Transbay Terminal Station, the absolute number of bicycle riders is projected to decrease somewhat at this station.



Figure 3-23 AM Mode of Access to Caltrain Stations, 2040 No Project and Project Scenarios



Notes: AM period defined as 6:30 to 10:30 AM (weekday); AM mode of access is for weekdays only, as a result there is no data for Broadway and Atherton Stations (weekend-only service)



3.7.2.4 2040 Modes of Egress

Most stations continue to show a progression toward higher proportions of walking and less driving in 2040, with transit egress taking over as a dominant mode at BART-service stations by 2040. Thus this trend, which would already be pronounced in 2020, continues on an upward trajectory in 2040. Figure 3-24 displays AM mode of egress for the 2040 No Project and Project scenarios.

3.7.2.4.1 2040 No Project Scenario

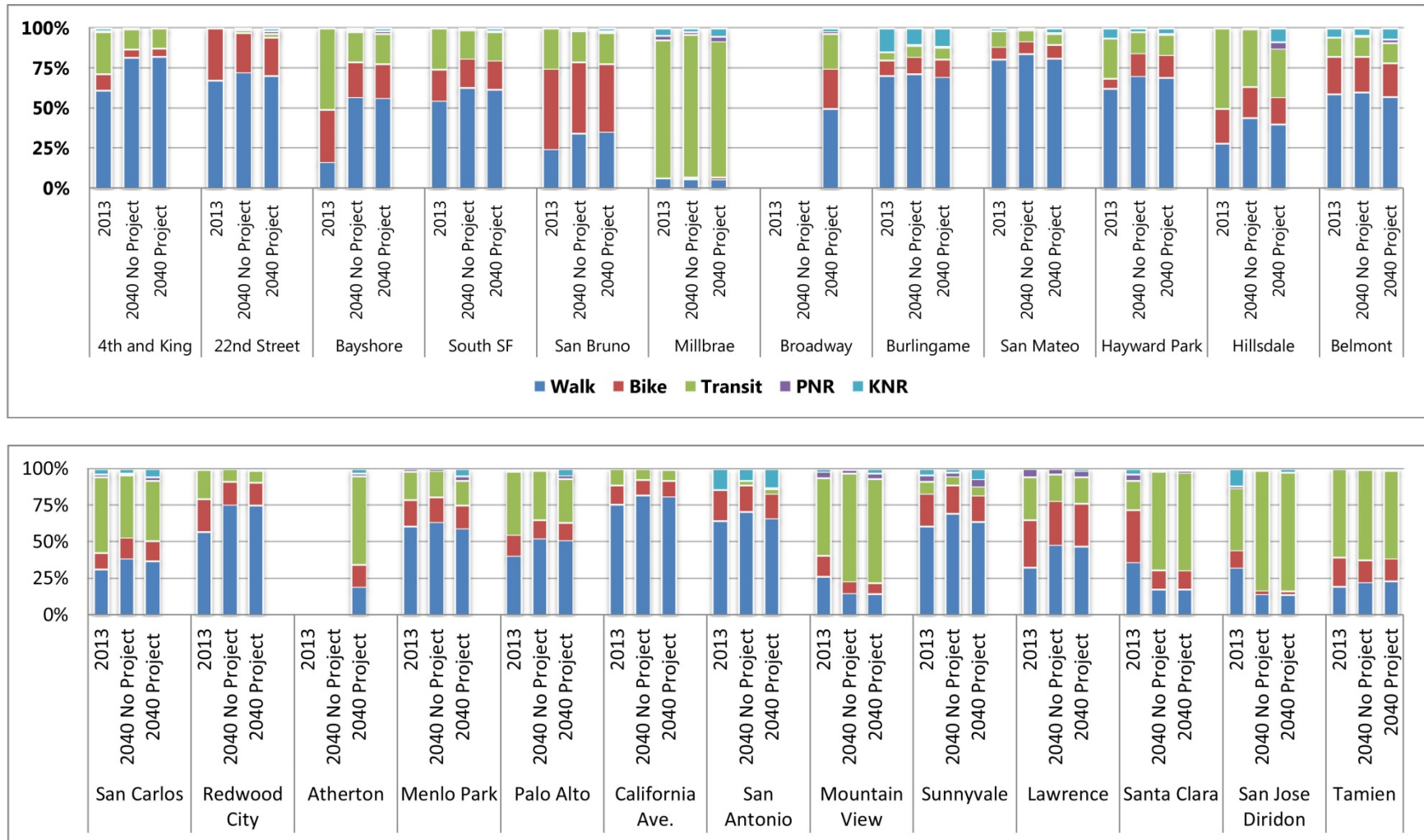
Walking, biking, and transit are projected to be the most commonly used egress modes under the 2040 No Project scenario. At Millbrae, transit use is slightly higher under the 2040 No Project scenario as compared to the 2040 Project scenario. Walking and transit egress is high at 4th and King and Hillsdale Stations. Walking and biking are the most common egress modes at the 22nd Street and Redwood City Stations. At the San Jose Diridon Station, transit is the dominate egress mode, likely due to the BART service, but walking and biking also increase considerably at proportions about equal to the 2040 Project scenario.

3.7.2.4.2 2040 Project Scenario

The 2040 Project Scenario does not vary greatly from 2020 Project Scenario or the 2013 existing conditions at most stations. System-wide, walking, biking, and transit are the most popular egress modes under the 2040 Project scenario. Walking and transit are the dominant modes of egress at most high-ridership stations under the 2040 Project scenario. At 4th and King, Hillsdale, and Diridon Stations, walking and transit are the most commonly used egress modes. Transit egress is highest at Millbrae and is about equal under 2040 No Project and 2040 Project scenarios. Stations that are in close proximity to transit extensions see a greater share of transit riders, such as the San Jose Diridon Station.



Figure 3-24 AM Mode of Egress to Caltrain Stations, 2040 No Project and Project Scenarios



Notes: AM period defined as 6:30 to 10:30 AM (weekday); AM mode of access is for weekdays only, as a result there is no data for Broadway and Atherton Stations (weekend-only service)



3.7.3 RIDERSHIP ON CONNECTING TRANSIT SYSTEMS

This section describes ridership projections in years 2020 and 2040 on transit systems that connect to Caltrain. Systems that currently connect to Caltrain are summarized in the existing conditions section. All regional transit systems are assumed to remain in years 2020 and 2040. Systems currently in the design and/or construction stages that are assumed to connect to Caltrain by 2020 and 2040 are described in Sections 3.1.2 and 3.3.2, respectively. Ridership projections for connecting systems are derived from the VTA travel demand model. Ridership on the following systems are summarized in this section: BART, SamTrans, VTA, San Francisco Muni Metro and Bus, and private and public shuttles connecting to Caltrain.

3.7.3.1 2020 Ridership on Connecting Transit Systems

This section presents and analyzes ridership on connecting transit systems that connect to Caltrain in 2020. The electrification of Caltrain in the 2020 Project scenario would impact ridership on connecting transit systems. As reported in Section 3.7.1 the total number of system-wide boardings on Caltrain would be greater for the 2020 Project scenario than the 2020 No Project scenario. The added passenger boardings associated with the 2020 Project scenario would result in a need for increased connective transit services on systems that connect to Caltrain, especially at stations with increased transit access and egress mode shares (Section 3.5.1).

**TABLE 3-30
RIDERSHIP ON TRANSIT SYSTEMS CONNECTING TO CALTRAIN, 2020 NO PROJECT AND 2020 PROJECT**

Connecting Transit System	Existing Conditions (observed)	2020 No Project	2020 Project	Percent Change 2020 Project vs. No Project
BART	366,600	459,500	459,100	-0.1%
SamTrans Bus (Local and BRT)	39,800	73,400	75,800	3.3%
VTA Light Rail	34,600	70,600	70,700	0.1%
VTA Bus (Local and BRT)	103,100	165,600	167,100	0.9%
VTA BRT	-	42,500	42,500	0%
Muni Metro	173,500	203,800	205,200	0.7%
Muni Bus	531,700	592,600	595,500	0.5%
Shuttles (public and private)	NA	12,200	16,600	36.1%
Total	1,250,600	1,626,000	1,648,800	1.4%

Source: VTA travel demand model, 2013

Table 3-30 displays ridership on connecting transit systems for 2020 No Project and 2020 Project scenarios. Overall, total ridership on all connecting systems would increase more for the 2020 Project scenario than 2020 No Project scenario. Ridership on connecting systems would increase by 1.4% for the 2020 Project scenario as compared 2020 No Project scenario.



The 2020 No Project scenario would be accompanied by a combined ridership of 126,000 passengers on connecting systems, an increase of 385,700 passengers from existing conditions. The 2020 Project scenario would be accompanied by a combined ridership of 1,648,800 passengers on connecting systems, an increase of 421,000 passengers from existing conditions.

On an individual-system level, the system that would see the highest increase in ridership for both 2020 No Project and 2020 Project scenarios is Muni Bus. BART would experience the second highest ridership increases for both scenarios. The BART system would experience a very slight decrease of ridership for the 2020 Project scenario compared to the 2020 No Project scenario. All other systems would experience a higher increase of passengers for the 2020 Project scenario than the 2020 No Project scenario.

3.7.3.2 2040 Ridership on Connecting Transit Systems

This section presents and analyzes ridership on connecting transit systems that connect to Caltrain in 2040. Ridership system-wide would increase more for the 2040 Project scenario than the 2040 No Project scenario. The added passenger boardings associated with the 2040 Project scenario would result in a need for increased connective transit services on systems that connect to Caltrain, especially at stations with increased transit access and egress mode shares (Section 3.5.1)

**TABLE 3-31
RIDERSHIP ON TRANSIT SYSTEMS CONNECTING TO CALTRAIN, 2040 NO PROJECT AND 2040 PROJECT**

Connecting Transit System	Existing Conditions (observed)	2040 No Project	2040 Project	Percent Change 2040 Project v No Project
BART	366,600	678,900	678,500	-0.1%
SamTrans Bus (Local and BRT)	39,800	103,200	99,500	-3.6%
VTA Light Rail	34,600	129,300	129,900	0.5%
VTA Bus (Local and BRT)	103,100	246,100	247,100	0.4%
VTA BRT	-	56,200	55,100	-2.0%
Muni Metro	173,500	252,200	251,600	-0.2%
Muni Bus	531,700	736,600	739,100	0.3%
Shuttles (public and private)	NA	20,700	26,800	29.5%
Total	1,250,600	2,227,700	2,222,900	-0.2%

Source: VTA travel demand model, 2013

Overall, connecting transit systems would experience increased ridership under both the 2040 No Project and 2040 Project scenarios. However, ridership for the 2040 Project scenario would be slightly less than the 2040 No Project scenario. This can be attributed to the constrained capacity on Caltrain for the 2040 No Project scenario. With space on Caltrain trains limited, transit demand would shift to connecting systems. For some trips, this could involve increased transfers and travel times for passengers. Capacity under the 2040 Project scenario would increase due to improved train frequencies and the added bullet service to more stations.



3.7.4 TRANSIT IMPACTS AND MITIGATION MEASURES

This section summarizes the impacts of the ridership significance criteria for each scenario in 2020 and 2040. There are four significance criteria for ridership:

- TR-8: The project would create demand for public transit services above the capacity which is provided or planned
- TR-9: The project would disrupt existing transit services or facilities
- TR-10: The project would interfere with planned transit services or facilities
- TR-11: The project would conflict or create inconsistencies with adopted transit system plans, guidelines, policies, or standards

3.7.4.1.1 2020 Project Scenario

The 2020 Project scenario does not exceed three of the four impact criteria. However, based on the current project description, the Caltrain ROW could interfere with planned SFMTA transit services at-grade crossing the 16th Street (Impact TR-10). The level of impact for each criteria and the mitigation measures associated with Impact TR-10 are discussed below.

Impact TR-8: The project would create demand for public transit services above the capacity which is provided or planned

Level of Impact: Less than Significant

In 2020, the Caltrain system would be able to accommodate the increased ridership in the peak and off peak periods under the Project scenario. There is adequate capacity in the future rolling stock with EMUs.¹⁹ In addition, the additional train service in the peak period will increase capacity as compared to existing conditions and the 2020 No Project scenario. Trains that are already close to full in existing conditions would continue to be full, but would not exceed 100% capacity at any point during the weekday. As a result, the impact on the Caltrain system is **less than significant and beneficial**.

As discussed above, growth in the region by 2020 will increase demand for increased transit service. The Proposed Project is one of many projects in the planning phase to address that increased demand.

One concern is that the Proposed Project would result in induced ridership for other systems that would result in changes in physical conditions such as through the construction of additional transportation infrastructure to address the increased ridership. Compared with 2020 No Project

¹⁹ It should be noted that the specific station ridership forecasts are based on a prospective 2020 schedule that was developed only for analytical purposes for this EIR. The actual schedule may vary, which could influence some of the local station ridership, but would not be expected to substantially change the overall system ridership estimates. In advance of mixed service in 2020, Caltrain staff would analyze station-to-station ridership patterns and conduct public outreach to develop the actual customer timetable.



scenario, the Proposed Project is expected to slightly lower ridership on BART and slightly increase ridership on VTA and Samtrans. The largest induced ridership for public transit systems would be for SamTrans bus service (+ 3.3 percent). While the increased demand may increase the need for bus service and vehicles, given that Caltrain facilities already contain bus connections and the modest level of increase, the induced ridership is not expected to result in substantial new capital improvements for SamTrans beyond that which it would plan for without the project. A similar conclusion applies for other public transit systems, all of which are estimated to have less than one percent increases due to induced ridership from the Proposed Project. Like Caltrain, other transit providers must plan for their future needs and construct the facilities to meet their system rider demands as feasible given funding availability.

The Proposed Project would also contribute substantially to increases in Caltrain and private shuttles but it is not expected to require substantial new facilities to support the increase, although it would contribute to the need for bus shelters, stops, and maintenance facilities.

Because infrastructure improvements for transit services other than Caltrain and their funding are outside the responsibility of the JPB, the responsibility for managing the environmental effects of any additional transit facilities or service that might be necessary to meet future demands lies with each transit operator. For future improvements that may be necessary to accommodate increased Caltrain shuttle service due to increased ridership from the Proposed Project, such as shuttle bus stops, shelters, or other facilities, Caltrain will be required to complete the appropriate state (and federal if required) environmental review for such improvements and shall adopt feasible mitigation for any significant environmental impacts thus identified. For future improvements that may be necessary to accommodate increased other transit service due to increased ridership from the Proposed Project, the responsible transit operations will be required complete the appropriate state (and federal if required) environmental review for such improvements and shall adopt feasible mitigation for any significant environmental impacts thus identified.

At this time, it appears unlikely that the relatively modest increases in ridership for other transit services resultant from the Proposed Project would result in the construction of additional transit infrastructure that might have significant physical impacts on the environment and thus the Proposed Project's impact related to induced demand for additional transit infrastructure is **less than significant**.

Impact TR-9: The project would disrupt existing transit services or facilities

Level of Impact: Less than Significant

The 2020 Project scenario would not disrupt any existing transit services. The increased train frequencies in the peak period would enhance connections to regional transit systems that connect to Caltrain. As a result, the impact is **less than significant and beneficial**.

Impact TR-10: The project would interfere with planned transit services or facilities

Level of Impact: Less than Significant with Mitigation

As discussed in Section 3.7.3, the added passenger boardings associated with the 2020 Project scenario would result in a need for increased connective transit services on systems that connect to



Caltrain, especially at stations with increased transit access and egress mode shares. However, the increased transit service needed is not expected to exceed future planned capacity on these systems.

However, the Proposed Project could conflict the planned realignment of SFMTA Muni Bus 22 Fillmore at 16th Street in San Francisco as planned in the City's Transit Effectiveness Project. As explained in Section 4.1. *Cumulative Impacts*, of the EIR main text, Caltrain has identified mitigation to ensure that there is no conflict between the Caltrain electrification and the rerouting of the 22-Fillmore. The mitigation is discussed in Section 4.1 of the EIR main text.

Impact TR-11: The project would conflict or create inconsistencies with adopted transit system plans, guidelines, policies, or standards

Level of Impact: Less than Significant

The 2020 Project scenario would not conflict or create inconsistencies with adopted transit plans, guidelines, policies, or standards adopted by Study Area cities, counties, the MTC, or the State of California. Some of the adopted plans would extend through 2020 or expire after. On the city-level, Caltrain is a beneficial component of currently approved and ongoing Station Area, Downtown Plans, and General Plans. In some cases, a City's Caltrain station is the focal point of a plan or at least a major aspect of the Circulation Element within General Plans.

On the regional level, Caltrain is consistent with *Plan Bay Area*. The Project is one of the major projects included in *Plan Bay Area*. *Plan Bay Area* serves as the region's SCS and the 2040 Regional Transportation Plan (preceded by *Transportation 2035*), integrating transportation and land-use strategy to manage greenhouse gas emissions and plan for future population growth. The transition from a diesel-hauled to electrified EMU flight would contribute to regional greenhouse gas reduction goals. On the state-level, Caltrain is consistent with the State's blueprint for meeting future mobility needs. For example, the electrification of Caltrain would contribute to the quality environment goals, as EMUs are far more environmentally efficient than diesel-hauled locomotives. As a result, the impact is **less than significant and beneficial**.

3.7.4.1.2 2040 Project Scenario

Impact TR-8: The project would create demand for public transit services above the capacity which is provided or planned

Level of Impact: Less than Significant

Cumulative growth in the region will increase demand for increased transit service. The Proposed Project is one of many projects in the planning phase to address that increased demand.

One concern is that the Proposed Project, would result in increased ridership not only for Caltrain but also for other transit systems. The increase in ridership on other systems alone is not a concern for the CEQA evaluation, unless that increase in induced ridership would result in changes in physical conditions such as through the construction of additional transportation infrastructure to address the increased ridership. Compared with the 2040 No Project scenario, the Proposed Project is expected to slightly lower ridership on BART, SamTrans, and Muni Metro and slightly increase ridership on VTA light rail (0.5 percent), VTA bus (0.4 percent) and Muni bus (0.5 percent). Like



Caltrain, other transit providers must plan for their future needs and construct the facilities to meet their system rider demands as feasible given funding availability. The Proposed Project would also contribute substantially to increases in Caltrain and private shuttles. Where the Proposed Project would result in increased bus ridership (VTA, Muni, and shuttles), it is not expected to require substantial new facilities to support the increase, although it would contribute to the need for bus shelters, stops, and maintenance facilities. Where the Proposed Project would contribute to VTA light rail ridership, it may contribute to the need for additional light rail infrastructure, which might result in environmental impacts during construction.

Because infrastructure improvements for transit services other than Caltrain and their funding are outside the responsibility of the JPB, the responsibility for managing the environmental effects of any additional transit facilities or service that might be necessary to meet future cumulative demands lies with each transit operator. For future improvements that may be necessary to accommodate increased Caltrain shuttle service due to increased ridership from the Proposed Project, such as shuttle bus stops, shelters, or other facilities, Caltrain will be required to complete the appropriate state (and federal if required) environmental review for such improvements and shall adopt feasible mitigation for any significant environmental impacts thus identified. For future improvements that may be necessary to accommodate increased other transit service due to increased ridership from the Proposed Project, the responsible transit operations will be required complete the appropriate state (and federal if required) environmental review for such improvements and shall adopt feasible mitigation for any significant environmental impacts thus identified.

At this time, it appears unlikely that the relatively modest increases in ridership for other transit services resultant from the Proposed Project would result in the construction of additional transit infrastructure that might have significant physical impacts on the environment and thus the Proposed Project's contribution to cumulative need for transit infrastructure is less than considerable.

Impact TR-9: The project would disrupt existing transit services or facilities

Level of Impact: Less than Significant

The 2040 Project scenario would not disrupt any existing transit services. The increased train frequencies in the peak period would enhance connections to regional transit systems that connect to Caltrain. As a result, the impact is **less than significant and beneficial**.

Impact TR-10: The project would interfere with planned transit services or facilities

Level of Impact: Less than significant with mitigation.

The discussion above for the 2020 Project Scenario applies to the 2040 Project Scenario.

Impact TR-11: The project would conflict or create inconsistencies with adopted transit system plans, guidelines, policies, or standards

Level of Impact: Less than Significant

The 2040 Project Scenario would not conflict or create inconsistencies with adopted transit plans, guidelines, policies or standards adopted by Study Area cities, counties, the MTC, or the State of



California. Some of the adopted plans would extend through 2040 or expire before. Consistent with the above discussion of the 2020 Project Scenario, the impact of the 2040 Project Scenario **less than significant and beneficial**.

3.8 PEDESTRIAN AND BICYCLE SYSTEMS

This section summarizes potential Project impacts on bicycle and pedestrian systems in the Caltrain Study Area.

3.8.1 SUMMARY OF FUTURE PEDESTRIAN IMPROVEMENTS

Many cities are putting pedestrian facilities in place that are complementary to Caltrain. In some instances pedestrian enhancements are included in the bike plan, such as in the *City of South San Francisco Bicycle Master Plan*, in other plans, such as the *San Mateo County Comprehensive Bicycle and Pedestrian Plan*, pedestrian infrastructure enhancements are focused on for a portion of the report. The full list and status of these plans and those similar can be seen in Table 3-32.

3.8.2 IMPACTS EVALUATION AND MITIGATION MEASURES

Impact TR-12: The project would potentially disrupt existing pedestrian facilities

Level of Impact: Less than significant with mitigation

Many cities are locating pedestrian facilities in locations proximate and complementary to Caltrain station areas. In some instances, pedestrian infrastructure enhancements are included in a city or county's bicycle or pedestrian plan, such as in the *City of South San Francisco Bicycle Master Plan* and the *San Mateo County Comprehensive Bicycle and Pedestrian Plan*.

Increased ridership under Proposed Project conditions would subsequently cause increased pedestrian volumes at pedestrian facilities surrounding Caltrain stations. The existing pedestrian facilities were evaluated to determine if pedestrian facilities would be capable of accommodating increased pedestrian volumes. Results showed the existing facilities are capable of accommodating increased pedestrian volumes at all stations with the exception of the 4th and King Station in San Francisco.

Existing pedestrian facilities, including sidewalks and crosswalks, surrounding the 4th and King Station currently experience high levels of pedestrian activity. This trend is projected to continue in future years. In 2020, majority high proportion of passengers would access and exit this station on foot, potentially resulting in sidewalks and crosswalks not having the capacity to accommodate the increased pedestrian traffic. Boardings at the 4th and King Station would increase from 10,700 under existing conditions to 13,000 under 2020 No Project conditions and 14,340 with the Proposed Project (an increase of 2,340 over 2020 No Project conditions).

In 2040, without the project (or DTX/TTC), daily boardings would increase to 16,560. Proposed Project boardings would increase to 15,230 (a decrease of 1,330 compared to 2040 No Project



conditions). Thus, the Proposed Project would contribute to increased pedestrian activity from 2020 until DTX/TTC infrastructure is completed. Currently high-speed rail is anticipated to reach San Francisco sometime between 2026 and 2029. The Proposed Project would contribute to increased pedestrian activity at the 4th and King Station between 2020 and 2026 or 2029. Other transit improvements in proximity to the 4th & King Station, such as the Central Subway project, would also add passengers in this area.

Due to existing high levels of pedestrian activity and the anticipated increase in pedestrian activity under Proposed Project conditions as compared to No Project conditions, pedestrian facility capacity may be exceeded in 2020. Pedestrian facility flow and safety improvements will be implemented per **Mitigation Measure TRA-12** described below in order to allow for the orderly movement of pedestrians, bicyclists, private vehicles, buses, and shuttles around the 4th and King Station. With this mitigation, the impact at the San Francisco 4th and King Station would be **less than significant**.

Mitigation Measure TRA-12: In cooperation with the City and County of San Francisco, implement surface pedestrian facility improvements to address the Proposed Project's additional pedestrian movements at and immediately adjacent to the San Francisco 4th and King Station

The JPB, in cooperation with the City and County of San Francisco will improve surface pedestrian facilities at the San Francisco 4th and King Station where needed to accommodate the Proposed Project's increase in pedestrian volumes. This mitigation applies to increased pedestrian traffic under Proposed Project conditions that would occur within the impact window beginning in 2020 and ending when DTX/TTC is fully operational.

Both the JPB and the City and County of San Francisco will implement a pedestrian access study to identify the surface improvements necessary to accommodate the Proposed Project's increased pedestrian demand during the impact window identified above. The JPB's responsibility will be to implement mutually agreed upon improvements necessary to accommodate pedestrian demand within the Caltrain station and JPB-owned right-of-way. The City and County of San Francisco's will be responsible for implementing improvements on City streets and the public right-of-way surrounding the 4th and King Station.

The following surface improvements to pedestrian facilities would address increased pedestrian demand caused by the Proposed Project. These improvements will be studied in detail in the pedestrian access study.

- Widening curb waiting areas and adding pedestrian bulbouts where high levels of demand cannot be accommodated by existing facilities.
- Install a pedestrian "scramble" at the intersection of 4th and Townsend Streets. A pedestrian scramble is an intersection that is striped and designed to allow pedestrians to cross diagonally in all directions during an all-way red signal at which all motor vehicles are stopped.



- Signalization improvements for both 4th and Townsend and 4th and King. While a pedestrian scramble is not likely to be feasible at the intersection of 4th Street and King Street due to intersection size, traffic volumes, and SMFTA at-grade transit operations, all-way pedestrian signals at existing crosswalks are potentially feasible.
- Widening crosswalks to increase pedestrian volumes that can be accommodated and improving pedestrian sidewalk widths on the immediate approaches to the intersections of 4th and Townsend and 4th and King Streets, as appropriate and feasible.
- Implementing pedestrian safety countermeasures, such as pedestrian barriers and improved signage as necessary to address safety issues that are directly related to increased pedestrian volumes at station access points.

The improvements identified in the access study shall be completed in a manner that does not interfere with SMTA bus operations, SFMTA Metro or bicycle facilities in and around the station area.

This measure does not include any above- or below-ground pedestrian facilities, as the Proposed Project's impact can be addressed through feasible surface treatments described above.

Impact TR-13: The project would interfere with planned pedestrian facilities

Level of Impact: Less than Significant

Future planned pedestrian facilities are designed around the project's existing alignment. Under both the Project scenario and the no project scenario planned pedestrian facilities will be constructed to accommodate Caltrain's existing alignment. As a result, the impact is **less than significant**.

Impact TR-14: The project would conflict or create inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards

Level of Impact: Less than Significant

The project would not conflict with adopted pedestrian system plans, guidelines or policies designed to accommodate increased Caltrain ridership due to the project. This impact is considered **less than significant**.

3.8.3 SUMMARY OF FUTURE BIKEWAY IMPROVEMENTS

The Caltrain Study Area has several planning initiatives that will improve cycling infrastructure and accessibility. These planning initiatives include but are not limited to countywide plans, citywide Bike Master Plans and Transportation Plans as well as Station Area plans. The full list and status of these plans can be seen in Table 3-32.

These plans add facilities and amenities that promote increased bike ridership and provide better connectivity at Caltrain stations. Bicycle connectivity is a key policy for the future of Caltrain as discussed in the Caltrain's Comprehensive Access Policy (Caltrain 2010). This policy prioritizes bicycle access above auto-access and suggests the following strategies and investments "can be made throughout the Caltrain system to shift our [Caltrain's] access mode of transportation away from



auto to walk, transit and bike (San Mateo County Transit District, "CBOSS" 2013)." Bicycle access strategy examples include "Bike routes and lanes and paths, On-board accommodations, Bike parking and stations, E-lockers and Bike sharing."¹ Currently, walking is the top daily access mode (36 percent) followed by transit (26 percent), auto (23 percent) and bike (14 percent). This data is displayed in Figure 2-7.



**TABLE 3-32
BICYCLE INFRASTRUCTURE PLANS IN THE STUDY AREA (ADOPTED 2005-2013)**

Project and Study	Lead Jurisdiction and Agency	County	Status of Project and Study
INTRA-COUNTY PLANS			
Comprehensive Access Policy	Caltrain	San Francisco, San Mateo, Santa Clara	Completed, 2010
Bicycle Access and Parking Plan	Caltrain	San Francisco, San Mateo, Santa Clara	Completed, 2008
COUNTYWIDE PLANS			
San Francisco Bicycle Plan	San Francisco Municipal Transportation Agency	San Francisco	Adopted, 2009
San Mateo County Comprehensive Bicycle and Pedestrian Plan	San Mateo County	San Mateo	Adopted, 2011
Santa Clara Countywide Bicycle Plan	VTA	Santa Clara	Adopted, 2008
CITYWIDE PLANS			
City of South San Francisco Bicycle Master Plan	City of South San Francisco	San Mateo County	Adopted, 2011
City of San Bruno Transit Corridors Plan	City of San Bruno	San Mateo County	Adopted, 2012
City of San Mateo Bicycle Master Plan	City of San Mateo	San Mateo County	Adopted, 2011
San Carlos Bicycle Transportation Plan	City of San Carlos	San Mateo County	Approved by City Council in February 2012
Redwood City General Plan	City of Redwood City	San Mateo County	Approved, 2010
Menlo Park El Camino Real and Downtown Specific Plan	City of Menlo Park	San Mateo County	Prepared July 2012
Menlo Park Comprehensive Bicycle Development Plan	City of Menlo Park	San Mateo County	January 2005
City of Palo Alto Bicycle + Pedestrian Transportation Plan	City of Palo Alto	Santa Clara County	Adopted, 2012
San Jose Bicycle Master Plan	City of San Jose	Santa Clara County	Adopted, 2009



3.8.3.1 Bikes on Board Program

Caltrain's existing Bikes on Board program is described in Section 2.5.1. Under all 2020 and 2040 scenarios, bike capacity will not decrease from existing conditions. This commitment increases the reliability of Caltrain for those bringing bicycles on board and will prove to be useful as bicycle ridership is predicted to increase. It is predicted that the share of people who walk or bike to Caltrain will remain consistent or increase at most stations in the future. All predictions for Mode of Access and Egress can be seen in Section 3.7.2.

As discussed in Section 2.5, biking is a popular connection mode to Caltrain Stations. Of the 14 percent of Caltrain passengers who access stations via bicycle, about 13 percent bring their bicycles on-board, while about one percent of passengers park their bicycles at their origin station (Fehr & Peers, 2013). Biking is the third most popular egress mode under existing conditions, following walk and transit. About 20 percent of passengers bike from Caltrain stations to get to their final destination. In 2020, bike access tends to increase at more under the No Project than the Project scenario. As discussed in Section 3.7.2, about 16 percent of passengers are projected to access Caltrain by bike under the 2020 No Project Scenario, in contrast to about 11 percent under the 2020 Project scenario.

Thus, under the 2020 Project scenario, average bike access system-wide would decrease slightly from existing conditions (about 13 percent). In 2040, the share of bike access between Project and No Project scenarios is about equal. Given that bike trains often operate at capacity during peak periods under existing conditions, it is possible that capacity issues may continue in future years. Any unmet on-board demand for bikes-on-board could be accommodated through the provision of increased bike parking at stations. This would allow passengers to safely and securely park their bikes before boarding the train. If a passenger is in need of a bike to egress from their destination station, they could also make use of Bay Area Bike Share or travel by another mode. Although exact capacity projects for Bay Area Bike Share are not yet available, the program will be expanded to include 1,000 bikes and 100 stations in 2014 (San Francisco Chronicle, 2013).

3.8.4 OVERALL BICYCLE IMPACTS EVALUATION AND MITIGATION MEASURES

Impact TR-15: The project substantially disrupts existing bicycle facilities

Impact TR-16: The project would substantially interfere with planned bicycle facilities

Impact TR-17: The project would conflict or create substantial inconsistencies with adopted bicycle system plans

Level of Impact: Less than Significant with Mitigation

The Proposed Project will increase future demand for bicycle facilities. Most plans in the Study Area account for increased bicycle volumes through added bicycle infrastructure. The Proposed Project does not change the alignment and does not impede any existing or preclude planned bicycle projects because the new improvements are limited to overhead infrastructure and the TPFs (which do not affect bicycle facilities). For the Caltrain system itself, the increase in ridership over time will likely increase the demand for bicycle facilities at Caltrain stations. Given that bike trains often



operate at capacity during peak periods under existing conditions, capacity issues may continue in future years. Any unmet on-board demand for bikes-on-board could be accommodated through the provision of increased bike parking at stations. This would allow passengers to safely and securely park their bikes before boarding the train. If a passenger is in need of a bike to egress from their destination station, they may also be able to use Bay Area Bike Share or travel by another mode. Although exact capacity projects for Bay Area Bike Share are not yet available, the program would be expanded to include 1,000 bikes and 100 stations in 2014 (Cabanatuan 2013).

Mitigation Measure TRA-15 would require Caltrain to improve bicycle facilities at Caltrain stations over time to meet potential increased demand for such facilities. Thus, with mitigation, the Proposed Project would have a less than significant impact on bicycle facilities.

Mitigation Measure TRA-15: Increase Bicycle Facilities at Caltrain Stations and Partner with Bike Share Programs where available

Caltrain will improve bicycle facilities at Caltrain stations where needed to accommodate increased demand over time for such facilities including bike parking and bike lockers necessary to safely and securely park bikes that are not taken on the train. Caltrain will work local and regional bike share programs to provide opportunities for Caltrain riders to utilize bike share facilities located at Caltrain stations (where feasible) or nearby (where not).

3.9 TRANSPORTATION SAFETY HAZARDS

Right-of-way (ROW) accidents could include vehicle or pedestrian versus train as a result of trespassing or crossing the alignment. While very rare, other potential accidents could occur as a result of train derailment and train versus train collision. Existing pedestrian safety measures in place at at-grade crossings is discussed in Section 2.5.2.2. Safety in the Study Area will significantly improve with the installation of CBOSS PTC. Described in detail in Section 3.2.1.1.2, CBOSS PTC Project will, improve the efficiency of grade crossing warning functions, and automatically stop a train when there is violation of speed or route. This advanced signal system is scheduled to be operational by 2015 as mandated by the Federal Railroad Administration (FRA) per the *Railroad Safety Improvement Act of 2008*. This act of Congress was a response to a fatal train collision on the Metrolink commuter rail system in Southern California September 2008 (San Francisco Chronicle, 2013). CBOSS PTC is a component included in all 2020 and 2040 No Project and Project Scenarios.

The CBOSS PTC system will monitor, and if necessary, control train movement in the event of human error. This will increase safety both on the tracks and at at-grade crossings by:

- Preventing the risk of train-to-train collisions by enforcing movement authority limits.
- Reduce risk of potential over-speed train derailments by enforcement speed limits on the right-of-way

Preventing incursions into established work zones in the ROW by providing additional safety for railroad workers on the tracks. Employees responsible for the protection and safety of workers performing work on or near the tracks will also have the ability to remotely communicate with the



dispatching system and the train engineer, via the train's Onboard System, to notify the train engineer of approaching work zones. The Onboard System is a combination of software and hardware that monitors and controls train movement if the engineer fails to respond to the audible warnings (Southern California Regional Rail Authority, 2013).

The CBOSS PTC System will greatly improve upon the existing wayside block system, which is dependent upon dispatchers and train engineers in events of ROW trespassing by pedestrian or vehicle. CBOSS PTC constantly monitors train movement and can take over in the event of human error. For example, if a train engineer ignores the speed limits or experiences a debilitating medical emergency while operating a vehicle, the PTC equipped train will automatically enforce the brakes to slow down the train and prevent unsafe travel. PTC may also bring trains to a safe stop in the event of a natural disaster. Although PTC cannot prevent a car from driving around lowered gates or prevent trespassers making their way onto the tracks, it can help trains decelerate, brake, and respond more quickly.

In addition, there are a number of factors that pose safety hazards. Non-signalized intersections with high vehicle volumes can be a safety concern for pedestrians. Signalizing the intersection or implementing additional signage or warning devices can be potential methods of alerting motorists of crossing individuals. At-grade crossing locations are another safety hazard but the use of warning lights, sounds, and gate arms can alert pedestrians of nearing trains. While overcrowded boarding platforms can be another safety hazard, these platforms can be properly sized to accommodate waiting riders.

3.9.1 TRANSPORTATION SAFETY IMPACTS AND MITIGATION MEASURES

The significance criterion for Safety is as follows:

- The project would result in unsafe access between Caltrain stations and adjacent streets

3.9.1.1 2020 and 2040 Project Scenarios

Impact TR-4: The project would result in unsafe access between Caltrain stations and adjacent streets.

Level of Impact: Less than Significant

While the 2020 Project scenario would increase vehicle traffic around certain Caltrain stations, most intersections with high vehicle volumes are already signalized and include pedestrian walk phases. Though ridership would increase, Caltrain platforms would be properly sized to accommodate passengers. In addition, no new at-grade crossings are anticipated for the 2020 Project scenario and the introduction of CBOSS PTC, as described previously, will improve safety. As a result, the impact is **less than significant**.



3.10 EMERGENCY VEHICLE ACCESS

The existing roadways surrounding Caltrain stations in the Study Area enable emergency vehicle response to all areas. Emergency vehicles often identify and use multiple routes dependent upon time of day and traffic conditions. Peak period traffic congestion generally does not result in delay for emergency vehicles, which have right-of-way and often utilize multi-lane major arterials for access. Emergency vehicles are permitted to use transit-only lanes or other vehicle-restricted lanes if necessary.

Emergency vehicles traveling on streets that cross the at-grade crossings will experience some additional delay at the intersections that exceed thresholds of significance defined in Section 3.5.6.5. Unlike at intersections with traffic signals where emergency vehicles can pass through the intersection at reduced speeds even when receiving a red signal indication, they will not be able to cross through the at-grade crossings when the railroad gates are down. This may cause some additional delay to emergency vehicles.

3.10.1 EMERGENCY VEHICLE IMPACTS AND MITIGATION MEASURES

Significance criteria for Emergency Vehicle access is as follows:

- The Project would result in inadequate emergency vehicle circulation or access

3.10.1.1 2020 and 2040 Project Scenarios

Impact TR-18: The project would result in inadequate emergency vehicle circulation or access

Level of Impact: Less than Significant

The existing roadways surrounding Caltrain stations in the Study Area enable emergency vehicle response to all areas. Emergency vehicles often identify and use multiple routes dependent upon time of day and traffic conditions. Peak period traffic congestion generally does not result in delay for emergency vehicles, which have ROW and often utilize multi-lane major arterials for access. Emergency vehicles are permitted to use transit-only lanes or other vehicle-restricted lanes if necessary.

Emergency vehicles traveling on streets that cross the grade crossings would experience some additional delay at the intersections that would exceed the acceptable levels of service and would have longer gate-down times with Proposed Project implementation. Unlike at intersections with traffic signals where emergency vehicles can pass through the intersection at reduced speeds even when receiving a red signal indication, emergency vehicles would not be able to cross through the grade crossings when the railroad gates are down. This may cause some minor delay to emergency vehicles, though delays would not substantially differ from typical congestion that already occurs around grade crossing locations and would only affect the small number of emergency vehicles that are actually traveling through study intersections.



Despite these localized traffic delay impacts, emergency vehicle response times are a function of travel along the entire path from their base to the incident location. The Proposed Project overall would substantially reduce overall vehicle miles travelled in the Peninsula corridor by approximately 235,000 miles per day in 2020 (compared with the No Project scenario) which would substantially improve congestion on a broad general basis. Most of the VMT reductions would be during peak hours, which is especially important in reducing congestion. The broad-based congestion improvement is expected to more than offset the localized effects at individual at-grade crossings and near Caltrain stations and result in a net improvement (compared with the No Project Scenario) in the emergency response times.

Although the Proposed Project would reduce regional vehicle miles travelled, the Proposed Project would be considered **less than significant**.

3.11 STATION PARKING AND ACCESS

Parking is currently provided by Caltrain at most existing stations with the exception of 4th and King and 22nd Street Stations. Most stations have supplemental parking options including on-street parking and non-Caltrain parking lots. On-street parking and non-Caltrain lot options were considered when within 0.25 miles of the Caltrain station. System wide, most Caltrain lots reach capacity prior to off-site lots and on-street spots therefore, future scenarios were forecast accordingly. Because existing data information for Broadway and Atherton Station parking is not available, parking is only estimated in the Project scenarios as service to those stations will only occur in the Project scenarios. Data for Broadway and Atherton was derived using an average of stations exhibiting similar traits. Stations similar to Broadway include Burlingame, Hayward Park, Belmont, and San Carlos Stations, as they are all low ridership stations in San Mateo County. For Atherton, data was derived from a production-based metric based on residential-heavy locations like Belmont, Menlo Park, and San Antonio.

As seen in Table 3-33, the parking demand increases at most stations regardless of the project in both 2020 and 2040. This increase is due to increased ridership and changes in future modes of access. Mode of access and mode of egress models (Sections 3.7.2.3 and 3.7.2.4) were used in order to accurately predict parking demand in future scenarios. At some stations, ridership increases in both No Project and Project scenarios and parking demand is beyond that of Caltrain, non-Caltrain and on-street parking capacity.



**TABLE 3-33
EXCESS PARKING DEMAND BEYOND CALTRAIN LOT AND ON STREET PARKING**

Station	2020 No Project	2020 Project Scenario	2040 No Project	2040 Project Scenario
4 th and King	35	124	39	0
22nd Street	0	18	0	157
Bayshore	0	0	0	0
South SF	0	14	1	39
San Bruno	0	0	0	0
Millbrae*	0	0	0	0
Broadway	-	0	-	0
Burlingame	0	0	0	0
San Mateo	0	0	0	0
Hayward Park	0	0	0	0
Hillsdale	0	33	0	503
Belmont	0	0	0	0
San Carlos	0	0	0	0
Redwood City	0	0	0	0
Atherton	-	0	-	0
Menlo Park	0	0	0	0
Palo Alto	0	0	0	43
California Avenue	0	0	0	0
San Antonio	0	0	0	0
Mountain View	0	136	119	687
Sunnyvale	189	447	296	847
Lawrence	0	0	0	0
Santa Clara	0	0	0	0
San Jose Diridon	0	0	0	0
Tamien	0	455	0	301
Total Excess Demand	224	1227	455	2577

* Includes additional parking available in shared BART-Caltrain parking garage at Millbrae Station. The shared BART/Caltrain parking facility would likely be able to absorb future increases in parking under no project and project scenarios, meaning that there would not be excess demand beyond available supply at this station.

3.11.1.1 2020 Parking Conditions

Due to the region's planned focused growth in transit-oriented development areas the proportion of passengers who drive to Caltrain is expected to decrease at some stations however ridership in all



future scenarios is expected to increase. In 2020 scenarios, parking supply remains the same in both No Project and Project scenarios and parking demand increases. The increase is greater in the Project scenario due to increased ridership. As shown in Table 3-34, the majority of parking deficits will be absorbed by on-street parking and and/or non-Caltrain lots where available. Parking surpluses are predicted at some stations such as Hayward Park and Belmont. Currently most stations with a parking surplus have a low utilization rate, which is not anticipated to change.

As discussed in Section 2.7, the parking lot facility at the Millbrae Station is shared between BART and Caltrain. In addition to the 170 parking stalls, BART provides 2,978 parking spots that are available to both Caltrain and BART passengers. Included in the BART totals are spaces reserved for station agents, long term parking, and those designated for BART-reserved uses until 10:00 AM (after which point they become available for general use). Daily BART ridership at Millbrae Station was about 6,400 daily boardings in 2013. Currently, there is available supply at the Millbrae Station due to the large parking capacity at this shared parking lot. Based on recent data from BART, the typical peak occupancy for the 2,978 spaces is about 80%, or roughly 2,340 spaces. As a result, there are about 640 BART-reserved and non-reserved parking spaces available during typical weekday peak times.

3.11.1.1.1 2020 No Project Scenario

Parking demand is forecasted to increase by 2020 at most stations regardless of the Proposed Project. This increase is due to increased ridership and changes in future modes of access. Although existing on street and non-Caltrain lot parking would accommodate some excess demand, there are still stations that exceed the supply of on-street parking, non-Caltrain and Caltrain lots. These stations include 4th and King, 22nd Street, South San Francisco, Hillsdale, Mountain View, Sunnyvale, and Tamien in the 2020 scenario. At most stations where impacts occur under Project scenarios they also occur in No Project scenarios, though to a lesser extent.

Demand for shared BART/Caltrain parking spaces at the Millbrae Station is expected to be proportional to BART and Caltrain ridership increases, which would mean that the occupancy of the BART/Caltrain garage would increase over time due to increased park and ride activity related to each system. Assuming BART and Caltrain parking demand would increase proportional to their forecast increase in ridership, approximately half of the available parking spaces would be utilized by BART riders and half by Caltrain riders. This means that about 320 spaces would be available for each system to accommodate future increases in parking demand. This additional capacity would mean that the shared BART/Caltrain parking facility could absorb expected future increases in parking under Project and No Project scenarios.

Stations with a large parking surplus and high existing utilization, such as Palo Alto, will tend to have more walk, bike, or transit access in future scenarios. Caltrain's 2010 Comprehensive Access Policy Statement, emphasizes station access by walking, transit, and bicycling over automobile access at most stations. The policy targets different access strategies at different stations based on the station characteristics and access opportunities. For example, the San Francisco 4th and King Station is a transit center where the access priority for autos is the lowest priority after transit, walking and bicycles. At intermodal connectivity and neighborhood circulator stations, auto access is not a priority. At auto-oriented stations, auto access is the primary priority access mode followed by biking.



In the 2020 No Project scenario, ridership increases causes parking demand that exceeds Caltrain supply at seven stations. This parking deficit will be absorbed by existing non-Caltrain lots and on-street parking at most stations, such as San Jose Diridon. Two stations exceed Caltrain and Non-Caltrain parking supply (Table 3-34).

3.11.1.1.2 2020 Project Scenario

The Project scenario predicts a greater increase in ridership that contributes to more parking deficits than the No Project scenario. This ridership increase creates increased parking demand. Additionally, the parking supply decreases slightly under the 2020 Project Scenario at Hillsdale and Sunnyvale Stations, which would each experience a loss of up to 10 spaces due to the Project. Accounting for these changes, seven stations in the Project scenario exceed Caltrain and Non-Caltrain parking supply (Table 3-34).



**TABLE 3-34
PARKING SUPPLY AT CALTRAIN STATIONS, 2020 NO PROJECT AND 2020 PROJECT**

Station	Existing		2020 No Project Scenario			2020 Project Scenario		
	Caltrain Lot Utilization	Caltrain Lot Parking Supply	Parking Demand	Parking Surplus and Deficit ¹	Excess Parking Demand ²	Parking Demand	Parking Surplus and Deficit ¹	Excess Parking Demand ²
4 th and King	-	0	165	-165	35	254	-254	124
22nd Street	-	0	447	-447	0	640	-640	18
Bayshore	13%	38	37	1	0	67	-29	0
South SF	51%	74	48	26	0	88	-14	14
San Bruno	22%	201	118	83	0	131	70	0
Millbrae*	79%	170	331	179	0	426	84	0
Broadway	8%	122	-	-	-			
Burlingame	30%	69	37	32	0	35	34	0
San Mateo	20%	42	148	-106	0	228	-186	0
Hayward Park	3%	210	10	200	0	45	165	0
Hillsdale	86%	513	449	64	0	642		33
Belmont	20%	375	53	322	0	93	282	0
San Carlos	32%	207	158	49	0	183	24	0
Redwood City	46%	553	273	280	0	379	174	0
Atherton	-	96	-	-	-	28	68	0
Menlo Park	33%	155	60	95	0	75	80	0
Palo Alto	87%	350	139	211	0	200	150	0
California Avenue	31%	169	48	121	0	58	111	0
San Antonio	33%	193	28	165	0	66	127	0
Mountain View	97%	336	573	-237	0	828	-492	136
Sunnyvale	103%	391	643	-252	189	891	-500	447
Lawrence	30%	122	79	43	0	104	18	0
Santa Clara	62%	190	125	65	0	162	28	0
San Jose Diridon	99%	576	742	-166	0	1002	-426	0
Tamien	98%	275	777	-502	0	1359	-1084	455
Total Excess Demand					224			1227

* Includes additional parking available in shared BART-Caltrain parking garage at Millbrae Station.

Notes: High parking surplus can be attributed to changes in land use where parking currently exists in some cases. Excess Park and Ride demand beyond non-Caltrain lot and on street parking. There is no Caltrain lot at the College Park Station. Parking is



located on the street. Given limited ridership and that there are no plans to change service levels, parking demand was not evaluated at this location.

3.11.1.2 2040 Parking Conditions

The 2040 scenario parking supply and demand for both scenarios is displayed in Table 3-35. In the 2040 scenarios, ridership continues to increase and mode of access shares shift according to Figure 3-23.

In 2040 scenarios, parking supply remains the same in both the No project and Project scenarios (with the exception of minor changes at Sunnyvale and Hillsdale Stations, as noted above in the 2020 section), and parking demand increases. The increase is greater in the Project scenario due to increased ridership. As shown in Table 3-35, the majority of parking deficits will be absorbed by on-street parking and and/or non-Caltrain lots where space is available.

3.11.1.2.1 2040 No Project Scenario

In the 2040 No Project scenario, ridership increases, causing parking demand that exceeds Caltrain supply at 12 stations. At some stations, this parking deficit will be absorbed by existing non-Caltrain lots and on-street parking at stations such as San Mateo, Hillsdale, and San Jose Diridon. As discussed in the 2020 Parking Conditions section, additional capacity available at the shared BART/Caltrain parking facility at the Millbrae Station would absorb expected future increases in parking under Project and No Project scenarios. Five stations will exceed both Caltrain and non-Caltrain parking supply (Table 3-35). The Mountain View and Sunnyvale Stations will exceed the Caltrain and non-Caltrain parking supply by more than 100 spaces.

Parking demand decreases from the 2020 No Project scenario to the 2040 No Project scenario at Santa Clara and San Jose Diridon Stations. This decrease is due to a substantial increase in transit use, decreasing park and ride at both stations. The mode of access information can be found in Section 3.7.2.

3.11.1.2.2 2040 Project Scenario

The Project Scenario predicts a greater increase in ridership that contributes to more parking deficits than the No Project scenario. This ridership increase creates increased parking demand; however, at some stations the increased demand is offset by future mode of access changes. Seven stations in the Project scenario exceed Caltrain and Non-Caltrain parking supply, five of which will exceed the supply by more than 100 (Table 3-35).

At the 4th and King, Hayward Park, Santa Clara, San Jose Diridon and Tamien Stations parking demand decreases from the 2020 Project Scenario to the 2040 Project Scenario. This demand decrease can be attributed to planned future transit-oriented development, contributing to increasing riders who access Caltrain via transit, walking and bicycling. It should be noted that land use changes in the station area contributing to parking demand decrease may decrease the parking supply as well. Subsequently, this planned development may result in lower parking surplus.



**TABLE 3-35
PARKING SUPPLY AT CALTRAIN STATIONS, 2040 NO PROJECT AND 2040 PROJECT**

Station	Existing		2040 No Project Scenario			2040 Project Scenario		
	Caltrain Lot Utilization	Caltrain Lot Parking Supply	Parking Demand	Parking Surplus and Deficit ¹	Excess Parking Demand ²	Parking Demand	Parking Surplus and Deficit ¹	Excess Parking Demand ²
4 th and King	-	0	169	-169	39	77	-77	0
22nd Street	-	0	514	-514	0	779	-779	157
Bayshore	13%	38	54	-16	0	114	-76	0
South SF	51%	74	75	-1	1	113	-39	39
San Bruno	22%	201	215	-14	0	304	-103	0
Millbrae*	79%	170	332	178	0	455	55	0
Broadway	8%	122	-	-	-	35	87	0
Burlingame	30%	69	55	14	0	74	-5	0
San Mateo	20%	42	190	-148	0	359	-317	0
Hayward Park	3%	210	28	182	0	37	173	0
Hillsdale	86%	513	615	-102	0	1112	-599	503
Belmont	20%	375	82	293	0	135	240	0
San Carlos	32%	207	210	-3	0	243	-36	0
Redwood City	46%	553	331	222	0	588	-35	0
Atherton	-	96	-	-	-	44	52	0
Menlo Park	33%	155	82	73	0	118	37	0
Palo Alto	87%	350	232	118	0	393	-43	43
California Avenue	31%	169	52	117	0	59	110	0
San Antonio	33%	193	47	146	0	115	78	0
Mountain View	97%	336	811	-475	119	1379	-1043	687
Sunnyvale	103%	391	750	-359	296	1291	-900	847
Lawrence	30%	122	105	17	0	143	-21	0
Santa Clara	62%	190	33	157	0	32	158	0
San Jose Diridon	99%	576	239	337	0	380	196	0
Tamien	98%	275	853	-578	0	1205	-930	301
Total Excess Demand					455	2577		

* Includes additional parking available in shared BART-Caltrain parking garage at Millbrae Station.

Notes: High parking surplus can be attributed to changes in land use where parking currently exists in some cases. Excess Park and Ride demand beyond non-Caltrain lot and on street parking. There is no Caltrain lot at the College Park Station. Parking is on the street. Given limited ridership and that there are no plans to change service levels, parking demand was not evaluated at this location.



3.11.2 PARKING IMPACTS AND MITIGATION MEASURES

Impact TR-19: The project would not meet Caltrain's Comprehensive Access Policy or Bicycle Access and Parking Plan

Level of Impact: Less than Significant

The Proposed Project would not interfere with the implementation and completion of the Comprehensive Access Policy Program Statement or the Bicycle Access and Parking Plan. The Proposed Project would increase both vehicular traffic around Caltrain stations but locations with high vehicle volumes are signalized and allow pedestrians to cross safely. No additional new at-grade crossings are planned with the Proposed Project and the implementation of CBOSS PTC further improves safety. As a result, the impact is **less than significant**.

Impact TR-20: The project would result in the construction of off-site parking facilities that would have secondary physical impacts on the environment

Level of Impact: Less than Significant

In future Project scenarios parking demand exceeds parking supply at some stations. Existing on street and non-Caltrain lot parking should accommodate some excess demand; however, there are still stations that exceed the supply of on-street parking, non-Caltrain, and Caltrain lots. These stations include 4th and King, 22nd Street, South San Francisco, Hillsdale, Mountain View, Sunnyvale, and Tamien in the 2020 scenario, and 22nd Street, South San Francisco, Hillsdale, Palo Alto, Mountain View, Sunnyvale, and Tamien in the 2040 scenario. The estimated parking demand and supply at all stations can be seen in Table 3-35. At most stations where impacts occur in the Project scenarios they also occur in the No Project scenarios, though to a lesser extent.

These findings are intended for informational purposes only as they are derived based on behavioral forecasts. Actual parking demand will fluctuate based on day and month based on peoples changing mode of access to Caltrain.

Since some of the parking deficits identified above are at stations where providing automobile access is not a priority, provision of substantial additional parking facilities at these stations would conflict with Caltrain's Comprehensive Access Program Policy Statement. Where parking deficits are at auto-oriented stations, provision of additional auto parking would be a priority, where feasible and where funding is available. The Comprehensive Access Program Policy Statement is implemented by Caltrain in cooperation with local jurisdictions as part of Caltrain's long-term planning and capital improvement program; however, access improvements are implemented on a funding available basis. Caltrain also works with local jurisdictions, other transit agencies, and local, state and federal funding partners to fund improvements to access to Caltrain stations via alternatives to automobiles including transit connections, bicycle and walking. Where future investments in these access modes are realized, they will help to reduce some of the excess parking demand. Caltrain is also working with many local jurisdictions concerning transit-oriented developments including exploring shared parking opportunities where appropriate.



However, despite these efforts, given the funding limitations, priorities and long-term nature of Caltrain's implementation of its Comprehensive Access Program Policy Statement, it is likely that not all of the parking deficits will be addressed when the Proposed Project is in operation.

A parking deficit in and of itself, or the need to find a parking space off-site, while inconvenient is not inherently a significant physical impact on the environment. Some station users unaware of the parking deficits may circle to find an available space, but experienced station users will modify their behavior to take into account the parking deficits and take alternative actions. Those actions may include arriving earlier, using other nearby stations with available parking, using the kiss-and-ride, using parking areas further from the station, or accessing the station via other modes such as transit, biking or walking.

At the extreme, lack of vehicle parking could result in some riders deciding to use an alternative transit system, carpool, or drive to their destination alone. This could result in lower Caltrain ridership than estimated in this EIR. As an unrealistic worst-case example, if the system deficit of approximately 1,200 (2020) to 2,500 (2040) spaces in excess of the Proposed Project were to mean 1,200 – 2,500 less Caltrain riders, then ridership would be lower by two percent than predicted overall for 2020 and 2040. However, given that the Proposed Project would still result in substantial ridership increases (compared to the No Project conditions) even in this worst-case situation, the environmental consequences would be less than significant as the Project benefits to regional traffic, noise, air quality, and greenhouse gases would still be substantial (though slightly smaller). In this scenario, the localized traffic impacts around the stations with parking deficits would be slightly better than with full ridership.

The other potential impact of a parking deficit in and around Caltrain stations would be potential increased demand for additional off-site parking facilities, the construction of which might result in other secondary environmental impacts. However, as described above, Caltrain expects that the dominant response to parking deficits will be behavioral change on the part of the commuting public.

Thus, while the Proposed Project may result in a parking deficit at some stations, even with implementation of its access program, as described above this is not considered to result in a significant environmental impact. Thus the Proposed Project would not result in a significant physical impact to the environment related to air quality, noise, traffic or greenhouse gas emissions or the secondary impacts of construction of parking facilities due to the potential parking deficits that may occur.



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