



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

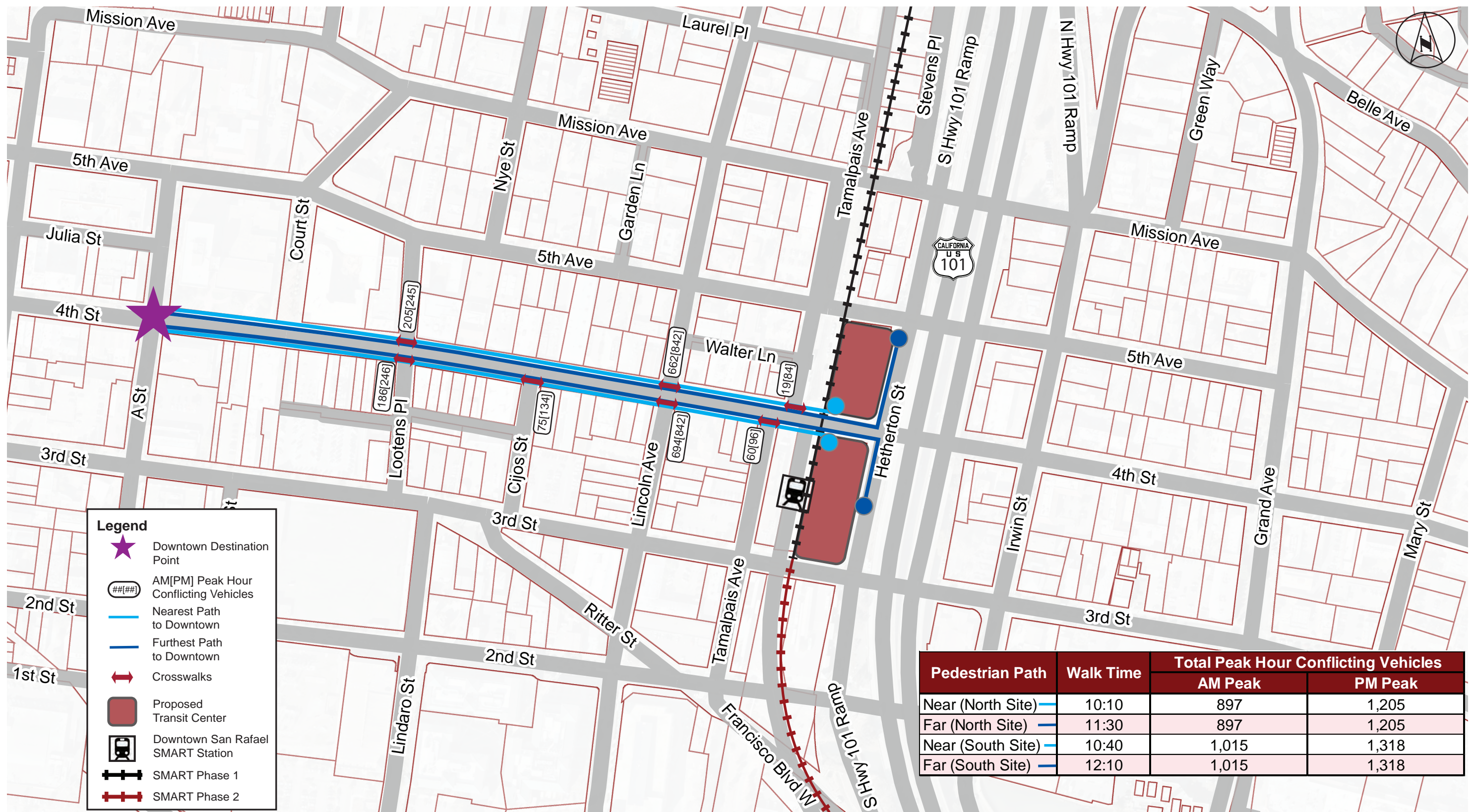


Figure 5-2: 4th Street Gateway Alternative - Pedestrian Connectivity to Downtown

Under the Freeway Alternative

Two pedestrian routes to Downtown San Rafael were identified for this alternative, one “long” route and one “short” route. The long route is the route taken by pedestrians from the Bay farthest from the downtown destination, while the short route is the closest. The routes identified are shown in Figure 5-3. For the north side of the transit center, pedestrian routes include the following:

- *Pedestrian Route 1:* This is the nearest path to downtown from the north side of the transit center, starting at the southernmost bays of the northern site near 4th Street. This option is a 12.3-minute walk (0.38 miles). The total conflicting vehicle volume along 4th Street (from the cross streets of Hetherton Street, West and East Tamalpais Ave, Lincoln Avenue, and Lootens Place) during the a.m. peak hour is 1,840 vehicles and during the p.m. peak hour is 2,128 vehicles.
- *Pedestrian Route 2:* This is the farthest path to downtown from north side of the transit center, starting at the corner of Irwin Street and Fifth Avenue. This option is a 14-minute walk (0.45 miles). The total conflicting vehicle volume (from the intersection of Hetherton Street and Fifth Avenue, and the intersections of 4th Street with Hetherton Street, East and West Tamalpais Avenue, Lincoln Avenue, and Lootens Place) during the a.m. peak hour is 1,840 vehicles and during the p.m. peak hour is 2,128 vehicles.

For the south side of the transit center, pedestrian routes include the following:

- *Pedestrian Route 3:* This is the nearest path to downtown, from the northwest corner of the south side of the transit center at 4th Street and Hetherton Street. This option is a 12.8-minute walk (0.35 miles). The total conflicting vehicle volume on 4th Street (from the six cross streets of Hetherton Street, West and East Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 2,162 vehicles and during the p.m. peak hour is 2,373 vehicles.
- *Pedestrian Route 4:* This is the farthest path to downtown from the south side of the transit center. This option is a 12.8-minute walk (0.4 miles). The total conflicting vehicle volume on 4th Street (from the six cross streets of Hetherton Street, West and East Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 2,162 vehicles and during the p.m. peak hour is 2,373 vehicles.



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

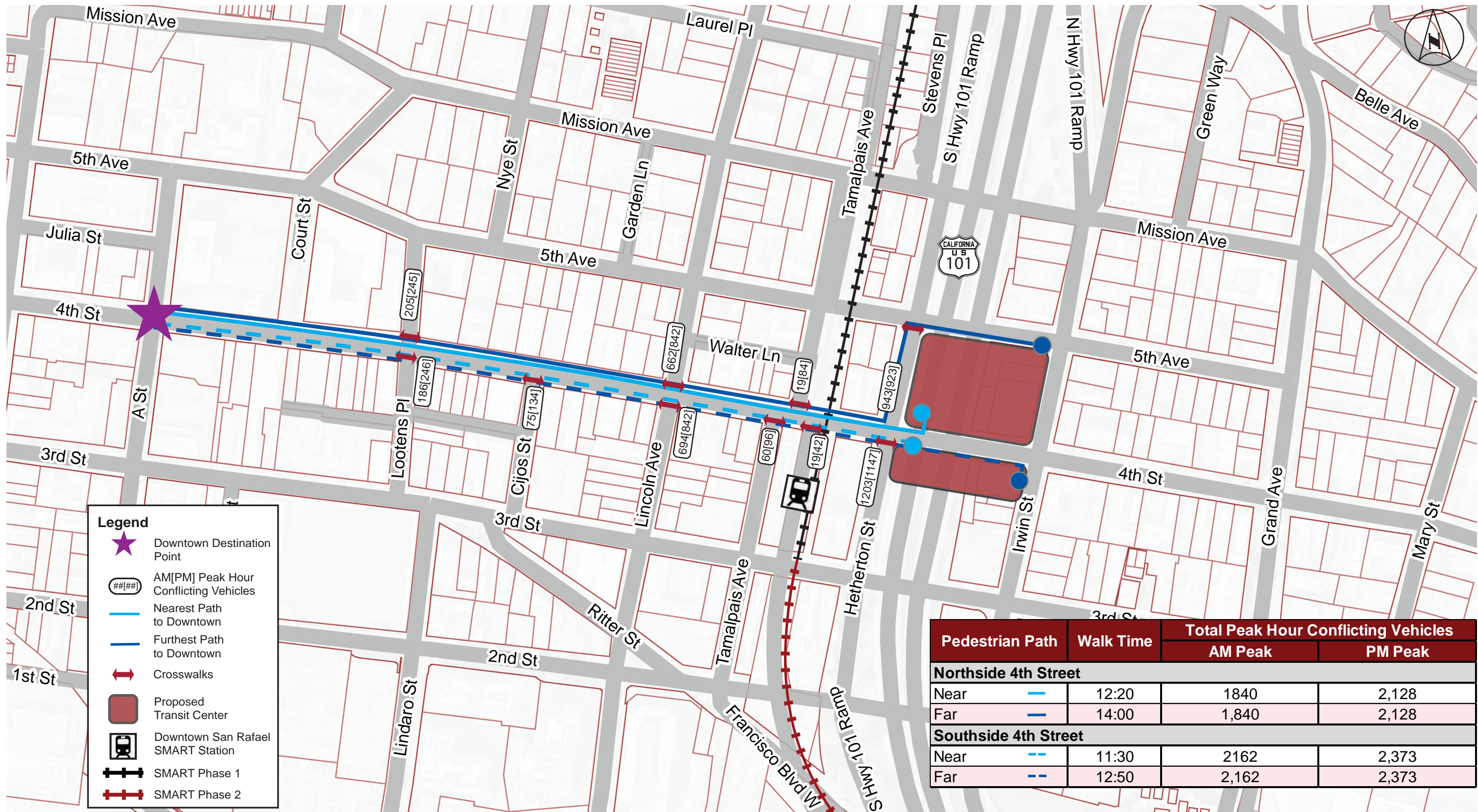


Figure 5-3: Under the Freeway Alternative - Pedestrian Connectivity to Downtown

Whistlestop Block Alternatives

Two pedestrian routes to downtown were identified for these alternatives, one “long” route and one “short” route. The long route is the route taken by pedestrians from the Bay farthest from the downtown destination, while the short route is the closest. The routes identified are shown in Figure 5-4. Compared to other alternatives, the Whistlestop Block Alternatives have shortest walk times. The pedestrian routes identified include:

- *Pedestrian Route 1:* This is the nearest path to downtown, from the northeast corner of the transit center, at 4th Street and Tamalpais Avenue. This option is a 9.3-minute walk (0.29 miles). The total conflicting vehicle volume on 4th Street (from the four cross streets of Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 955 vehicles and during the p.m. peak hour is 1,222 vehicles.
- *Pedestrian Route 2:* This is the farthest path to downtown from east side of transit center, at the corner of Hetherton Street and 3rd Street. This option is a 12-minute walk time (0.37 miles). The total conflicting vehicle volume on 4th Street (from the four cross streets of Tamalpais Avenue, Lincoln Avenue, Cijos Street, and Lootens Place) during the a.m. peak hour is 1,034 vehicles and during the p.m. peak hour is 1,360 vehicles.



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

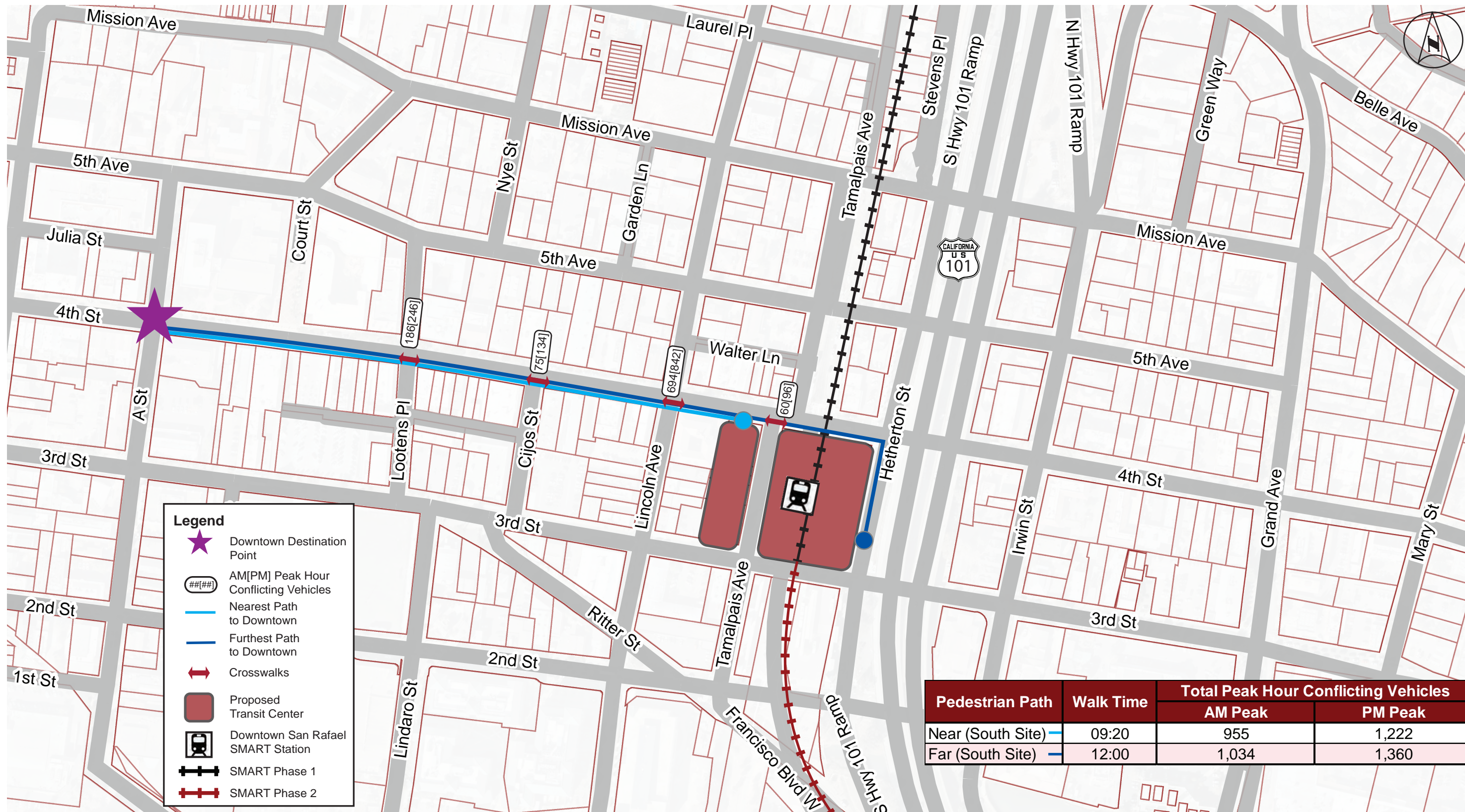


Figure 5-4: Whistlestop Block Alternative - Pedestrian Connectivity to Downtown

Summary

Table 5-1 summarizes the analysis of pedestrian paths to Downtown San Rafael for the No-Build and each Build Alternative. Only the shortest and longest paths for each alternative are shown. As can be seen in the results, all build alternatives exhibit a savings in travel time and a reduction in vehicle conflicts to Downtown compared to the No-Build Alternative. The 4th Street Gateway and Whistlestop Block Alternatives exhibit a savings in travel time to Downtown compared to the Under the Freeway Alternative. Notably, the Under the Freeway Alternative, being located on the east side of Hetherton Street, leads pedestrians to have to make a greater number of street crossings and encounter conflict with a substantially higher number of vehicles than the other Build alternatives.

Table 5-1: Pedestrian Connectivity to Downtown – Summary

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.38	12:40	2,304	2,703
	Far	0.45	14:40	2,304	2,703
4th Street Gateway	Near (N)	0.33	10:10	897	1,205
	Far (S)	0.38	12:10	1,015	1,318
Under the Freeway	Near (S)	0.35	11:30	2,162	2,373
	Far (N)	0.45	14:00	1,840	2,128
Whistlestop Block	Near	0.29	09:20	955	1,222
	Far	0.37	12:00	1,034	1,360

Walk times provided in minutes:seconds format

5.3 Pedestrian Connectivity to Local Destinations

In addition to Downtown San Rafael, other local destinations serve as trip attractors for transit center users. To evaluate each alternative's strength in providing connectivity to non-downtown local destinations, the project team evaluated the pedestrian routes between the transit center and two locations for each alternative:

- San Rafael High School (specifically, the front of the school on 3rd Street between Union Street and Embarcadero Way)
- BioMarin campus (specifically, a point on the campus fronting 2nd Street between Lincoln Avenue and Lindaro Street)

The team then estimated walk times and utilized existing vehicle volumes to determine the number of conflicting vehicles encountered by pedestrians on their route between the transit center and the above destinations.

No-Build Alternative/Existing Transit Center Site

The existing transit center is on the block bound by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. Figure 5-5 presents the pedestrian connectivity analysis from the No-Build Alternative to San Rafael High School and BioMarin's campus.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1:* This is the nearest path to the school starting from the northeast of transit center at Hetherton Street and 3rd Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 17.5-minute walk (0.44 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 5,164 vehicles and during the p.m. peak hour is 4,710 vehicles.
- *Pedestrian Route 2:* This is the farthest path to the school from the west side of the transit center at Tamalpais Avenue and Ritter Street. Pedestrians would proceed north on Tamalpais Avenue and turn right on 3rd Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 20.1-minute walk (0.53 miles). The total conflicting vehicle volume during the a.m. peak hour is 5,164 vehicles and during the p.m. peak hour is 4,710 vehicles.

The pedestrian routes identified for the BioMarin Campus include:

- *Pedestrian Route 1:* This is the nearest path to the BioMarin Campus from the west side of the transit center at Tamalpais Avenue and Ritter Street. Pedestrians would proceed west on 2nd Street to get to the campus. This option is a 5.5-minute walk (0.14 miles).
- *Pedestrian Route 2:* This is the farthest path to the BioMarin Campus from the west side of the transit center at Tamalpais Avenue and Ritter Street. Pedestrians would proceed south on Hetherton Street and make a right on 2nd Street. This option is a 7.5-minute walk (0.22 miles).

The walk trip to BioMarin encounter 2,700 to 3,050 vehicle conflicts.



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

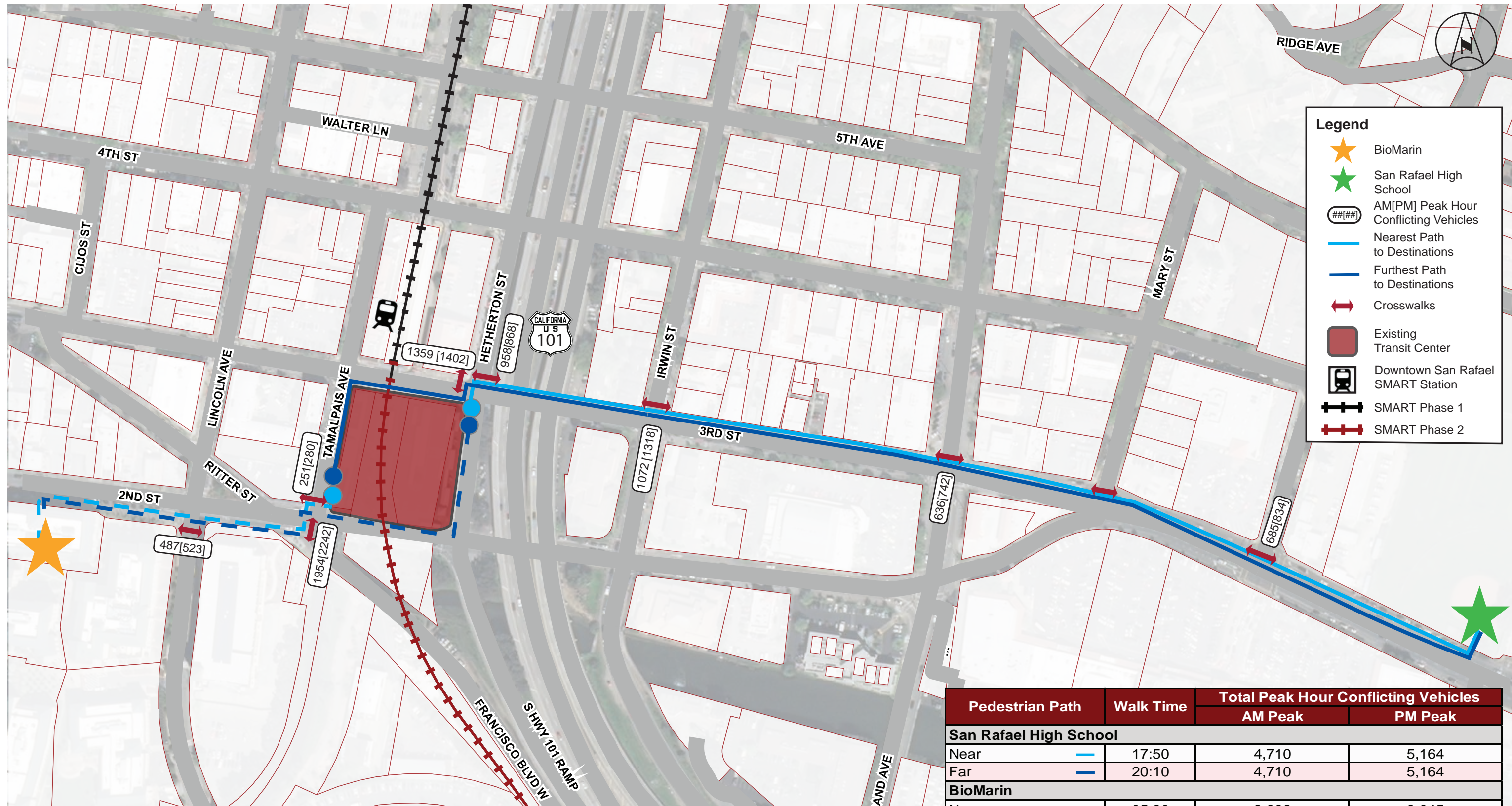


Figure 5-5: No-Build Alternative - Connectivity to Other Local Destinations

4th Street Gateway Alternative

Two pedestrian routes were identified for this alternative for each of the two local destinations considered, one “long” and one “short” route. The long route is the route taken by pedestrians from the Bay farthest from the selected destination, while the short route is the closest. The routes identified are shown in Figure 5-6.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1:* This is the nearest path to the school from the southern block of the transit center, located at the corner of 3rd Street and Hetherton Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 17-minute walk (0.54 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,351 vehicles and during the p.m. peak hour is 3,762 vehicles.
- *Pedestrian Route 2:* This is the farthest path to the school, from the northern block of the transit center near Fifth Avenue and Hetherton Street. Pedestrians would utilize Hetherton Street and the north side of 3rd Street to reach the school under this modeled route. This option is a 20.7-minute walk (0.66 miles). The total conflicting vehicle volume (from the crossing volumes at Hetherton Street and 4th Street, and the four intersections of 3rd Street and Hetherton Street, Irwin Street, Grand Avenue, and Mary Street) during the a.m. peak hour is 4,294 vehicles and during the p.m. peak hour is 4,685 vehicles.

The pedestrian routes identified for the BioMarin campus include:

- *Pedestrian Route 1:* This is the nearest path to BioMarin from the southern block of the transit center, located at the corner along 3rd Street. The assumed route would utilize 3rd Street, Lincoln Avenue, and 2nd Street to reach the campus. This option is an 8.5-minute walk (0.21 miles). The total conflicting vehicle volume (from the crossing volumes at 3rd Street and Tamalpais Avenue, 3rd Street and Lincoln Avenue, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 3,636 vehicles and during the p.m. peak hour is 4,342 vehicles.
- *Pedestrian Route 2:* This is the farthest path to BioMarin from northern block of the transit center near Fifth Avenue and Hetherton Street. The assumed route would utilize 4th Street, Lincoln Avenue, and 2nd Street to reach the campus. This option is a 12.2-minute walk (0.32 mile). Total conflict vehicles encounter over five crossings (across Tamalpais Avenue, Lincoln Avenue, Ritter Street, and 2nd Street) during the a.m. peak hour is 3,636 vehicles and during the p.m. peak hour is 4,342 vehicles.



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

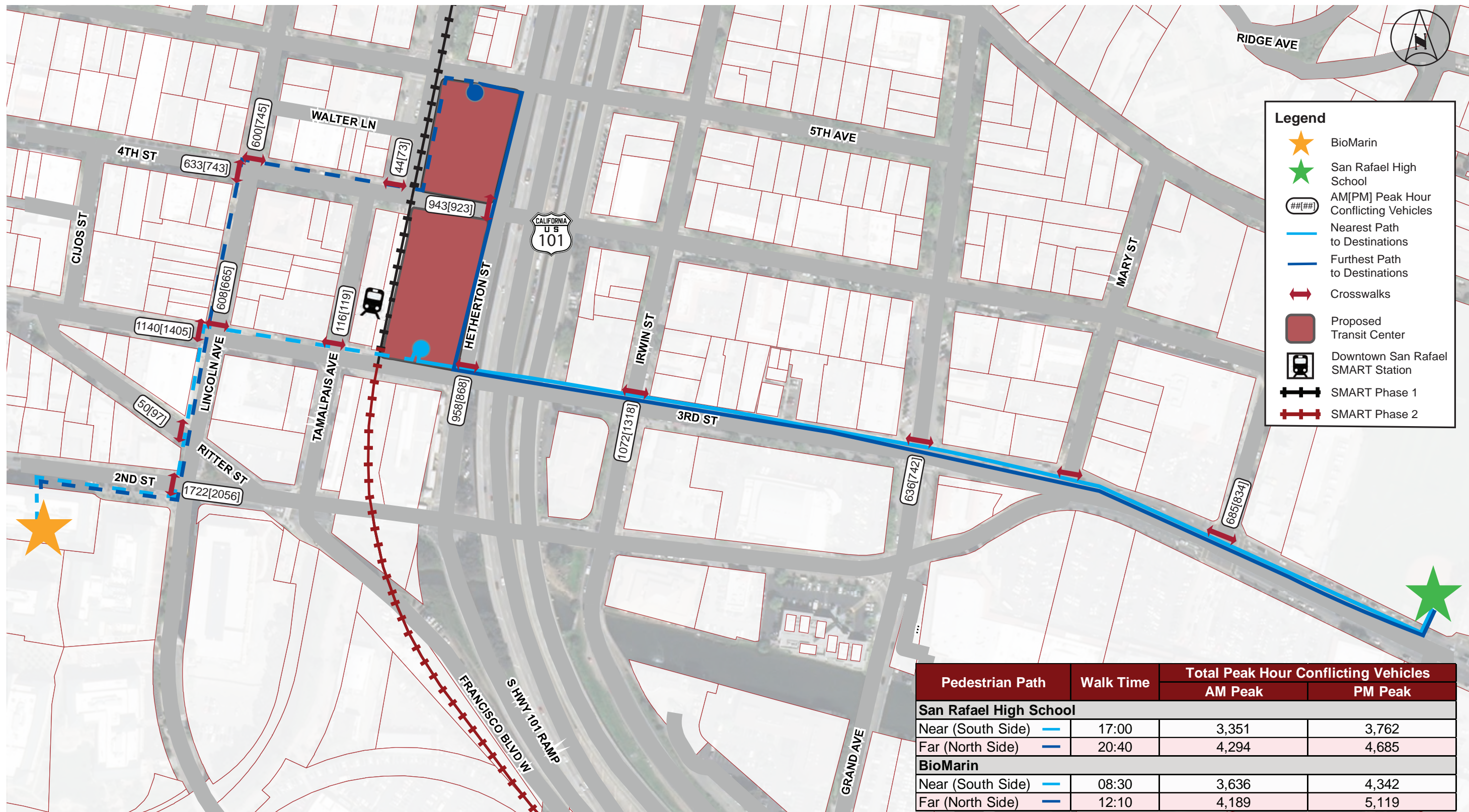


Figure 5-6: 4th Street Gateway Alternative - Connectivity to Other Local Destinations

Under the Freeway Alternative

Two pedestrian routes were identified for this alternative for each of the two local destinations considered, one “long” and one “short” route. The long route is the route taken by pedestrians from the Bay farthest from the selected destination, while the short route is the closest. The routes identified are shown in Figure 5-7.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1:* This is the nearest path to the school from the southern block of the transit center near the corner of 4th Street and Irwin Street. Pedestrians would utilize the west side of Irwin Street and the north side of 3rd Street to reach the school. This option is a 15.5-minute walk (0.55 miles). The total conflicting vehicle volume on 3rd Street (from the crossing volumes at Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 2,393 vehicles and during the p.m. peak hour is 2,894 vehicles.
- *Pedestrian Route 2:* This is the furthest path to the school from the northern block of the transit center near the corner of Fifth Avenue and Hetherton Street. Pedestrians would utilize Fifth Avenue, Irwin Street, and the north side of 3rd Street to reach the school. This option is a 19-minute walk (0.62 miles). The total conflicting vehicle volume (from the crossing volumes at 4th Street and Irwin Street and the intersections of 3rd Street with Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,039 vehicles and during the p.m. peak hour is 3,510 vehicles.

The pedestrian routes identified for the BioMarin campus include:

- *Pedestrian Route 1:* This is the nearest path to BioMarin from the southern block of the transit center near Hetherton Street and 4th Street. Pedestrians would utilize the south side of 4th Street, turn onto Lincoln Avenue, and proceed south toward 2nd Street. This option is a 11.5-minute walk (0.3 miles). The total conflicting vehicle volume (from the crossing volumes at 4th Street and Hetherton Street, 4th Street and East and West Tamalpais Avenue, 4th Street and Lincoln Avenue, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 4,594 vehicles and during the p.m. peak hour is 5,248 vehicles.
- *Pedestrian Route 2:* This is the farthest path to BioMarin from the northern block of the transit center near the corner of Fifth Avenue and Hetherton Street. Pedestrians would utilize Hetherton Street, the north side of 4th Street, and Lincoln Avenue to reach the campus. This option is a 15-minute walk (0.41 miles). The total conflicting vehicle volume (from the crossing volumes at 4th Street and Hetherton Street, 4th Street and East and West Tamalpais Avenue, 4th Street and Lincoln Avenue, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 5,132 vehicles and during the p.m. peak hour is 6,042 vehicles.



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

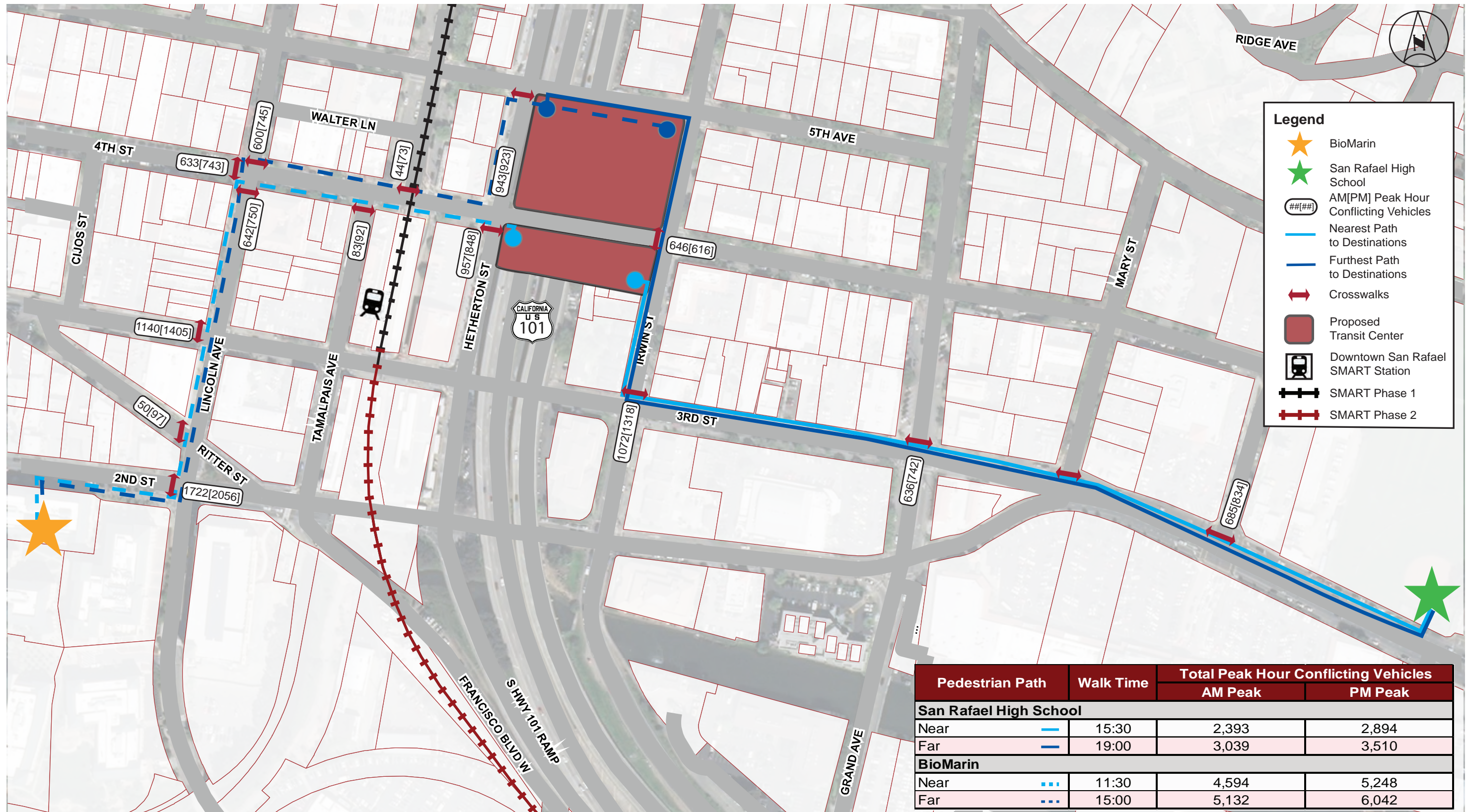


Figure 5-7: Under the Freeway Alternative - Pedestrian Connectivity to Downtown

Whistlestop Block Alternatives

Two pedestrian routes were identified for these alternatives for each of the two local destinations considered, one “long” and one “short” route. The long route is the route taken by pedestrians from the Bay farthest from the selected destination, while the short route is the closest. The routes identified are shown in Figure 5-8.

The pedestrian routes identified for San Rafael High School include:

- *Pedestrian Route 1:* This is the nearest path to the school from the southern portion of the transit center, located at the corner of 3rd Street and Hetherton Street. Pedestrians would utilize the north side of 3rd Street and proceed east toward the school. This option is a 17.2-minute walk (0.55 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,351 vehicles and during the p.m. peak hour is 3,762 vehicles.
- *Pedestrian Route 2:* This is the farthest path to the school from the northern portion of the transit center, at 4th Street and Tamalpais Avenue. Pedestrians would utilize Tamalpais Avenue and the north side of 3rd Street to reach the school. This option is a 20.3-minute walk (0.65 miles). The total conflicting vehicle volume on 3rd Street (from the five cross streets of Hetherton Street, Irwin Street, Grand Avenue, Mary Street, and Union Street) during the a.m. peak hour is 3,467 vehicles and during the p.m. peak hour is 3,881 vehicles.

The pedestrian routes identified for the BioMarin campus include:

- *Pedestrian Route 1:* This is the nearest path to BioMarin from south of the station, at Tamalpais Avenue and 3rd Street. Pedestrians would utilize 3rd Street, Lincoln Avenue, and 2nd Street to reach the BioMarin campus. This option is a 7-minute walk (0.17 miles). The total conflicting vehicle volume (from the crossing volumes at Lincoln Avenue and 3rd Street, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 3,520 vehicles and during the p.m. peak hour is 4,223 vehicles.
- *Pedestrian Route 2:* This is the farthest path to BioMarin from the northeast corner of the station, at 4th Street and Hetherton Street. Pedestrians would utilize 3rd Street, Lincoln Avenue, and 2nd Street to reach the campus. This option is a 10.2-minute walk (0.27 miles). The total conflicting vehicle volume (from the crossing volumes at Lincoln Avenue and 3rd Street, Lincoln Avenue and Ritter Street, and Lincoln Avenue and 2nd Street) during the a.m. peak hour is 3,636 vehicles and during the p.m. peak hour is 4,342 vehicles.



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

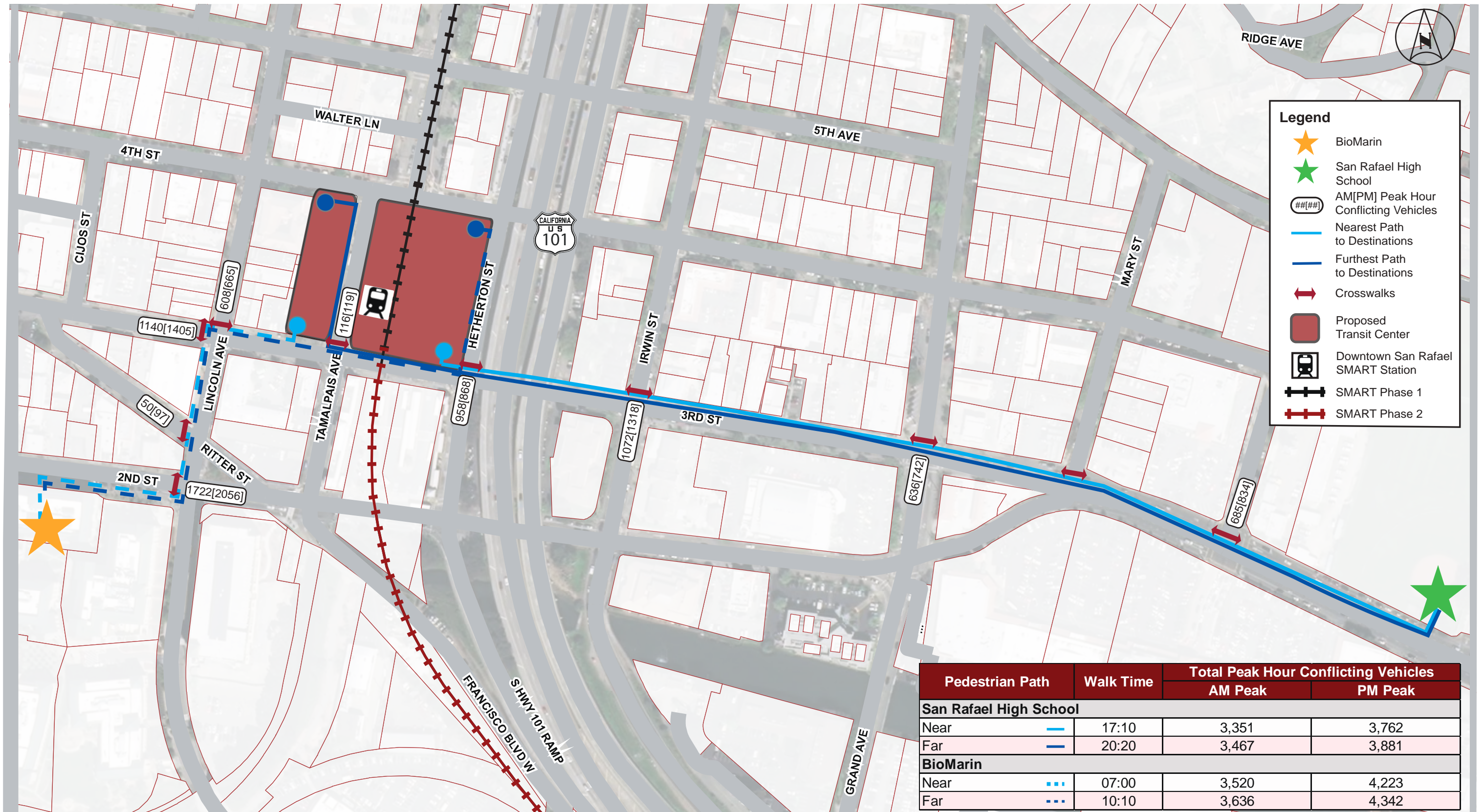


Figure 5-8: Whistlestop Block Alternative - Pedestrian and Bicycle Connectivity to Other Local Destinations

Summary

Table 5-2 summarizes the analysis of pedestrian paths to San Rafael High School for each alternative. As shown in the results, all build alternatives exhibit a savings in travel time and a reduction in vehicle conflicts on walking trips to San Rafael High School compared to the No-Build Alternative. The Under the Freeway Alternative, by nature of being on the east side of Hetherton Street, requires pedestrians to conflict with fewer vehicles when making street crossings on the way to the school. That alternative also exhibits shorter walk times to the transit center, though passengers coming from the north side of the transit center may experience a walk time similar to those of other alternatives. The 4th Street Gateway Alternative, by nature of being the farthest away from the school, exhibits longer walk times and greater conflicting vehicle volumes for pedestrians than the other build alternatives.

Table 5-2: Pedestrian Connectivity to Other Destinations – San Rafael High School

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.44	17:50	4,710	5,164
	Far	0.53	20:10	4,710	5,164
4th Street Gateway	Near (S)	0.54	17:00	3,351	3,762
	Far (N)	0.66	20:40	4,294	4,685
Under the Freeway	Near	0.51	15:30	2,393	2,894
	Far	0.62	19:00	3,039	3,510
Whistlestop Block	Near	0.55	17:10	3,351	3,762
	Far	0.65	20:20	3,467	3,881

Walk times provided in minutes:seconds format

Table 5-3 summarizes the analysis of pedestrian paths to the BioMarin campus for the No-Build Alternative and each build alternative. Aside from the No-Build Alternative, the results show the Whistlestop Block Alternatives have the shortest walk times to the campus compared to the other build alternatives. The Under the Freeway Alternative, by nature of being the farthest away from the campus, requires pedestrians to make crossings that conflict with a greater number of vehicles than the other alternatives. Like in other scenarios, this is largely a result of it being located on the east side of Hetherton Street, which is a high-volume street.

Table 5-3: Pedestrian Connectivity to Other Destinations – BioMarin Campus

Alternative	Pedestrian Path	Walk Distance (mi)	Walk Time	Total Peak Hour Conflicting Vehicles	
				AM Peak	PM Peak
No-Build	Near	0.14	05:30	2,692	3,045
	Far	0.22	07:30	2,692	3,045
4th Street Gateway	Near (S)	0.21	08:30	3,636	4,342
	Far (N)	0.32	12:10	4,189	5,119
Under the Freeway	Near	0.30	11:30	4,594	5,248
	Far	0.41	15:00	5,132	6,042
Whistlestop Block	Near	0.18	07:10	3,520	4,223
	Far	0.27	10:10	3,636	4,342

Walk times provided in minutes:seconds format

5.4 Pedestrian Connectivity between SMART and Bus

Each alternative's effectiveness at serving the SMART and bus connection was evaluated by identifying the major pedestrian barriers (i.e., street crossings) to making this transfer. Using data included in Chapter 3 on existing transfer patterns by route, the number of daily transfers between SMART and bus routes at the transit center that would need to cross a city street to make the transfer was estimated. These transfer volumes are shown in Table 5-4.

Table 5-4. Weekday Daily Average Transfer Volume between SMART and Bus

Alternative and Street Crossing	Daily SMART/Bus Transfers Required to Make Street Crossings				
	SMART to Bus	Bus to SMART	Longest SMART to Bus Transfer Distance (ft)	Longest SMART to Bus Transfer Time	Total
No-Build	66	46	625	03:40	112
4th Street Gateway (Crossing 4 th Street)	56	39	625	03:40	95
Under the Freeway (Crossing Hetherton Street and/or 4 th Street)	66	46	1,050	06:30	112
Whistlestop Block	0	0	500	02:25	0

As can be seen in the above table, the 4th Street Gateway and Under the Freeway Alternatives result in similar numbers of SMART transfers having to cross a city street to make the transfer; however, the nature of the street that they have to cross is very different. To quantify the conflict between these added pedestrian crossings and vehicle traffic, a conflict quotient was estimated by multiplying the number of peak hour crossings by the conflicting peak hour vehicle volume. These are shown in Table 5-5 for the p.m. peak hour, which is the hour with the highest SMART and bus transfer activity. The peak-hour transfer volume was estimated based on hourly ridership patterns at the transit center.

Notably, while all build alternatives are better than the No-Build Alternative by removing the crossing of 3rd Street, the Under the Freeway Alternative produces a greater conflict quotient than the other build alternatives because it forces all transfers to SMART to cross higher-volume streets (i.e., Hetherton Street) than the other alternatives.

Table 5-5. P.M. Peak Hour SMART – Bus Transfer Conflict Quotients

Alternative	Peak Hour Transfer Volume	Conflicting Vehicle Volume	Conflict Quotient
No-Build	34	1,483	50,422
4th Street Gateway	29	616	17,864
Under the Freeway	34	713	24,242
Whistlestop Block	0	0	0

5.5 Pedestrian Connectivity within the Transit Center

While approximately half of the transit center users are destined to or from Downtown San Rafael, the other half are transferring between routes. To identify the effectiveness of the alternatives in meeting the needs of transferring passengers, analysis was performed on the quality of the bus-to-bus transfer.

The 4th Street Gateway Alternative utilizes two blocks separated by 4th Street. The Under the Freeway Alternative uses two blocks also separated by 4th Street. The Whistlestop Block Alternatives are on a single block as West Tamalpais Avenue is converted to bus traffic only and East Tamalpais Avenue is closed. To quantify the impact to users for having to cross city streets, the proposed bay assignments, existing pedestrian volumes, and existing transfer activity data were used to estimate the number of pedestrian crossings of city streets. The results are shown in Table 5-6.

Table 5-6. Peak Hour Bus-to-Bus Transfers and Existing Pedestrian Volume

Alternative	A.M. Peak Hour			P.M. Peak Hour			Longest Bus to Bus Transfer Distance (ft)	Longest Bus to Bus Transfer Time
	Transfer Volume Across Street	Conflicting Vehicles	Conflict Quotient	Transfer Volume Across Street	Conflicting Vehicles	Conflict Quotient		
No-Build	0	0	0	0	0	0	450	2:10
4th Street Gateway	93	631	58,683	112	616	68,992	625	3:40
Under the Freeway	32	713	22,816	39	718	28,002	625	3:40
Whistlestop Block	0	0	0	0	0	0	625	3:40

The No-Build and Whistlestop Block Alternatives, as a result of being located on one contiguous site, do not require transfers across city streets. As the results show, the 4th Street Gateway Alternative results in the greatest number of added pedestrian volume to street crossings; this is a result of it being the most evenly bifurcated of the alternatives. The Under the Freeway Alternative is divided by 4th Street, but the majority of bays and the majority of heavy-transfer routes are located to the north of 4th Street.

5.6 Bicycle Conditions

Existing Conditions

The following bicycle facilities are located in close proximity to the Project alternatives and are shown in Figure 5-9:

- Puerto Suello Bike Path – A Class I north-south off-street trail that runs along the east side Hetherton Street and has a southern terminus at 4th Street
- Mahon Creek Path – A Class I east-west off-street trail that runs along the San Rafael Creek and through the BioMarin campus
- Francisco Boulevard Cycle Track – A Class IV two-way cycle track on the west side of Francisco Boulevard between Rice Drive and 2nd Street (connecting to the Mahon Creek path)
- Class III east-west bike route on 4th Street throughout the study area, with a gap between Hetherton Street and Irwin Street
- Class III north-south bike route on Lincoln Avenue with a northern terminus at 2nd Street
- Class III north-south bike route on Grand Avenue with a southern terminus at Fifth Avenue

Existing bicycle parking on the current transit center site consists of two racks with a capacity for eight bikes each. Additionally, there are 10 U-shaped bike racks and four bike lockers located along the east side of West Tamalpais Avenue, immediately north of 4th Street. Secured bicycle parking is also available in the Caltrans park & ride lot under US 101, north of 3rd Street.

Year 2040 Conditions and Build Alternatives

In 2018, the City of San Rafael completed an update to its Bicycle and Pedestrian Master Plan, which included proposed improvements to the bicycle network in the study area. Improvements proposed in close proximity to the Project alternatives, and shown in Figure 5-9 include:

- A Class I bike path along the SMART right-of-way south of 2nd Street
- The North South Greenway, a Class IV protected bike facility along Tamalpais Avenue between 2nd Street and Laurel Place

Construction of the build alternatives would include some modifications to the existing bicycle network. All build alternatives are proposed to include at least 20 unsecure and 10 secure bicycle parking spaces on site.

Under the 4th Street Gateway Alternative, the existing Class I path on the west side of Hetherton Street would be removed between 4th Street and Fifth Avenue (shown in Figure 5-10). Instead, bikes would use Fifth Avenue to connect from the Puerto Suello Bike Path to the planned Class IV facility on Tamalpais Avenue.

The Under the Freeway Alternative does not include any modifications to the existing bike network (shown in Figure 5-11).

The Whistlestop Block Alternatives would construct the City's planned North South Greenway on Tamalpais Avenue between 2nd Street and 4th Street (shown in Figure 5-12).



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

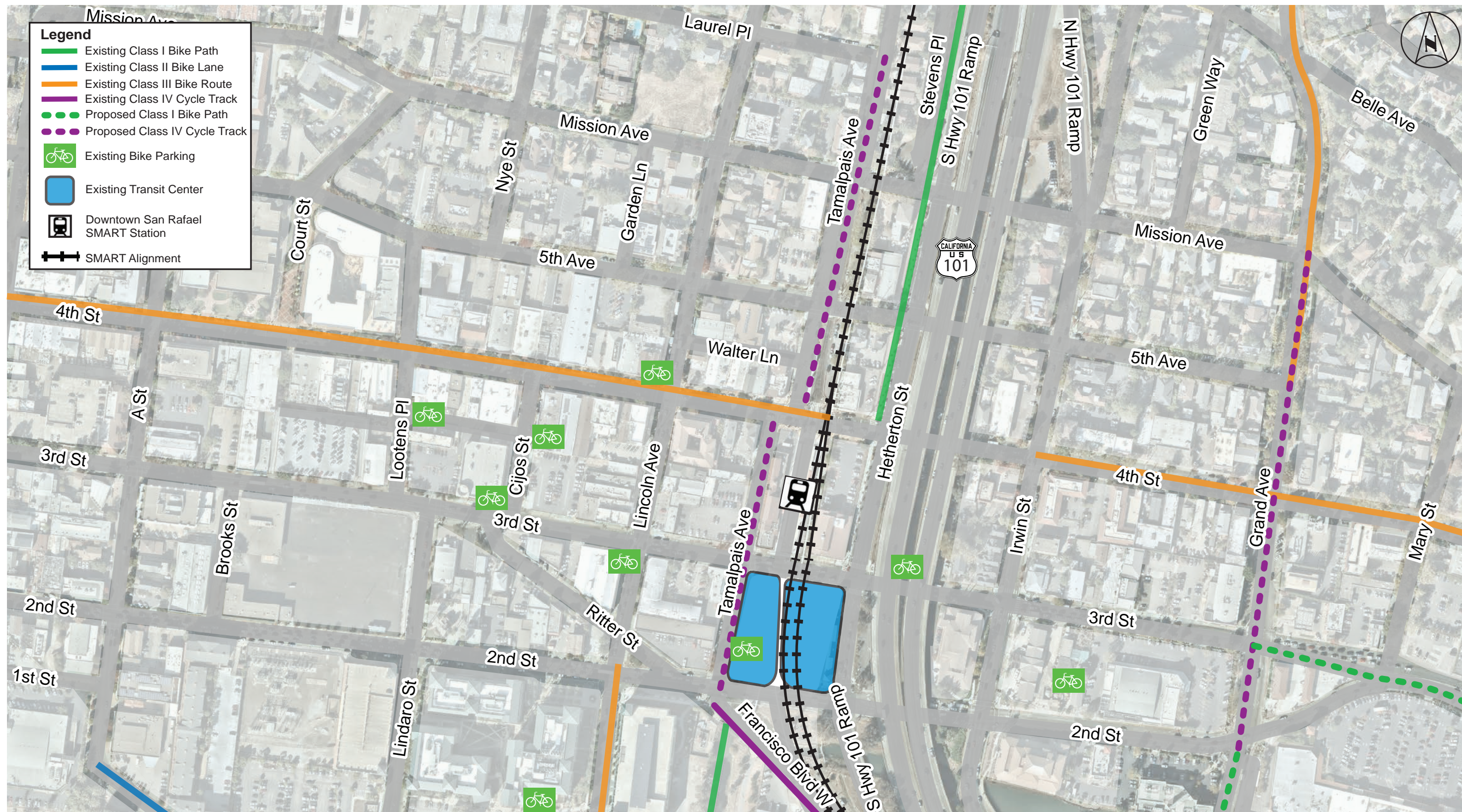


Figure 5-9: Existing and Planned Bicycle Network



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

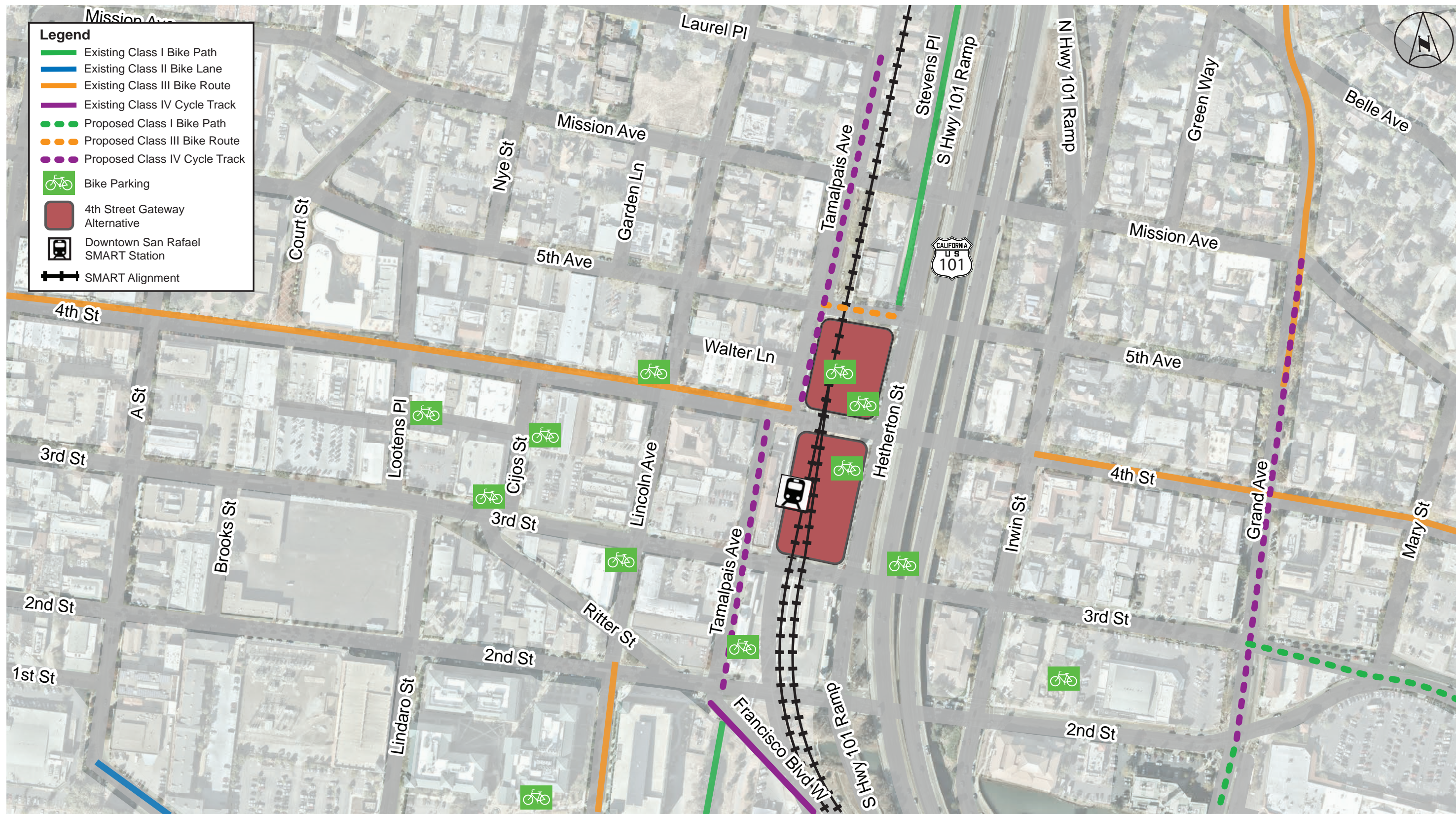


Figure 5-10 Planned Bicycle Network - 4th Street Gateway



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design

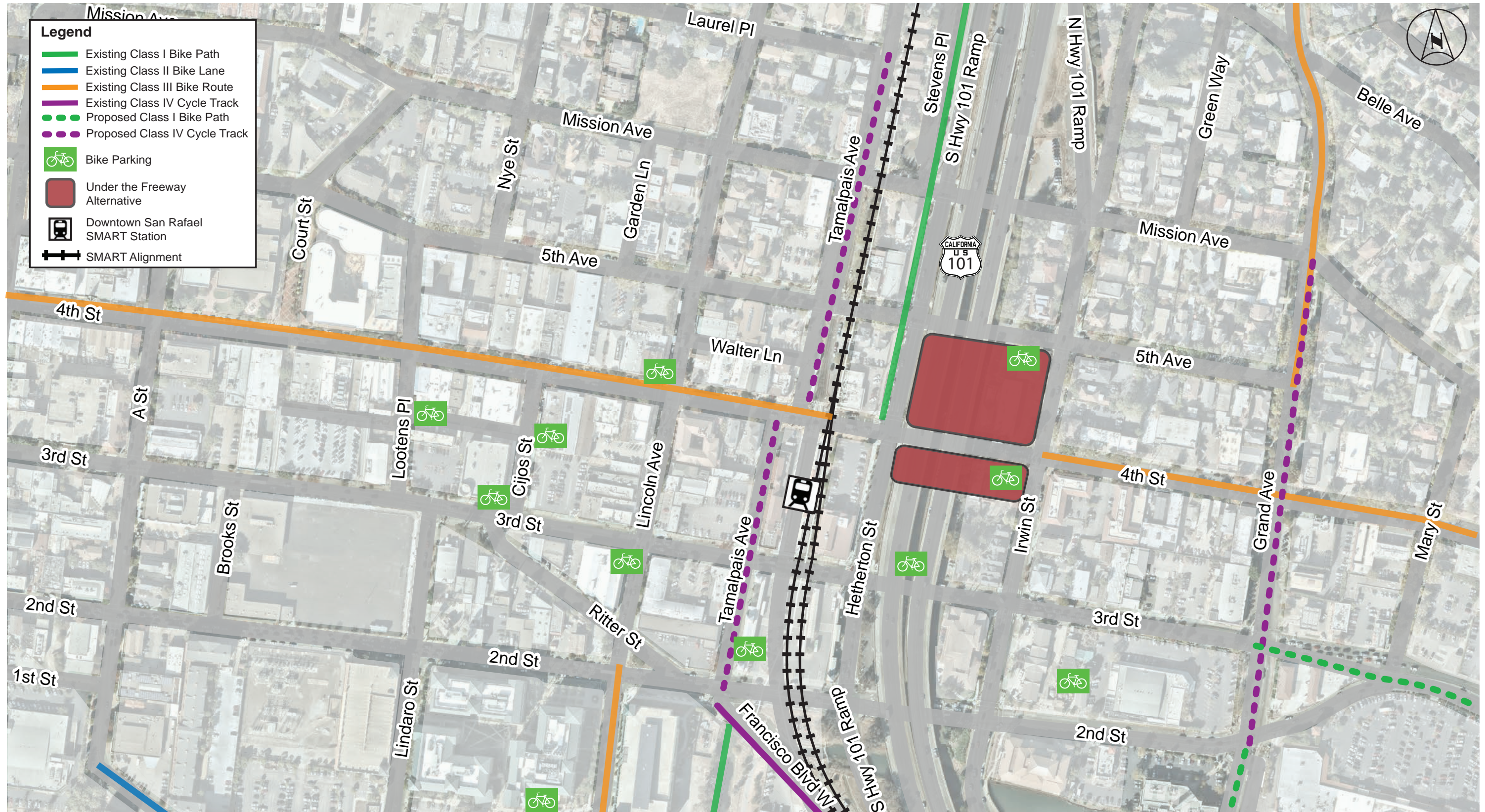
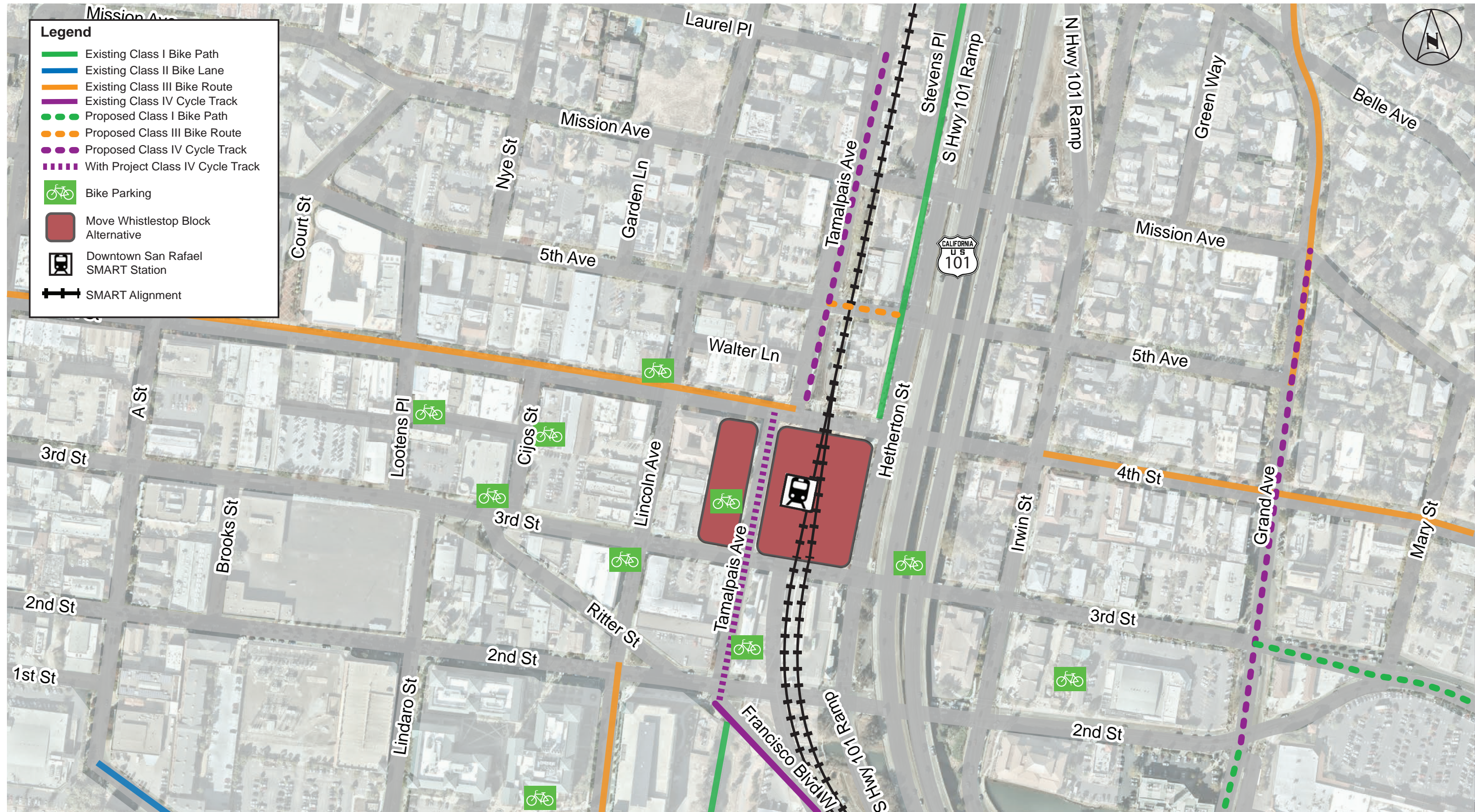


Figure 5-11: Planned Bicycle Network - Under the Freeway



SAN RAFAEL TRANSPORTATION CENTER

Relocation Analysis, Environmental Clearance, and Preliminary Design



6.0 Safety

The safety analysis includes the blocks immediately surrounding the Project alternatives and includes the block bounded by 2nd Street, Irwin Street, Fifth Avenue, and West Tamalpais Avenue.

All of the Project alternatives provide several advantages relative to the No-Build Alternative. This includes a reduction in vehicle-auto conflicts for most users and the implementation of pedestrian safety treatments, such as high-visibility crosswalks, LPIs, and enhanced lighting. Appendix D summarizes the findings of the pedestrian paths analysis to nearby destinations.

6.1 No-Build Alternative

The results identified that the intersections around the transit center and SMART station collision rates are higher than statewide averages with the existing transit center location in the No-Build Alternative.

6.2 4th Street Gateway Alternative

The 4th Street Gateway Alternative requires some passengers to cross 4th Street to transfer between transit services, which is a lower volume street than 3rd Street, but still introduces some conflicts. This alternative reduces the number of driveway and vehicle conflicts on the south side of 4th Street; however, it introduces a larger pedestrian crossing on the north side of 4th Street across the transit center driveway that increases pedestrian exposure.

6.3 Under the Freeway Alternative

The Under the Freeway Alternative also shifts the transit center north of 3rd Street, reducing the number of vehicle conflicts for pedestrians traveling north into downtown, it shifts the transit center east of Hetherton Street, adding a new barrier with significant vehicle-pedestrian conflicts. It requires passengers transferring between SMART and bus accessing Downtown San Rafael to cross Hetherton Street at 4th Street or Fifth Avenue, which are high-traffic volume intersections. Additionally, many transfers would also have to cross 4th Street to transfer between buses or between bus and SMART. The 4th Street and Hetherton Street intersection has the highest existing total collision rate amongst intersections within the study area, while 4th Street and Irwin Street has the highest number of existing pedestrian and bicycle collisions. The 4th Street and Irwin Street intersection also has more than double the existing rate of pedestrian- and bicycle-involved collisions as any other intersection in the study area. Increasing pedestrian activity at this intersection with this alternative may introduce new safety hazards. The Under the Freeway Alternative would also introduce a very long driveway along Irwin Street, increasing pedestrian exposure and adding a barrier to pedestrian movements along Irwin Street. Additionally, crosswalks within the transit center would have constrained visibility due to the presence of columns supporting the US 101 viaduct.

6.4 Whistlestop Block Alternatives

Analysis of pedestrian paths of travel indicate that the Move Whistlestop Alternative is the most effective at reducing or eliminating pedestrian conflicts for both transfers between transit modes and between the transit center and Downtown San Rafael. The Whistlestop Block Alternatives are the only alternatives where users transferring between transit modes do not experience any auto conflicts. Those alternatives, along with 4th Street Gateway, also result in the shortest walk time and substantially

fewer vehicle-pedestrian conflicts for movements to Downtown San Rafael, the predominate destination for transit riders, than both the Under the Freeway and No-Build Alternatives.

The Whistlestop Block Alternatives keep all transfer activity within the intermodal station block and passengers do not have to cross any streets, further enhancing pedestrian safety and reducing conflicts. Crosswalks within the transit center would have good visibility and would include crossing a single-direction bus lane. Outside of the limits of the transit center itself, these alternatives also include removing the vehicle-pedestrian conflict through signalization between the southbound right-turn movement at Hetherton Street and 3rd Street and the west leg pedestrian movement, a location that has a history of severe pedestrian injuries.

The Whistlestop Block Alternatives also incorporate dedicated bicycle facilities along West Tamalpais Avenue between 2nd and 4th Streets, connecting to the Mahon Creek Path and the new protected bicycle facility on Francisco Boulevard, which will provide safer bicycle conditions to/from the SRTC. By re-aligning West Tamalpais Avenue, crossing distances across 3rd Street and 4th Street will be shortened and visibility improved, benefitting bicycle and pedestrian safety for this movement.

7.0 Parking

This section describes the effects of each alternative on parking supply in the study area. The loss of parking is not a significant impact according to CEQA. Parking loss is noted for informational purposes only.

7.1 No-Build Alternative

Under the No-Build Alternative there would be no effects to the baseline parking supply.

7.2 4th Street Gateway Alternative

In the 4th Street Gateway Alternative, a total of 32 parking spaces would be removed in the following locations: six on-street taxicab parking spaces on the east side of East Tamalpais Avenue between 3rd Street and 4th Street; two parking spaces on the east side of West Tamalpais Avenue between 3rd Street and 4th Street; two on-street spaces on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street; 11 on-street parking spaces on East Tamalpais Avenue between 4th Street and Fifth Avenue; eight on-street parking spaces on the east side of Tamalpais Avenue between 4th Street and Fifth Avenue; and three on-street parking spaces on the south side of Fifth Avenue between East Tamalpais Avenue and Hetherton Street. The businesses on East Tamalpais Avenue, between 4th Street and Fifth Avenue, on 4th Street, and on Fifth Avenue that are closest to the on-street parking would be relocated with the 4th Street Gateway Alternative.

Three parking spaces are planned to be added for taxicab parking on the east side of West Tamalpais Avenue between 3rd Street and 4th Street. The 4th Street Gateway Alternative would result in a net loss of 29 parking spaces.

7.3 Under the Freeway Alternative

In the Under the Freeway Alternative, a total of 16 on-street and 72 off-street parking spots would be removed. Eight parking spaces on the south side of Fifth Avenue between Irwin Street and Hetherton Street would be removed, as well as eight parking spaces on the west side of Irwin Street between 4th Street and Fifth Avenue. The businesses on Irwin Street that are closest to the on-street parking would be relocated with the Under the Freeway Alternative. The new transit center would utilize the entire space currently occupied by the Caltrans park & ride under Highway 101 between 4th Street and Fifth Avenue, resulting in a loss of 55 spaces. It would also utilize 17 spaces of the Caltrans park & ride lot under the freeway between 3rd Street and 4th Street.

Two parking spaces are planned to be added for taxicab parking on the south side of Fifth Avenue between Hetherton Street and Irwin Street. The Under the Freeway Alternative would result in a net loss of 14 on-street and 72 off-street park & ride spots. As required by Caltrans, the park & ride spaces will need to be replaced elsewhere in a location that serves a similar commute market. No location for replacement park & ride parking has been identified.

7.4 Whistlestop Block Alternatives

In the Whistlestop Block Alternatives, 31 on-street parking stalls would be removed in the following locations: six on-street parking stalls on Tamalpais Avenue between Second Street and 3rd Street; six on-street taxicab parking spaces on the east side of East Tamalpais Avenue between 3rd Street and 4th Street; 16 on-street parking stalls on Tamalpais Avenue between 3rd Street and 4th Street; one on-street

parking stall on the south side of 4th Street between Lincoln Avenue and Tamalpais Avenue; and two on-street spaces on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street. The existing businesses on Tamalpais Avenue that are closest to the on-street parking would be relocated with the Whistlestop Block Alternatives.

In the Move Whistlestop Alternative, a total of 18 parking stalls would be added in the following locations: 16 parking stalls will be added on Tamalpais Avenue between Second Street and 3rd Street; and two taxicab parking stalls on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street. The Move Whistlestop Alternative would result in a net loss of 13 on-street parking stalls.

In the Adapt Whistlestop Alternative, a total of 10 parking stalls would be added in the following locations: 8 parking stalls will be added on the east side of Tamalpais Avenue between Second Street and 3rd Street; and two taxicab parking stalls on the north side of 4th Street between East Tamalpais Avenue and Hetherton Street. The Adapt Whistlestop Alternative would result in a net loss of 21 on-street parking stalls. Table 7-1 provides a summary of the parking removed and planned for each alternative.

Table 7-1. Net Change in Public Parking

Alternative	Removed		Planned		Net Total	
	On-Street	Off-Street	On-Street	Off-Street	On-Street	Off-Street
4th Street Gateway	26	0	0	0	-26	0
Under the Freeway	16	72	0	0 ¹	-16	-72 ¹
Adapt Whistlestop	25	0	8	0	-17	0
Move Whistlestop	25	0	16	0	-9	0

¹ The impacted 72 spaces at the Caltrans park & ride lots will be required to be replaced at a similar location within the existing park & ride driveway; however, no replacement parking area has yet been identified.

8.0 Summary

This report documents the four alternatives for the SRTC Project. The project team analyzed the three build alternatives, plus a No-Build Alternative, under existing (Year 2020) and future (Year 2040) conditions, focusing on the effects of the alternatives on transit circulation, vehicular traffic, non-motorized transportation, and parking. The analysis included the development of a VISSIM microsimulation model, which was utilized to estimate vehicle delay and transit circulation time for the alternatives. Effects on parking and pedestrian and bicycle circulation were analyzed qualitatively and quantitatively, using data on existing conditions to project conditions under the build alternatives.

The transit circulation analysis indicated that only the Whistlestop Block Alternatives achieved reductions in transit travel time and variability in both existing and future conditions in both the a.m. and p.m. peak hours. While both the Under the Freeway and 4th Street Gateway Alternatives provide benefits in existing conditions, they each increased transit travel time in one future peak hour condition.

The traffic circulation analysis found that both the Under the Freeway and Whistlestop Block Alternatives achieved reductions in delay at several congested intersections in the study area in both existing and future conditions. Both alternatives also either held congestion levels relatively constant (10 percent change or less, measured as overall network-wide vehicle delay) in both the existing and future conditions for both the a.m. and p.m. peak hours, with the exception of the Under the Freeway p.m. peak hour with future conditions where there is a 14% increase in delay. Both alternatives resulted in travel time reductions on some corridors, with small increases on other corridors. The 4th Street Gateway Alternative resulted in gridlock in a subset of the VISSIM model runs in the a.m. peak hour in Year 2040 conditions. This represented a degradation of traffic operations relative to the No-Build and other project alternatives.

The safety analysis of the blocks immediately surrounding the Project alternatives identified that the intersections around the transit center and SMART station have collision rates higher than statewide averages. This emphasizes the need to consider pedestrian and bicycle safety and access improvements as a key element of the SRTC Project. All of the build alternatives provide several advantages to the No-Build Alternative by reducing the number of vehicle-pedestrian conflicts, particularly along high-volume pedestrian routes and at high collision propensity. Data shows that pedestrian trips to and from the transit center are predominately oriented towards Downtown San Rafael to the north and west. By relocating the transit center to blocks north of 3rd Street, pedestrian crossings of 3rd Street will be greatly reduced, reducing the number of pedestrian-vehicle conflicts, particularly at intersections with a history of pedestrian- and bicycle-involved collisions and fatalities.

Analysis of pedestrian paths of travel indicate that the Whistlestop Block Alternatives are the only alternatives that limit conflicts for transferring transit passengers, have shortest walk time, and have fewer vehicle-pedestrian conflicts for movements to Downtown San Rafael and provide a high-quality bicycle facility to close a critical gap in the City's bicycle network. Outside of the limits of the transit center itself, these alternatives also include removing the existing vehicle-pedestrian conflict through signalization between the southbound right-turn movement at Hetherton Street and 3rd Street and the west leg pedestrian movement, a location that has a history of severe pedestrian injuries. The 4th Street Gateway Alternative would require a number of passengers to cross 4th Street to transfer between bus

routes. The Under the Freeway Alternative would require passengers to cross Hetherton Street at 4th Street or Fifth Avenue to access Downtown San Rafael. In addition, several passengers would have to cross 4th Street to transfer between bus routes. The Under the Freeway Alternative is adjacent to the 4th Street and Irwin Street intersection, which has more than double the existing rate of pedestrian- and bicycle-involved collisions as any other intersection in the study area. Increasing pedestrian activity at this intersection with this alternative may introduce new safety hazards.

The Whistlestop Block Alternatives were found to provide users the best transfer experience, with no required street crossings either for connections between bus and SMART or connections between bus and bus. The Under the Freeway Alternative was least desirable for SMART and bus transfers due to the requirement to cross busy Hetherton Street. The 4th Street Gateway Alternative was least desirable for bus-to-bus transfers due to the higher number of transfers across 4th Street.

The 4th Street Gateway Alternative is placed closest to Downtown San Rafael, while the Under the Freeway Alternative is placed closest to San Rafael High School, and the Whistlestop Alternatives are placed closest to BioMarin.

For bicycle connections, the Whistlestop Block Alternatives would best promote the City's planned bicycle network by constructing two blocks of the proposed Class IV bikeway on Tamalpais Avenue as a high-quality raised two-way Class IV facility. The 4th Street Gateway Alternative would require removal of one block of the Puerto Suello bike path but would provide strong connections to the Mahon Creek Path and the Puerto Suello bike path. The Under the Freeway Alternative would not closely integrate with the City's planned network nor would it affect any planned facilities.

Appendix A: Transit Circulation Tables

Existing Baseline: Average Circulation Time in Network (sec)				
Route #	Existing A.M.	AM Std Dev	Existing P.M.	PM Std Dev
17	755.1	44.9	626.4	16.4
22	760.8	49.3	650.1	41.8
23 EB	864.1	132.2	966.4	223.1
23 WB	654.0	63.9	536.9	73.7
23X EB	780.5	91.8	642.8	15.7
23X WB	574.7	50.2	530.1	47.6
27 NB	N/A	N/A	517.1	61.0
27 SB	728.1	71.9	656.2	23.6
29 EB	944.5	80.0	815.2	60.8
29 WB	913.3	62.0	715.5	37.9
30 SB	922.2	59.3	726.2	35.3
30 NB	507.7	26.3	498.0	78.0
35 SB	886.2	95.6	748.4	66.3
35 NB	870.6	139.4	764.8	52.0
36 NB	567.8	20.4	799.8	51.5
36 SB	701.7	34.2	785.3	36.1
40	638.2	29.3	561.0	29.8
40X	517.2	18.0	N/A	N/A
49	456.9	15.4	598.2	57.4
68	568.7	74.1	692.7	94.9
70 NB	657.8	118.3	505.1	81.4
70 SB	552.3	6.6	625.6	34.6
71X SB	551.7	31.5	562.4	19.6
71X NB	511.0	75.4	606.9	74.3
101 NB	518.4	39.2	698.1	82.3
101 SB	558.8	8.8	538.2	6.7
122 NB	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7
145	683.4	152.5	N/A	N/A
228	240.7	56.0	593.1	31.4
233	575.4	80.4	408.0	34.0
245	551.9	74.1	694.8	119.1
257	463.0	31.7	397.2	32.3
38 SCT	N/A	0.0	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Existing 4th Street Gateway – Average Circulation Time in Network (sec)

Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	4th Street Gateway A.M.	4th Street Gateway A.M. Standard Deviation	4th Street Gateway P.M.	4th Street Gateway P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	547.1	109.4	598.9	90.5
22	760.8	49.3	650.1	41.8	746.8	123.2	530.6	29.3
23 EB	864.1	132.2	966.4	223.1	532.1	57.6	582.5	81.9
23 WB	654.0	63.9	536.9	73.7	530.4	108.2	601.1	69.9
23X EB	780.5	91.8	642.8	15.7	772.3	303.7	719.8	63.7
23X WB	574.7	50.2	530.1	47.6	693.2	75.7	760.6	216
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	517.9	108.1
27 SB	728.1	71.9	656.2	23.6	722.1	113.5	545.6	42.1
29 EB	944.5	80.0	815.2	60.8	647.1	53.1	612.1	92.4
29 WB	913.3	62.0	715.5	37.9	623.1	141.4	530.6	91.1
30 SB	922.2	59.3	726.2	35.3	816.1	148.4	573.3	103.1
30 NB	507.7	26.3	498.0	78.0	712.3	87.5	734.7	99.9
35 SB	886.2	95.6	748.4	66.3	718.2	207.1	740.3	66.6
35 NB	870.6	139.4	764.8	52.0	597	56.5	573.1	37.1
36 NB	567.8	20.4	799.8	51.5	554.3	62.1	654	97.5
36 SB	701.7	34.2	785.3	36.1	477	73.5	577.5	15.5
40	638.2	29.3	561.0	29.8	626	96	651.9	90
40X	517.2	18.0	N/A	N/A	502.3	93.7	N/A	N/A
49	456.9	15.4	598.2	57.4	512.9	86.4	552.6	75.5
68	568.7	74.1	692.7	94.9	484.2	59.8	490.9	132.9
70 NB	657.8	118.3	505.1	81.4	633.7	116.3	475.8	50.7
70 SB	552.3	6.6	625.6	34.6	523.7	35.6	538.7	56.3
71X SB	551.7	31.5	562.4	19.6	499.4	142.4	619.7	28.2
71X NB	511.0	75.4	606.9	74.3	495.6	95.8	525.5	56.9
101 NB	518.4	39.2	698.1	82.3	476.3	78.6	584.7	115.8
101 SB	558.8	8.8	538.2	6.7	511.4	61.9	722.1	43.1
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	693.1	101.4
145	683.4	152.5	N/A	N/A	863.6	164.9	N/A	N/A
228	240.7	56.0	593.1	31.4	600.6	67.2	652.9	99.2
233	575.4	80.4	408.0	34.0	528	138.2	510.6	69.9
245	551.9	74.1	694.8	119.1	526.9	59	532.3	94.6
257	463.0	31.7	397.2	32.3	466.9	67.1	646.8	163.7
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	498.9	34.3	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	473.1	3.4	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Existing Under the Freeway - Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	Under the Freeway A.M.	Under the Freeway A.M. Standard Deviation	Under the Freeway P.M.	Under the Freeway P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	481.3	15.4	588.4	86.5
22	760.8	49.3	650.1	41.8	645.6	56.4	640.2	90.1
23 EB	864.1	132.2	966.4	223.1	398.1	26.6	569.2	79.2
23 WB	654.0	63.9	536.9	73.7	660.9	64.1	645.4	47.8
23X EB	780.5	91.8	642.8	15.7	494.9	243.7	771.5	109.2
23X WB	574.7	50.2	530.1	47.6	679.6	157.9	658.2	85.3
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	528	103.6
27 SB	728.1	71.9	656.2	23.6	472.6	13	512.9	8.4
29 EB	944.5	80.0	815.2	60.8	534	6.4	553.6	37.8
29 WB	913.3	62.0	715.5	37.9	528	69.9	507.5	88.8
30 SB	922.2	59.3	726.2	35.3	751.2	53.5	602.7	82.7
30 NB	507.7	26.3	498.0	78.0	676.6	162.2	697.1	208.3
35 SB	886.2	95.6	748.4	66.3	678	176.7	695.3	77.9
35 NB	870.6	139.4	764.8	52.0	741.4	214.3	661.7	71.5
36 NB	567.8	20.4	799.8	51.5	537	23.5	601.5	79.5
36 SB	701.7	34.2	785.3	36.1	471.5	78	503.3	32.5
40	638.2	29.3	561.0	29.8	513.8	18.1	462.7	13.3
40X	517.2	18.0	N/A	N/A	417.7	14	N/A	N/A
49	456.9	15.4	598.2	57.4	414.6	25.1	399.1	6.6
68	568.7	74.1	692.7	94.9	513.8	78.1	788.8	157.5
70 NB	657.8	118.3	505.1	81.4	417.3	18	452.5	35.4
70 SB	552.3	6.6	625.6	34.6	463.4	27.7	498.8	67.4
71X SB	551.7	31.5	562.4	19.6	476.4	25.5	511.9	13.7
71X NB	511.0	75.4	606.9	74.3	431.7	20.7	434.1	84.4
101 NB	518.4	39.2	698.1	82.3	440	28.5	435.4	37.1
101 SB	558.8	8.8	538.2	6.7	448.9	17.3	465.8	10.6
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	805.3	82.7
145	683.4	152.5	N/A	N/A	646.6	126.1	N/A	N/A
228	240.7	56.0	593.1	31.4	466.4	10.8	605.7	189.9
233	575.4	80.4	408.0	34.0	469.9	47.3	476	39.8
245	551.9	74.1	694.8	119.1	374.5	28	430.6	37.9
257	463.0	31.7	397.2	32.3	460.4	22.9	485.2	27.3
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	402.2	4.6	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	392.2	31.8	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Existing Whistlestop Block – Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	Whistlestop Block A.M.	Whistlestop Block A.M. Standard Deviation	Whistlestop Block P.M.	Whistlestop Block P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	652.0	33.8	536.4	32.5
22	760.8	49.3	650.1	41.8	382.8	24.6	431.3	11.6
23 EB	864.1	132.2	966.4	223.1	513.9	35.3	548.2	11.8
23 WB	654.0	63.9	536.9	73.7	504.8	23.8	586.0	31.7
23X EB	780.5	91.8	642.8	15.7	593.8	162.9	659.1	74.8
23X WB	574.7	50.2	530.1	47.6	679.1	197.2	548.6	75.2
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	524.8	15.4
27 SB	728.1	71.9	656.2	23.6	520.2	17.1	501.9	16.1
29 EB	944.5	80.0	815.2	60.8	650.6	43.7	570.6	34.9
29 WB	913.3	62.0	715.5	37.9	631.1	53.2	569.3	41.1
30 SB	922.2	59.3	726.2	35.3	612.1	62.9	559.8	32.3
30 NB	507.7	26.3	498.0	78.0	621.5	44.6	534.2	61.8
35 SB	886.2	95.6	748.4	66.3	768.7	103.4	549.6	39.0
35 NB	870.6	139.4	764.8	52.0	706.1	271.0	587.9	35.0
36 NB	567.8	20.4	799.8	51.5	528.4	12.5	526.0	55.3
36 SB	701.7	34.2	785.3	36.1	538.8	19.9	536.6	40.2
40	638.2	29.3	561.0	29.8	571.8	72.5	712.2	52.3
40X	517.2	18.0	N/A	N/A	521.4	10.2	N/A	N/A
49	456.9	15.4	598.2	57.4	512.3	39.3	558.5	60.6
68	568.7	74.1	692.7	94.9	410.6	35.0	426.5	15.4
70 NB	657.8	118.3	505.1	81.4	622.9	45.9	463.8	41.1
70 SB	552.3	6.6	625.6	34.6	556.8	66.8	504.1	29.7
71X SB	551.7	31.5	562.4	19.6	512.6	14.5	507.2	24.5
71X NB	511.0	75.4	606.9	74.3	485.0	28.0	535.5	55.4
101 NB	518.4	39.2	698.1	82.3	560.3	56.2	444.9	28.8
101 SB	558.8	8.8	538.2	6.7	510.0	94.0	497.9	11.1
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	776.7	45.2
145	683.4	152.5	N/A	N/A	465.5	43.9	N/A	N/A
228	240.7	56.0	593.1	31.4	701.4	44.1	539.5	40.4
233	575.4	80.4	408.0	34.0	596.5	60.0	497.0	34.7
245	551.9	74.1	694.8	119.1	473.7	38.0	485.6	59.0
257	463.0	31.7	397.2	32.3	482.1	49.9	473.1	51.3
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	537.0	97.7	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	498.6	95.0	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 Baseline – Average Circulation Time in Network (sec)								
Route #	Existing A.M.	Existing A.M. Standard Deviation	Existing P.M.	Existing P.M. Standard Deviation	Year 2040 A.M.	Year 2040 A.M. Standard Deviation	Year 2040 P.M.	Year 2040 P.M. Standard Deviation
17	755.1	44.9	626.4	16.4	742.9	59.2	726.7	59.7
22	760.8	49.3	650.1	41.8	979.5	165.7	666.2	57.7
23 EB	864.1	132.2	966.4	223.1	1297.0	345.1	899.0	158.0
23 WB	654.0	63.9	536.9	73.7	1552.8	537.4	545.1	41.7
23X EB	780.5	91.8	642.8	15.7	884.1	320.4	643.0	78.6
23X WB	574.7	50.2	530.1	47.6	1402.9	433.3	567.4	114.9
27 NB	N/A	N/A	517.1	61.0	N/A	N/A	583.4	22.7
27 SB	728.1	71.9	656.2	23.6	907.6	185.7	572.1	2.8
29 EB	944.5	80.0	815.2	60.8	978.0	127.6	982.2	134.8
29 WB	913.3	62.0	715.5	37.9	791.8	43.5	669.9	26.4
30 SB	922.2	59.3	726.2	35.3	1294.9	469.8	888.0	498.7
30 NB	507.7	26.3	498.0	78.0	570.4	105.4	594.9	89.2
35 SB	886.2	95.6	748.4	66.3	942.0	324.4	786.3	108.8
35 NB	870.6	139.4	764.8	52.0	1594.8	325.2	832.5	37.0
36 NB	567.8	20.4	799.8	51.5	602.0	110.3	758.4	46.7
36 SB	701.7	34.2	785.3	36.1	1016.1	132.7	697.2	84.7
40	638.2	29.3	561.0	29.8	615.6	112.3	646.7	64.0
40X	517.2	18.0	N/A	N/A	493.7	103.0	N/A	N/A
49	456.9	15.4	598.2	57.4	573.7	80.4	682.0	96.6
68	568.7	74.1	692.7	94.9	782.2	237.0	663.1	87.6
70 NB	657.8	118.3	505.1	81.4	646.1	136.2	518.4	65.4
70 SB	552.3	6.6	625.6	34.6	723.8	168.3	642.8	59.0
71X SB	551.7	31.5	562.4	19.6	539.7	13.9	607.2	33.9
71X NB	511.0	75.4	606.9	74.3	609.8	146.5	553.5	45.4
101 NB	518.4	39.2	698.1	82.3	633.6	190.8	622.7	46.3
101 SB	558.8	8.8	538.2	6.7	589.6	69.8	591.4	42.5
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	484.0	186.7	N/A	N/A	839.5	139.6
145	683.4	152.5	N/A	N/A	1251.4	264.2	N/A	N/A
228	240.7	56.0	593.1	31.4	401.7	111.7	695.5	105.5
233	575.4	80.4	408.0	34.0	512.4	37.3	387.4	4.2
245	551.9	74.1	694.8	119.1	737.4	114.2	539.9	114.0
257	463.0	31.7	397.2	32.3	680.2	280.8	428.0	60.3
38 SCT	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	394.5	50.4	N/A	N/A	467.1	152.0	N/A	N/A
Sonoma Airporter	486.6	75.1	N/A	N/A	541.0	164.8	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 4th Street Gateway – Average Circulation Time in Network (sec)								
Route #	Year 2040 Baseline A.M.	Year 2040 Baseline A.M. Standard Deviation	Year 2040 Baseline P.M.	Year 2040 Baseline P.M. Standard Deviation	Year 2040 4th Street Gateway A.M.	Year 2040 4th Street Gateway A.M. Standard Deviation	Year 2040 4th Street Gateway P.M.	Year 2040 4th Street Gateway P.M. Standard Deviation
17	742.9	59.2	726.7	59.7	794.2	185.7	550.5	70.3
22	979.5	165.7	666.2	57.7	1024.9	282.2	544.8	31.8
23 EB	1297.0	345.1	899.0	158.0	1332.6	730.9	555.3	15.5
23 WB	1552.8	537.4	545.1	41.7	1002.8	345	633.7	132
23X EB	884.1	320.4	643.0	78.6	1497.2	357.8	776.3	56.3
23X WB	1402.9	433.3	567.4	114.9	1304.4	331.7	659.8	100
27 NB	N/A	N/A	583.4	22.7	N/A	N/A	539.9	63.8
27 SB	907.6	185.7	572.1	2.8	887.2	192.2	568.1	58.5
29 EB	978.0	127.6	982.2	134.8	859.6	335.8	621.4	133.6
29 WB	791.8	43.5	669.9	26.4	822.3	193.8	559.3	166
30 SB	1294.9	469.8	888.0	498.7	1575.8	434.3	925.5	363.8
30 NB	570.4	105.4	594.9	89.2	756.2	149.2	707.2	85.6
35 SB	942.0	324.4	786.3	108.8	1013.3	693.1	704.9	44.1
35 NB	1594.8	325.2	832.5	37.0	1121.5	341	617.1	59.3
36 NB	602.0	110.3	758.4	46.7	730.3	79.6	673.6	73.2
36 SB	1016.1	132.7	697.2	84.7	891.4	254.9	641.4	110.2
40	615.6	112.3	646.7	64.0	1070.5	134	758.8	109.7
40X	493.7	103.0	N/A	N/A	943.4	251.9	N/A	N/A
49	573.7	80.4	682.0	96.6	812.7	131.6	513.8	46.4
68	782.2	237.0	663.1	87.6	862	285.9	481.5	87.7
70 NB	646.1	136.2	518.4	65.4	839.3	272.7	487.2	92.7
70 SB	723.8	168.3	642.8	59.0	649.3	197.9	458.5	8.4
71X SB	539.7	13.9	607.2	33.9	507.1	105.2	591.3	45.9
71X NB	609.8	146.5	553.5	45.4	823.9	95.3	512.1	37.2
101 NB	633.6	190.8	622.7	46.3	939.5	338.8	556.3	64.3
101 SB	589.6	69.8	591.4	42.5	552.3	107.7	703.8	43.8
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	839.5	139.6	N/A	N/A	795.5	98.4
145	1251.4	264.2	N/A	N/A	1670.1	651.1	N/A	N/A
228	401.7	111.7	695.5	105.5	670.5	70.9	595.1	79.5
233	512.4	37.3	387.4	4.2	584.5	92.2	521.6	139.1
245	737.4	114.2	539.9	114.0	973	261.7	496.3	69.5
257	680.2	280.8	428.0	60.3	597.5	229.5	512.5	41.5
38 SCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	467.1	152.0	N/A	N/A	522.6	54	N/A	N/A
Sonoma Airporter	541.0	164.8	N/A	N/A	553	169.6	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 Under the Freeway – Average Circulation Time in Network (sec)

Route #	Year 2040 Baseline A.M.	Year 2040 Baseline A.M. Standard Deviation	Year 2040 Baseline P.M.	Year 2040 Baseline P.M. Standard Deviation	Year 2040 Under the Freeway A.M.	Year 2040 Under the Freeway A.M. Standard Deviation	Year 2040 Under the Freeway P.M.	Year 2040 Under the Freeway P.M. Standard Deviation
17	742.9	59.2	726.7	59.7	532.7	70.2	810.3	132.7
22	979.5	165.7	666.2	57.7	783.5	53.4	837.9	87.7
23 EB	1297.0	345.1	899.0	158.0	569.7	193.9	572.4	167.7
23 WB	1552.8	537.4	545.1	41.7	1676.7	470.6	863.4	199.8
23X EB	884.1	320.4	643.0	78.6	836.9	124.4	683	84.4
23X WB	1402.9	433.3	567.4	114.9	1397.8	220.6	839.5	182
27 NB	N/A	N/A	583.4	22.7	N/A	N/A	737.4	226
27 SB	907.6	185.7	572.1	2.8	514.5	40.4	530.3	36.5
29 EB	978.0	127.6	982.2	134.8	559	33.3	574.3	108.8
29 WB	791.8	43.5	669.9	26.4	634.7	84.6	736.9	221.6
30 SB	1294.9	469.8	888.0	498.7	1306.1	381.2	940.5	200.9
30 NB	570.4	105.4	594.9	89.2	695	65.4	967.5	94.8
35 SB	942.0	324.4	786.3	108.8	1067.5	156.7	979.4	83.9
35 NB	1594.8	325.2	832.5	37.0	1478.4	284.9	871.7	129.6
36 NB	602.0	110.3	758.4	46.7	589	72.2	673.6	141.4
36 SB	1016.1	132.7	697.2	84.7	1258.5	269	585.7	127.3
40	615.6	112.3	646.7	64.0	604.6	98.7	636.1	72.1
40X	493.7	103.0	N/A	N/A	487.1	75.3	N/A	N/A
49	573.7	80.4	682.0	96.6	406.3	83.2	430.7	102.4
68	782.2	237.0	663.1	87.6	494.1	58.4	1025.3	211.2
70 NB	646.1	136.2	518.4	65.4	407.5	79.8	599.8	204.8
70 SB	723.8	168.3	642.8	59.0	498	83.6	733.9	244.9
71X SB	539.7	13.9	607.2	33.9	487.5	31.5	523	57.4
71X NB	609.8	146.5	553.5	45.4	468.9	70.4	456.4	128.4
101 NB	633.6	190.8	622.7	46.3	495.2	118.3	468.4	62.1
101 SB	589.6	69.8	591.4	42.5	432.3	26.1	485.8	61.9
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	839.5	139.6	N/A	N/A	983.2	176.1
145	1251.4	264.2	N/A	N/A	1029.5	66.6	N/A	N/A
228	401.7	111.7	695.5	105.5	573.9	109.7	968.1	187.8
233	512.4	37.3	387.4	4.2	487.2	53.8	474.4	98.1
245	737.4	114.2	539.9	114.0	384.5	34.3	472.6	120
257	680.2	280.8	428.0	60.3	614.8	258.1	461.8	28.9
38 SCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	467.1	152.0	N/A	N/A	414.3	24.6	N/A	N/A
Sonoma Airporter	541.0	164.8	N/A	N/A	494.7	141.1	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Year 2040 Whistlestop Block – Average Circulation Time in Network (sec)								
Route #	Year 2040 Baseline A.M.	Year 2040 Baseline A.M. Standard Deviation	Year 2040 Baseline P.M.	Year 2040 Baseline P.M. Standard Deviation	Year 2040 Whistlestop Block A.M.	Year 2040 Whistlestop Block A.M. Standard Deviation	Year 2040 Whistlestop Block P.M.	Year 2040 Whistlestop Block P.M. Standard Deviation
17	742.9	59.2	726.7	59.7	673.2	45.5	601.7	47.7
22	979.5	165.7	666.2	57.7	408.5	45.5	431.6	14.9
23 EB	1297.0	345.1	899.0	158.0	599.5	50.2	547.6	11.7
23 WB	1552.8	537.4	545.1	41.7	942.1	457.4	613.1	87.8
23X EB	884.1	320.4	643.0	78.6	817.9	48.8	670.5	49.3
23X WB	1402.9	433.3	567.4	114.9	900.4	301.0	587.4	71.5
27 NB	N/A	N/A	583.4	22.7	N/A	N/A	536.7	24.0
27 SB	907.6	185.7	572.1	2.8	568.8	40.1	503.5	15.8
29 EB	978.0	127.6	982.2	134.8	612.6	145.7	580.6	35.5
29 WB	791.8	43.5	669.9	26.4	668.2	59.5	566.7	134.5
30 SB	1294.9	469.8	888.0	498.7	788.7	80.3	552.3	47.4
30 NB	570.4	105.4	594.9	89.2	659.5	52.8	658.3	63.9
35 SB	942.0	324.4	786.3	108.8	908.7	79.7	620.4	42.8
35 NB	1594.8	325.2	832.5	37.0	951.2	361.0	647.1	86.8
36 NB	602.0	110.3	758.4	46.7	593.4	62.4	589.5	106.5
36 SB	1016.1	132.7	697.2	84.7	866.2	164.6	574.3	84.8
40	615.6	112.3	646.7	64.0	626.1	56.3	702.5	65.3
40X	493.7	103.0	N/A	N/A	586.3	35.4	N/A	N/A
49	573.7	80.4	682.0	96.6	532.7	48.9	564.1	39.8
68	782.2	237.0	663.1	87.6	446.7	95.3	424.5	30.2
70 NB	646.1	136.2	518.4	65.4	623.9	67.6	608.9	86.2
70 SB	723.8	168.3	642.8	59.0	603.1	66.7	573.9	39.6
71X SB	539.7	13.9	607.2	33.9	514.8	15.7	527.4	36.8
71X NB	609.8	146.5	553.5	45.4	581.3	77.4	571.0	67.6
101 NB	633.6	190.8	622.7	46.3	623.4	158.9	543.3	99.9
101 SB	589.6	69.8	591.4	42.5	491.3	33.8	487.6	13.9
122 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	N/A	N/A	839.5	139.6	N/A	N/A	830.2	65.6
145	1251.4	264.2	N/A	N/A	757.7	214.5	N/A	N/A
228	401.7	111.7	695.5	105.5	718.4	61.3	650.6	48.3
233	512.4	37.3	387.4	4.2	636.4	68.9	482.6	27.3
245	737.4	114.2	539.9	114.0	532.2	53.1	525.4	68.5
257	680.2	280.8	428.0	60.3	547.2	104.9	479.9	27.5
38 SCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Greyhound	467.1	152.0	N/A	N/A	645.9	183.4	N/A	N/A
Sonoma Airporter	541.0	164.8	N/A	N/A	480.6	41.6	N/A	N/A

Note: N/A denotes that there was no result recorded since the route does not occur during the specified peak hour.

Appendix B: Traffic Volumes

INT #	Intersection Name	Existing Baseline A.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				256	843			1050	940			
2	Hetherton & 3rd					727	219				372	1132	
3	Hetherton & 4th				87	692	161		217	130	124	290	
4	Hetherton & Fifth				35	737	167		209	149	54	234	
5	Hetherton & Mission				180	843	407		416	62	34	200	
6	Irwin & 2nd		1346	399				580	726				
7	Irwin & 3rd	807	1119									697	66
8	Irwin & 4th	126	990	69				110	194			288	65
9	Irwin & Fifth	141	1010	14				163	81			147	90
10	Irwin & Mission	88	1135	40				347	249			146	328
11	Grand & 2nd		405	235	18	438		112	675	338			
12	Grand & 3rd	203	314			193	64				263	496	135
13	Grand & 4th	114	275	60	34	160	50	24	165	74	23	189	102
14	Grand & Fifth	167	234			175	70	26		69			
15	Grand & Mission	134	105	21	43	175	72	25	226	38	32	268	27
16	Lincoln & 2nd		124	75	77	273		87	1632	34			
17	Lincoln & 3rd	14	172			258	136				112	1039	48
18	Lincoln & 4th	17	159	44	26	308	36	36	268	31	55	348	19
19	Lincoln & Fifth	8	177	29	30	285	39	42	281	31	54	327	22
20	Lincoln & Mission	2	209	30	64	293	370	147	376	15	46	522	40
21	A & 2nd		203	25	34	95		85	1567	181			
22	A & 3rd	166	122			105	22				24	926	50
23	A & 4th	18	106	15	20	97	29	43	272	27	37	300	23
24	A & Fifth	55		117					537	29	117	487	
25	Tamalpais & 2nd		48	148	90	112		11	1752	21			
26	Tamalpais & 3rd	36	23			34	7				168	1156	7
27	Lindaro & 2nd		55	180	28	238		28	1545	53			
28	Lindaro & 3rd	80	3			25	4				241	980	13
29	Cijos & 4th	14		20					315	1	46	355	
30	Lootens & 4th	5	32	20	20	65	25	24	276	7	15	330	24
31	Court & 4th								307			360	
32	Court & Fifth	4		4	31	19	288	282	342	30	40	312	21
33	Court & Mission	10		293					236	29	309	578	
34	Tamalpais & Fifth	3	2	7		4	2	1	327	12	1	398	6
35	Fifth Ave & E Tamalpais Ave	7	1	26				2	332			398	3
36	Ritter & 3rd	45										1189	
37	Lincoln & Ritter	25	186			350	20						
38	Nye & Fifth				17		14	40	337			359	15
39	Nye & Mission	1	30	24	8	3	19	20	506	3	25	867	2
40	Mission Ave & E Tamalpais Ave	1		5					473			607	
41	Tamalpais & Mission			9					464	6		608	
42	Tamalpais & 4th			30			17		297	41		405	12
43	4th St & E Tamalpais Ave			20					327			417	34

INT #	Intersection Name	Existing Baseline P.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				332	785			1484	849			
2	Hetherton & 3rd					736	221				381	1262	
3	Hetherton & 4th				97	710	202		265	151	96	255	
4	Hetherton & Fifth				26	776	232		265	189	44	195	
5	Hetherton & Mission				228	963	399		419	48	23	217	
6	Irwin & 2nd		1278	643				718	1098				
7	Irwin & 3rd	817	1179								826	139	
8	Irwin & 4th	89	1158	71				155	207		262	73	
9	Irwin & Fifth	116	1256	14				185	106		123	93	
10	Irwin & Mission	95	1400	39				363	284		145	269	
11	Grand & 2nd		494	236	16	431		138	972	631			
12	Grand & 3rd	253	379			157	112				290	600	130
13	Grand & 4th	95	354	60	73	164	42	16	167	95	10	198	70
14	Grand & Fifth	165	275			179	51	20		100			
15	Grand & Mission	151	124	20	50	169	57	35	245	43	18	206	47
16	Lincoln & 2nd		221	160	77	155		187	1821	33			
17	Lincoln & 3rd	36	286			216	174				79	1205	55
18	Lincoln & 4th	23	286	32	35	280	57	35	339	33	77	306	47
19	Lincoln & Fifth	16	317	35	29	300	41	49	377	28	44	344	44
20	Lincoln & Mission	4	370	36	24	312	299	229	396	9	49	493	75
21	A & 2nd		294	11	112	66		99	1642	142			
22	A & 3rd	243	150			112	45				66	1290	64
23	A & 4th	41	165	48	32	86	13	31	277	30	14	329	35
24	A & Fifth	55		176					627	53	78	517	
25	Tamalpais & 2nd		44	232	85	129		39	2016	26			
26	Tamalpais & 3rd	53	30			28	27				186	1259	17
27	Lindaro & 2nd		88	268	86	138		38	1687	40			
28	Lindaro & 3rd	103	23			17	13				207	1304	30
29	Cijos & 4th	18		65					342	21	30	356	
30	Lootens & 4th	21	53	41	16	49	21	23	306	28	17	336	21
31	Court & 4th								357			378	
32	Court & Fifth	9	4	50	21	10	207	364	414	25	19	379	22
33	Court & Mission	17		373					263	13	225	570	
34	Tamalpais & Fifth	6	4	17	4	1	3	1	417	23	3	423	5
35	Fifth Ave & E Tamalpais Ave	5	9	16					438			426	1
36	Ritter & 3rd	126										1415	
37	Lincoln & Ritter	86	322		23	232	40						
38	Nye & Fifth				11		32	42	443			388	13
39	Nye & Mission	2	12	41	6	8	30	34	587	15	13	763	20
40	Mission Ave & E Tamalpais Ave	2		8					459			616	
41	Tamalpais & Mission			10					449	7	1	617	
42	Tamalpais & 4th			47			27		351	55		403	27
43	4th St & E Tamalpais Ave	2	1	18					398			428	29

INT #	Intersection Name	Year 2040 Baseline A.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				314	908			1286	1145			
2	Hetherton & 3rd					816	409				406	1257	
3	Hetherton & 4th				107	915	198		266	158	152	355	
4	Hetherton & Fifth				40	987	191		240	176	57	269	
5	Hetherton & Mission				207	1114	467		478	69	35	230	
6	Irwin & 2nd		1566	420				611	989				
7	Irwin & 3rd	928	1249								735	69	
8	Irwin & 4th	203	1042	73				169	204		304	68	
9	Irwin & Fifth	160	1104	15				188	92		166	102	
10	Irwin & Mission	100	1249	45				403	282		165	372	
11	Grand & 2nd		427	248	19	461		118	711	580			
12	Grand & 3rd	214	331			203	67				277	523	142
13	Grand & 4th	120	290	63	36	168	53	25	174	78	24	199	139
14	Grand & Fifth	189	265			179	79	29		78			
15	Grand & Mission	152	119	23	49	179	82	28	256	43	36	303	31
16	Lincoln & 2nd		185	219	94	374		107	2053	40			
17	Lincoln & 3rd	17	220			355	166				137	1223	57
18	Lincoln & 4th	21	202	54	35	391	44	44	302	63	67	426	19
19	Lincoln & Fifth	9	227	29	34	372	45	48	323	36	62	375	20
20	Lincoln & Mission	2	257	36	73	374	425	169	425	24	53	599	46
21	A & 2nd		249	31	42	116		104	1919	222			
22	A & 3rd	204	149			129	27				29	1134	61
23	A & 4th	22	130	18	24	119	24	53	334	33	45	369	28
24	A & Fifth	77		134					616	33	134	560	
25	Tamalpais & 2nd				91	125			2340	26			
26	Tamalpais & 3rd										216	1417	9
27	Lindaro & 2nd		93	274	34	292		34	1892	66			
28	Lindaro & 3rd	124	3			31	5				295	1174	16
29	Cijos & 4th	17		24					385	1	56	435	
30	Lootens & 4th	6	39	24	24	80	31	29	338	9	18	405	29
31	Court & 4th								376			442	
32	Court & Fifth	5		5	36	22	331	324	392	34	46	358	24
33	Court & Mission	12		336					271	34	355	663	
34	Tamalpais & Fifth							1	385		1	457	7
35	Fifth Ave & E Tamalpais Ave	8	1	33				2	383			457	3
36	Ritter & 3rd	79										1406	
37	Lincoln & Ritter	55	237			468	24						
38	Nye & Fifth				20		16	46	387			412	17
39	Nye & Mission	1	34	28	9	4	22	23	581	3	29	995	2
40	Mission Ave & E Tamalpais Ave	1		5					542			697	
41	Tamalpais & Mission			8					534			698	
42	Tamalpais & 4th			9			1		391			511	
43	4th St & E Tamalpais Ave			24					400			511	42

INT #	Intersection Name	Year 2040 Baseline P.M. Peak Hour											
		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Hetherton & 2nd				351	830			1591	897			
2	Hetherton & 3rd					778	286				403	1383	
3	Hetherton & 4th				103	794	210		280	160	110	270	
4	Hetherton & Fifth				31	868	279		317	186	53	234	
5	Hetherton & Mission				230	1092	479		502	58	28	260	
6	Irwin & 2nd		1385	696				799	1143				
7	Irwin & 3rd	907	1277								879	150	
8	Irwin & 4th	96	1254	77				159	224		284	79	
9	Irwin & Fifth	153	1324	15				232	116		134	101	
10	Irwin & Mission	130	1484	43				410	322		158	293	
11	Grand & 2nd		535	256	17	467		149	1022	668			
12	Grand & 3rd	274	410			170	121				314	634	141
13	Grand & 4th	103	383	65	80	178	46	17	181	103	10	214	80
14	Grand & Fifth	180	300			195	55	22		109			
15	Grand & Mission	165	135	22	55	183	61	51	267	47	20	225	51
16	Lincoln & 2nd		265	332	104	225		197	1985	35			
17	Lincoln & 3rd	38	313			312	184				83	1238	110
18	Lincoln & 4th	24	365	34	37	354	60	37	332	61	81	324	46
19	Lincoln & Fifth	19	387	42	35	364	49	59	412	40	47	413	43
20	Lincoln & Mission	5	444	40	29	373	358	274	469	16	59	591	89
21	A & 2nd		310	12	118	70		105	1713	150			
22	A & 3rd	257	158			118	48				70	1363	68
23	A & 4th	43	174	51	34	91	31	33	292	31	15	347	37
24	A & Fifth	66		178					751	63	93	620	
25	Tamalpais & 2nd				70	128			2418	27			
26	Tamalpais & 3rd										198	1431	18
27	Lindaro & 2nd		109	365	91	146		40	1761	42			
28	Lindaro & 3rd	125	24			18	14				219	1362	32
29	Cijos & 4th	19		69					361	22	32	376	
30	Lootens & 4th	22	56	43	17	52	22	24	323	30	18	355	22
31	Court & 4th								377			399	
32	Court & Fifth	11	5	60	25	12	248	436	463	30	23	454	26
33	Court & Mission	20		447					315	15	270	682	
34	Tamalpais & Fifth							1	488		4	503	11
35	Fifth Ave & E Tamalpais Ave	6	11	15					488			512	1
36	Ritter & 3rd	153										1460	
37	Lincoln & Ritter	111	351		24	329	42						
38	Nye & Fifth				13		38	50	498			465	16
39	Nye & Mission	2	15	49	7	17	36	41	703	18	16	914	24
40	Mission Ave & E Tamalpais Ave	2		10					550			739	
41	Tamalpais & Mission			12					538		2	739	
42	Tamalpais & 4th			18					403			451	
43	4th St & E Tamalpais Ave	2	1	19					421			449	31

Appendix C: Baseline Pedestrian Volumes

Existing Baseline					
Intersection	East X-Walk A.M. [P.M.]	South X-Walk A.M. [P.M.]	West X-Walk A.M. [P.M.]	North X-Walk A.M. [P.M.]	Total A.M. [P.M.]
2nd & A	12 [12]	16 [27]	24 [30]	16 [18]	68 [87]
2nd & Grand	12 [16]	34 [52]	18 [39]	-	64 [107]
2nd & Irwin	10 [28]	-	-	31 [36]	41 [64]
2nd & Lincoln	-	62 [41]	15 [23]	19 [18]	96 [82]
2nd & Lindaro	17 [10]	43 [28]	5 [4]	15 [19]	80 [61]
2nd & Tamalpais	-	-	66 [78]	0 [0]	66 [78]
3rd & A	55 [50]	47 [58]	33 [54]	43 [50]	178 [212]
3rd & Grand	20 [28]	10 [25]	7 [40]	56 [49]	93 [142]
3rd & Hetherton	-	14 [35]	72 [37]	39 [33]	125 [105]
3rd & Irwin	11 [19]	18 [49]	-	0 [0]	29 [68]
3rd & Lincoln	22 [44]	22 [69]	25 [99]	39 [71]	108 [283]
3rd & Lindaro	16 [12]	22 [30]	-	-	38 [42]
3rd & Tamalpais	89 [105]	87 [105]	22 [18]	31 [48]	229 [276]
4th & A	2 [38]	10 [48]	39 [5]	34 [93]	85 [184]
4th & Cijos	4 [23]	38 [45]	12 [28]	-	54 [96]
4th & Grand	17 [23]	23 [43]	14 [32]	22 [18]	76 [116]
4th & Hetherton	5 [11]	34 [50]	24 [16]	21 [27]	84 [104]
4th & Irwin	10 [7]	25 [22]	7 [4]	14 [11]	56 [44]
4th & Lincoln	24 [39]	43 [79]	49 [132]	35 [62]	151 [312]
4th & Lootens	3 [18]	24 [105]	8 [25]	45 [125]	80 [273]
4th & Tamalpais	-	41 [76]	26 [46]	19 [40]	86 [162]
Fifth & A	5 [5]	7 [15]	14 [5]	-	26 [25]
Fifth & Court	7 [12]	9 [25]	18 [31]	17 [15]	51 [83]
Fifth & Hetherton	7 [1]	10 [25]	12 [14]	12 [4]	41 [44]
Fifth & Irwin	8 [2]	5 [6]	2 [9]	1 [5]	16 [22]
Fifth & Lincoln	9 [17]	6 [11]	27 [34]	6 [9]	48 [71]
Fifth & Tamalpais	-	9 [15]	9 [15]	9 [6]	27 [36]
Mission & Hetherton	0 [0]	11 [14]	10 [13]	5 [2]	26 [29]
Mission & Irwin	10 [3]	11 [13]	0 [4]	-	21 [20]
Mission & Lincoln	23 [33]	11 [9]	12 [15]	4 [6]	50 [52]
Mission & Tamalpais	0 [0]	14 [11]	2 [13]	1 [6]	17 [30]

Year 2040 Baseline					
Intersection	East X-Walk A.M. [P.M.]	South X-Walk A.M. [P.M.]	West X-Walk A.M. [P.M.]	North X-Walk A.M. [P.M.]	Total A.M. [P.M.]
2nd & A	15 [12]	20 [28]	30 [32]	20 [19]	84 [91]
2nd & Grand	13 [18]	36 [56]	19 [42]	-	68 [116]
2nd & Irwin	-	33 [39]	10 [30]	-	43 [69]
2nd & Lincoln	-	76 [43]	19 [24]	24 [19]	118 [86]
2nd & Lindaro	21 [10]	53 [30]	6 [4]	19 [20]	99 [64]
2nd & Tamalpais	-	-	81 [83]	-	81 [83]
3rd & A	67 [53]	58 [62]	41 [57]	53 [53]	218 [224]
3rd & Grand	21 [31]	10 [27]	7 [43]	59 [53]	97 [154]
3rd & Hetherton	17 [36]	-	88 [39]	48 [35]	153 [110]
3rd & Irwin	11 [21]	19 [53]	-	0	30 [121]
3rd & Lincoln	27 [0]	27 [73]	31 [104]	48 [75]	133 [253]
3rd & Lindaro	20 [12]	27 [32]	-	-	47 [44]
3rd & Tamalpais	109 [111]	107 [111]	28 [19]	38 [51]	281 [292]
4th & A	3 [40]	13 [50]	48 [5]	42 [99]	105 [194]
4th & Cijos	5 [24]	47 [48]	15 [30]	-	67 [101]
4th & Grand	18 [25]	25 [47]	15 [35]	23 [19]	80 [125]
4th & Hetherton	6 [12]	42 [53]	30 [17]	26 [29]	103 [110]
4th & Irwin	11 [8]	26 [24]	7 [4]	15 [12]	59 [47]
4th & Lincoln	30 [41]	53 [84]	60 [140]	43 [66]	186 [330]
4th & Lootens	4 [13]	30 [111]	10 [26]	55 [132]	98 [288]
4th & Tamalpais	0 [0]	51 [81]	32 [49]	24 [42]	106 [171]
Fifth & A	6 [6]	8 [18]	17 [6]	-	31 [30]
Fifth & Court	8 [15]	11 [30]	21 [37]	20 [18]	60 [100]
Fifth & Hetherton	8 [1]	12 [30]	14 [17]	14 [5]	48 [53]
Fifth & Irwin	10 [2]	6 [6]	3 [10]	1 [5]	19 [23]
Fifth & Lincoln	11 [21]	7 [13]	31 [41]	7 [11]	56 [86]
Fifth & Tamalpais	0 [0]	11 [18]	11 [18]	11 [8]	32 [44]
Mission & Hetherton	-	13 [17]	12 [16]	6 [3]	31 [35]
Mission & Irwin	12 [3]	13 [14]	0 [4]	-	25 [21]
Mission & Lincoln	26 [27]	13 [11]	14 [18]	5 [7]	58 [63]
Mission & Tamalpais	-	17 [14]	3 [16]	1 [7]	20 [37]

**Appendix D: San Rafael Transit Center Relocation Project Safety
Analysis**

Memorandum

To: Ray Santiago, Project Manager
Golden Gate Transit

From: Adam Dankberg, P.E.
Kimley-Horn and Associates, Inc.

Date: March 28, 2022

Subject: San Rafael Transit Center Relocation Project Safety Analysis

This memorandum provides a safety analysis of the San Rafael Transit Center (SRTC) Relocation Project (“Project”) alternatives. The Golden Gate Bridge, Highway, and Transportation District (GGBHTD) is currently undertaking the Project to identify a new location for the SRTC in Downtown San Rafael. A *Draft Environmental Impact Report (DEIR)* (ICF, August 2021) has been prepared in accordance with the provisions of the California Environmental Quality Act (CEQA). A detailed transportation analysis of transit, traffic, and pedestrian and bicycle conditions has also been prepared in *SRTC Transportation Summary Report* (Kimley-Horn, February 2021). Both documents provide details on transit center alternatives and traffic, pedestrian, and bicycle volumes (relevant sections of both documents are included as attachments). The safety analysis supports the transportation assessments presented in these documents and addresses the following:

- Pedestrian, bicycle, and vehicular safety around the existing SRTC using collision data provided by the City of San Rafael.
- Identification of pedestrian and bicycle treatments that will be built with each of the SRTC alternatives and how they relate to safety needs.
- A safety assessment for each of the SRTC alternatives that focuses on pedestrian-vehicle conflicts and circulation around the SRTC site.

Background

The existing SRTC (Bettini Transit Center) is located in the City of San Rafael on the block bounded by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. Golden Gate Transit (GGT) and Marin Transit (MT) operate local and regional bus service at the SRTC. Prior to the COVID-19 pandemic, there were over 9,000 daily boardings and alightings at the transit center each weekday. The Sonoma-Marín Area Rail Transit (SMART) Downtown San Rafael Station is located on the block immediately north of 3rd Street. The SMART rail tracks were recently extended to bisect the existing SRTC, which has impacted bus operations and passenger movements, creating the need for a new transit center facility. Through a community-driven process, several alternatives were developed and screened to identify potential new locations for the transit center. A new SRTC solution in Downtown San Rafael would address near-term

and long-term transit needs while improving the desirability and usability of transit for both local residents and regional commuters.

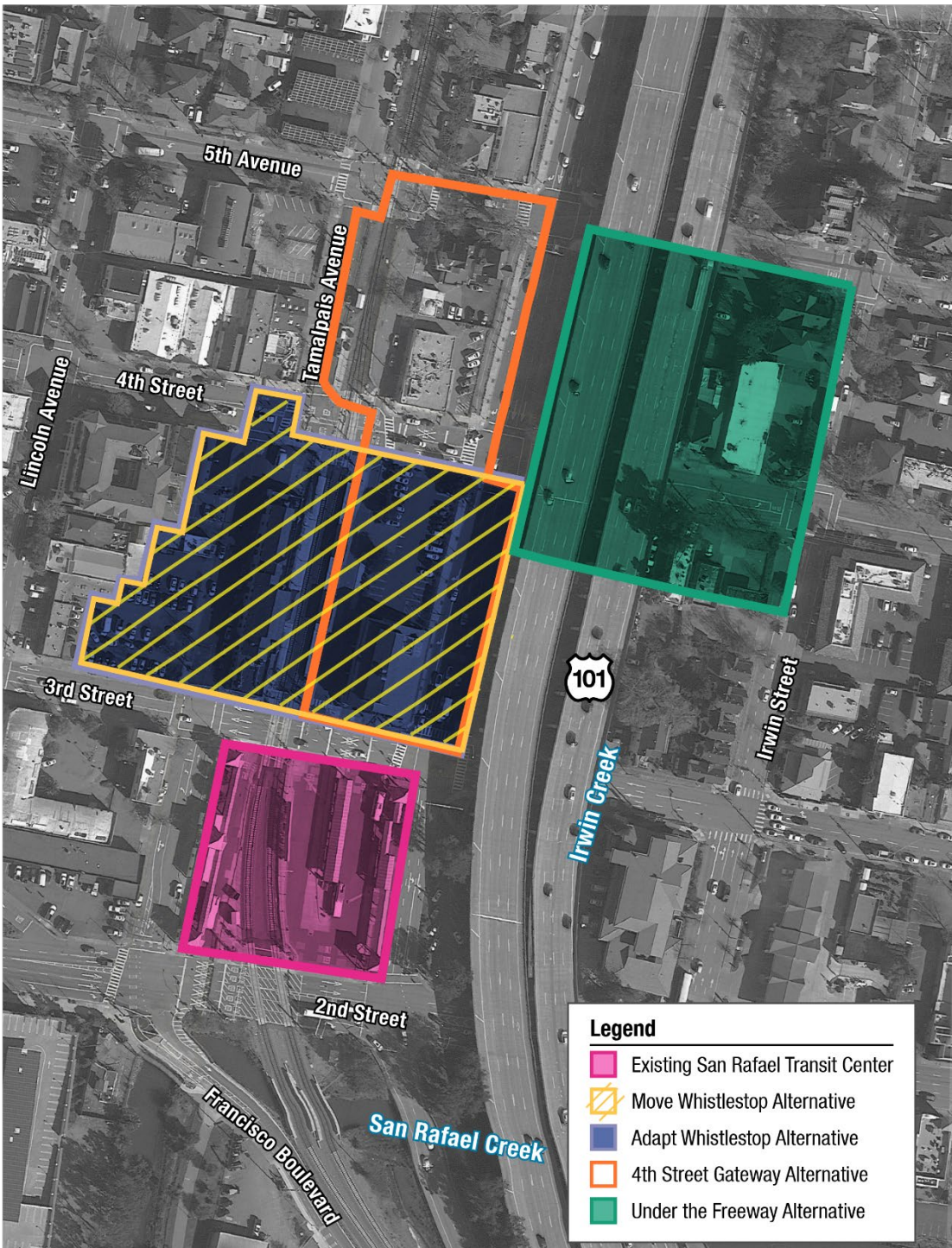
The Project objectives highlight the need for a well-connected and safe SRTC by “creating a more accessible transit facility for all users by reducing vehicular, rail, bicycle, and pedestrian conflicts and improving safety”. The City of San Rafael has provided a dataset of collisions and collision rates for streets in the vicinity of the Project study area. This memorandum analyzes the City’s collision data and provides an assessment on how each of the Project alternatives relate to safety objectives, especially for pedestrians and bicyclists, around the Project study area.

Project Alternatives

The DEIR analyzes five Project alternatives, including the No-Build Alternative. **Figure 1** shows the location of the alternatives, which include:

- **No-Build Alternative/Existing Transit Center Site:** the transit center would remain at its current location, on the block bound by 2nd Street, Tamalpais Avenue, 3rd Street, and Hetherton Street. The “interim” transit center configuration constructed as part of the SMART extension would remain.
- **Move Whistlestop (Preferred Alternative):** in this alternative, a portion of the Whistlestop building would be relocated to or rebuilt on the west side of West Tamalpais Avenue between 3rd and 4th Streets. As part of this relocation, West Tamalpais Avenue between 2nd and 4th Streets would be shifted east so that it is directly adjacent to the SMART tracks and more closely aligned with West Tamalpais Avenue north of 4th Street. This was designated as the “preferred alternative” in the Project DEIR.
- **Adapt Whistlestop:** this alternative co-locates the transit center on the same block as the existing SMART station, by utilizing area from west of West Tamalpais Avenue to 3rd Street, Hetherton Street, and 4th Street. West Tamalpais Avenue between 3rd Street and 4th Street would be limited to buses only, and curbside bays would be provided on both sides of the street.
- **4th Street Gateway:** this alternative utilizes the two blocks bounded by the SMART tracks, 3rd Street, Hetherton Street, and 5th Avenue. This alternative would include three curbside bays on the west side of Hetherton Street between 4th Street and 5th Avenue. To accommodate these curbside bays, southbound right-turns from Hetherton Street to 4th Street would be precluded. Other bus bays would be accessed via driveways on 3rd and 4th Streets and a driveway on Hetherton Street.
- **Under the Freeway:** this alternative utilizes the block bound by 4th Street, Hetherton Street, 5th Avenue, and Irwin Street, and the northern portion of the block bound by Hetherton Street, 3rd Street, 4th Street, and Irwin Street, generally located beneath US-101. Bus bays would be accessed via driveways on 4th Street, Irwin Street, and Hetherton Street.

Figure 1: SRTC Project Alternatives



Transportation Context

The study area for the SRTC safety analysis includes the blocks immediately surrounding the Project alternatives and includes the blocks bounded by 2nd Street, Irwin Street, 5th Avenue, and West Tamalpais Avenue. The SRTC is the largest regional transit hub in Marin County and has over 800 bus trips daily operating on 17 bus bays. SMART's Downtown station is located at 3rd Street between West and East Tamalpais Avenue.

The Project alternatives must address several key safety-related considerations within the SRTC study area:

- In 2017, approximately 50% of GGT and MT riders at the SRTC walk to/from the station, with 35% of transit riders transferring between GGT and MT bus routes¹. This translates to several thousand walking trips generated in the immediate area surrounding the SRTC. Providing safe and convenient walking routes to/from all directions to/from the SRTC is critical. Short, convenient transfers between bus routes and between SMART and bus routes is also important to provide a well-integrated and effective transit system.
- In 2017, approximately 50% of transit riders are traveling to/from a destination in Downtown San Rafael, the highest concentration located west and north of the SRTC². Promoting safe walking routes on 4th Street from the transit center area to the heart of downtown is particularly important.
- Hetherton and Irwin Streets at 2nd and 3rd Streets near the US-101 ramps have ADT traffic volumes in the 33,000-39,000 range and PM peak hour volumes in the 2,600-3,700 range. Intersections on Hetherton and Irwin at 4th Street and 5th Avenue have ADT traffic volumes in the 20,000-22,000 range and PM peak hour volumes in the 1,700-2,000 range. Reducing pedestrian-vehicle conflicts and improving safety at these highly utilized intersections is key to achieving Project objectives.

Table 1 presents the AM and PM peak hour pedestrian counts by crosswalk for the study intersections included in the safety analysis. These counts were collected in January 2020 and represent the peak hour for pedestrian activity, which can differ from the peak hour of traffic volume. The morning pedestrian peak hour is 7:15-8:15 AM, while the afternoon peak hour is 3:45-4:45 PM.

¹ *San Rafael Transit Center Transportation Summary Report* (Kimley-Horn, February 2021)

² *San Rafael Transit Center Relocation Study, Final Report* (Kimley-Horn, March 2017)

Table 1: Peak Hour Pedestrian Volumes by Crosswalk

Intersection	North X-Walk	East X-Walk	South X-Walk	West X-Walk	Total
	AM (PM)	AM (PM)	AM (PM)	AM (PM)	AM (PM)
2nd & Tamalpais	80 (97)	-	-	93 (103)	173 (200)
2nd & Hetherton	23 (29)	-	-	-	23 (29)
3rd & Tamalpais	34 (68)	91 (121)	90 (134)	22 (26)	237 (349)
3rd & Hetherton	67 (43)	-	18 (45)*	98 (69)	184 (157)
3rd & Irwin	-	20 (34)	23 (94)	-	43 (128)
4th & W Tamalpais	16 (45)	-	56 (66)	25 (58)	97 (169)
4th & Hetherton	21 (36)	7 (12)	33 (48)	28 (22)	89 (118)
4th & Irwin	11 (15)	9 (11)	20 (8)	7 (8)	47 (42)
5th & W Tamalpais	7 (9)	-	8 (18)	7 (21)	22 (48)
5th & Hetherton	11 (8)	12 (2)	11 (15)	12 (13)	46 (38)
5th & Irwin	1 (8)	4 (7)	4 (9)	4 (8)	13 (32)

* At 3rd & Hetherton, the south crosswalk was removed and the east crosswalk added after the counts were conducted in 2020

Data source: Kimley-Horn, counts conducted in January 2020

The volumes show that the intersections of 3rd Street with Tamalpais Avenue and Hetherton Street, immediately adjacent to the existing transit center, have the highest pedestrian activity. This reflects the high level of pedestrian activity associated with the existing transit center, accessing both the SMART station and Downtown San Rafael. Note that at 3rd Street & Hetherton Street, the south crosswalk was removed and a new crosswalk installed at the east leg later in 2020 after the counts were completed.

Precise calculation of the trip distribution of pedestrians emanating from the existing transit center cannot be determined; however, a general assessment of pedestrian flows can be conducted based on existing crosswalk volumes since the existing SRTC is the largest pedestrian trip generator in the immediate area. These patterns can then be confirmed with on-board survey data of transit center users. As shown above in **Table 1**, 225 pedestrians cross Hetherton Street at 2nd, 3rd, and 4th Streets, whereas 440 pedestrians cross Tamalpais Avenue at those same streets in the PM peak hour (the higher hour of pedestrian activity). This indicates that by a ratio of roughly 2:1, pedestrians travel to/from the west from the transit center, consistent with the findings of the on-board survey results referenced earlier in this document. Additionally, 105 pedestrians cross 2nd Street at Tamalpais Avenue (there is no crosswalk across 2nd Street at Hetherton Street) and 220 pedestrians cross 3rd Street at Hetherton Street and Tamalpais Avenue. This indicates, by a ratio of roughly 2:1, pedestrians travel to/from the north from the transit center.

Collision Data Analysis

The City of San Rafael provided collision data from January 2015 to the end of September 2021 (6 years and 9 months) for locations in Downtown San Rafael. The dataset contains 921 total collisions, which include vehicle collisions with other motor vehicles (vehicle-vehicle), vehicles with pedestrians (vehicle-pedestrian), vehicles with bicyclists (vehicle-bicycle), and vehicles with other objects (vehicle-other). The

location for each collision is identified in the dataset by a latitude and longitude point expressed in decimal degrees. There is some inherent uncertainty in the precision of the collision location. Many of the collisions are mapped at the same exact location within an intersection, while others are located on roadway segments just outside of the intersection. At intersections and street segments immediately adjacent to the existing SRTC or one of the four Project build alternatives, there were 337 collisions. The data provides information on several categories:

- **Date, time, lighting, weather and road conditions**
- **Location:** the primary and secondary roadway where the collision occurred. This is typically shown as an intersection and represented by a point of latitude and longitude.
- **Collision type:** describes the type of collision, such as rear-end, sideswipe, hit object, or vehicle-pedestrian.
- **Collision severity:** describes if the collision results in property damage, injury (complaint of pain to severe injury), or a fatality.
- **Collision factor:** describes the reported cause of the collision and includes the following: improper turning, unsafe speed, right-of-way violation, pedestrian violation, improper passing, etc.
- **Parties involved:** does the collision involve another motor vehicle, pedestrian, bicycle, or an object.

Figure 2 and Figure 3 plot the location for collisions in the safety analysis study area for the entire dataset (January 2015 to September 2021). Figure 2 shows total collisions and Figure 3 shows pedestrian- and bicycle-involved collisions only. Collisions that occurred at the same location are clustered.

Figure 2: All Collisions

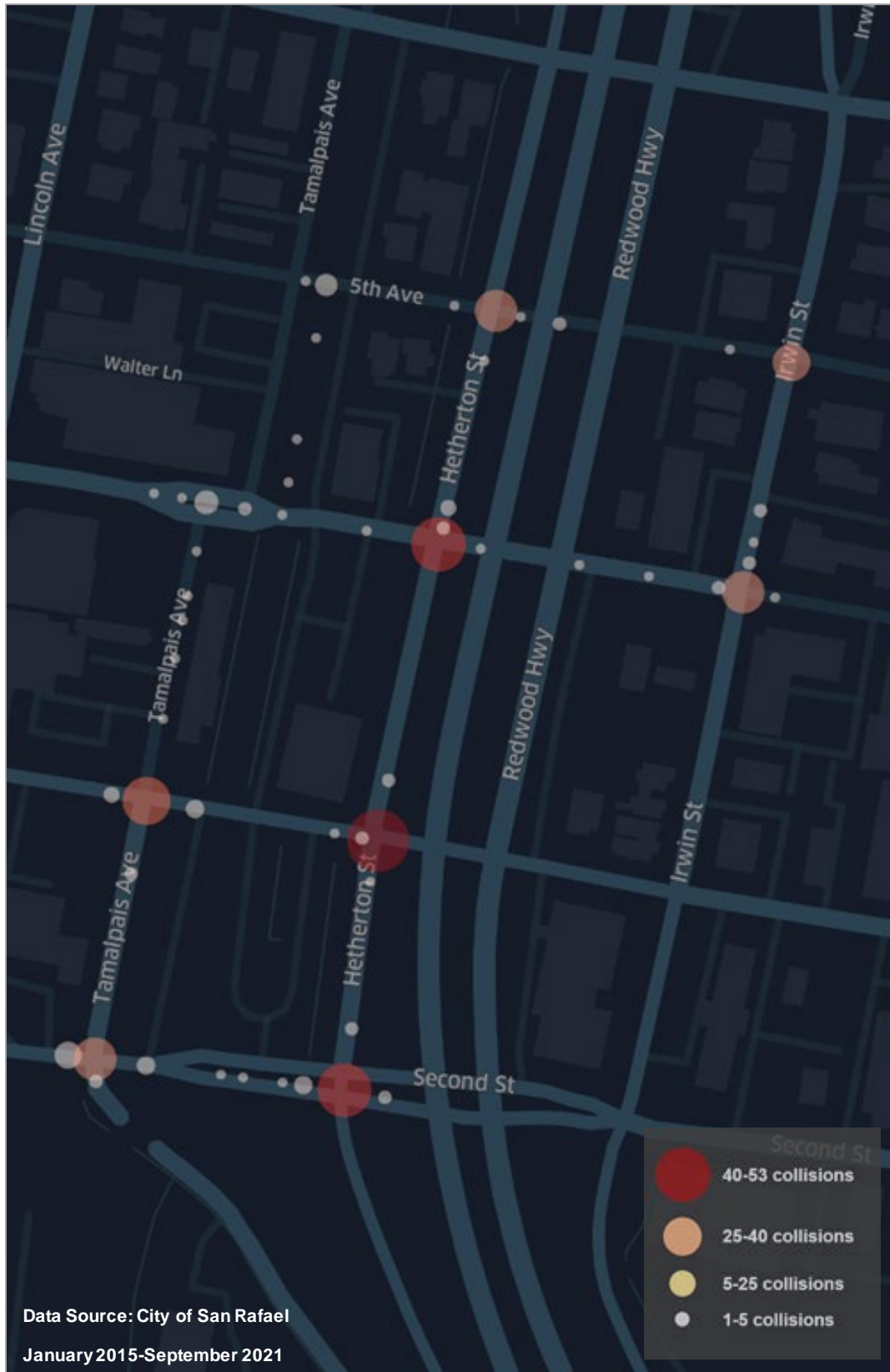


Figure 3: Pedestrian- & Bicycle-Involved Collisions

