

Mill Valley to Corte Madera  
Bicycle and Pedestrian Corridor Study

Appendix D:  
Multi-Modal Traffic Analysis

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**Appendix D - Multi-Modal Traffic Analysis**

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## **Appendix D: Multi-Modal Traffic Analysis**

*Parisi Associates, Traffic Engineers*

### **1. Purpose**

Parisi Associates, Traffic Engineers, prepared this analysis to describe conditions on roadways for the various routes between Mill Valley and Corte Madera, to summarize reported collisions involving pedestrians and bicyclists along these routes, and to provide a preliminary list of potential multi-modal solutions to address existing deficiencies. The scope includes analysis of available crash data, existing and projected traffic volumes, speeds, potential traffic operations, and sight distance constraints. The analysis evaluated alternatives for improvement of bicycle and pedestrian access across and along streets on the routes, including intersection, travel lane, bike lane, and pathway configurations.

### **2. Roadway Conditions**

The following describes conditions on the roadways along the various routes between Mill Valley and Corte Madera. Figure 1 illustrates the routes.

#### ***East Blithedale Avenue***

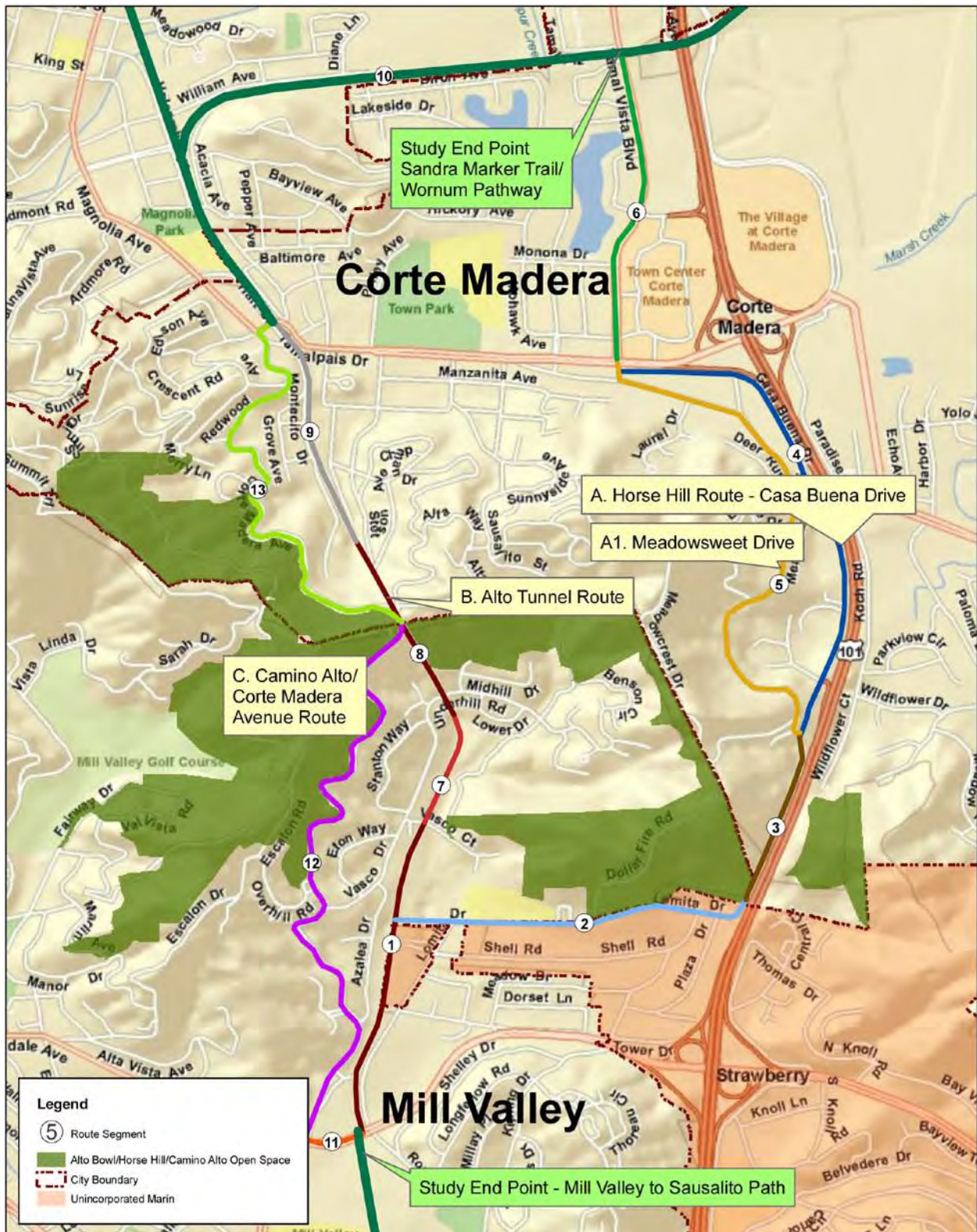
Route segment #1 intersects East Blithedale Avenue at Lomita Avenue, route segment #12 intersects East Blithedale Avenue at Camino Alto, and route segment #11 runs along East Blithedale Avenue between Lomita Avenue and Camino Alto. East Blithedale Avenue is within Mill Valley.

East Blithedale Avenue is a four-lane arterial roadway with turning lanes at intersections. No on-street parking is provided. Sidewalks are provided on both sides of the street. No bike lanes exist. East Blithedale Avenue carries about 35,000 vehicles per day. The posted speed limit is 25 mph.

The Mill Valley-Sausalito pathway intersects the East Blithedale Avenue/Lomita Avenue intersection in its southwest quadrant. A pathway exists on the north side of East Blithedale Avenue, west of Lomita Avenue. Northbound bicyclists wishing to cross East Blithedale Avenue (to either access the pathway or to turn left) activate the pedestrian push button and traverse the wide crosswalk across the intersection's western leg. The intersection's six-phase traffic signal features a leading pedestrian interval phase for the western crosswalk.

The East Blithedale Avenue/Camino Alto intersection is controlled with an eight-phase traffic signal. Bicyclists turning southbound-to-eastbound (left) destined for the Mill Valley-Sausalito pathway turn during the left-turn phase and either ride in East Blithedale Avenue's outside lane, slightly past the pathway, and make a tight right-hand u-turn via the intersection's curb ramp to access the pathway; or ride along East Blithedale Avenue's southern sidewalk by entering from one of the gas station's driveways.

Figure 1: Route Overview Map



### ***Lomita Avenue***

Route segments #1 and #2 run along Lomita Avenue. Portions of route segment #1 are within Mill Valley and Marin County. Most of route segment #2 is within Marin County.

Lomita Avenue is a two-lane street. On-street parallel parking is permitted. Sidewalks exist along the east side of the north-south segment of Lomita Avenue and along portions of the west side. Sidewalks exist along most of the south side of the east-west segment of Lomita Avenue and along portions of the north side. No bike lanes exist. Lomita Avenue, just north of East Blithedale Avenue carries about 8,000 vehicles per day. The posted speed limit is 25 mph.

### ***Camino Alto/Corte Madera Avenue***

Route segment #12 runs along Camino Alto between East Blithedale Avenue and Corte Madera Avenue. Route segment #13 runs along Corte Madera Avenue between Camino Alto and Redwood Avenue. Camino Alto is within Mill Valley and Corte Madera Avenue is within Corte Madera.

Camino Alto and Corte Madera Avenue are two-lane roadways. On-street parking is only permitted off the shoulders in designated areas. No sidewalks or bike lanes exist. Camino Alto/Corte Madera Avenue carries about 8,000 vehicles per day. The posted speed limit is 25 mph, but 15 mph warning signs are posted at three locations along Corte Madera Avenue.

A traffic signal was installed at the Corte Madera Avenue/Redwood Avenue intersection in 2006. The signal operates with three phases, enabling the right-turns from Redwood Avenue to “overlap” with the left-turns from Corte Madera Avenue onto Redwood Avenue. The gradient for bicyclists wishing to turn left from Redwood Avenue onto Corte Madera Avenue can be challenging. There is no bike lane for northbound bicyclists approaching the intersection from Corte Madera Avenue, there is a separate vehicular right-turn lane, and the bicycle loop detector is located on the left side of the through lane.

### ***Redwood Avenue***

Route segment #13 runs along the one-block length of Redwood Avenue between Corte Madera Avenue and Montecito Drive. Redwood Avenue is within Corte Madera. Redwood Avenue is a two-lane street. No on-street parking is provided in the project vicinity. Sidewalks are provided on both sides of the street. No bike lanes exist. Redwood Avenue carries about 12,000 vehicles per day. The speed limit is 25 mph.

### ***Montecito Drive***

Route segment #9 runs alongside Montecito Drive, south of Redwood Avenue. Montecito Drive is within Corte Madera.

Montecito Drive is a two-lane street. On-street parking is permitted. Within the Corte Madera plaza, the parking is angled at 90-degrees. South of the plaza, on-street parking is generally parallel to the street. An eight-foot wide pathway is located just east of Montecito Drive at the plaza. South of the plaza, no sidewalks exist. No bike lanes exist. No traffic



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counts were available for Montecito Drive, but it likely carries less than 2,000 vehicles per day. The speed limit is 25 mph.

Montecito Drive's crosswalk across Tamalpais Drive is not controlled with stop signs or a traffic signal. The crosswalk, located on the eastern approach of the intersection, is located at the end of a roadway curve and crosses five lanes of traffic, including a left-turn lane serving the Corte Madera plaza and the outside bus stop lanes. Sight distance is limited between pedestrians and bicyclists using the crosswalk and approaching motorists.

### ***Meadowsweet Drive***

Route segment #5 runs along Meadowsweet Drive between Sanford Street (at Tamalpais Drive) and Casa Buena Drive. Meadowsweet Drive is within Corte Madera.

Meadowsweet Drive is a two-lane street. On-street parallel parking is permitted between Sanford Street and Conow Street. Between Conow Street and Casa Buena Drive, on-street parking is not allowed. Sidewalks exist on both sides between Sanford Street and Conow Street, but no sidewalks exist between Conow Street and Casa Buena Drive. No bike lanes exist. No traffic counts were available for Meadowsweet Drive, but it likely carries less than 3,000 vehicles per day. The speed limit is 25 mph.

Meadowsweet Drive has many horizontal curves along its alignment, limiting sight distance between pedestrians, bicyclists, and motorists.

### ***Casa Buena Drive***

Route segment #4 runs along Casa Buena Drive between Sanford Street (at Tamalpais Drive) and Meadowsweet Drive. Casa Buena Drive is within Corte Madera.

Casa Buena Drive is a two-lane street. On-street parallel parking is permitted along segments of the south and west sides of the street. A sidewalk exists along the south side of the east-west portion of the street and along the west side of the northern half of the north-south segment. No bike lanes exist. No traffic counts were available for Casa Buena Drive, but it likely carries less than 5,000 vehicles per day. The speed limit is 25 mph.

### ***Madera Boulevard***

Route segment #6 runs along Madera Boulevard between Tamalpais Drive and Tamal Vista Boulevard. Madera Boulevard is within Corte Madera.

Madera Boulevard is a two-lane street with left-turn lanes. On-street parking is not permitted. Sidewalks exist along both sides of the street. Wide bike lanes exist between Mohawk Avenue and Tamal Vista Boulevard. Madera Boulevard carries about 10,000 vehicles per day. The posted speed limit is 30 mph.

Madera Boulevard's intersection with Tamalpais Drive is controlled with a six-phase traffic signal, providing separate phases for Madera Boulevard and Sanford Street.

### ***Tamal Vista Boulevard***

Route segment #6 runs along Tamal Vista Boulevard between Madera Boulevard and Wornum Way. Tamal Vista Boulevard is within Corte Madera.

Tamal Vista Boulevard is a two-lane street with left-turn lanes. On-street parking is not permitted. Sidewalks exist along both sides of the street. No bike lanes exist. Tamal Vista Boulevard carries about 9,000 vehicles per day. The posted speed limit is 30 mph.

### **3. Collisions**

Corte Madera and Mill Valley Police Departments researched their records of reported collisions involving pedestrians and bicyclists for the period from January 1, 2004 to December 31, 2008. The reported collisions are tabulated by roadway below and illustrated in Figure 2. The majority of reported collisions involved bicycles. The highest collision locations were at East Blithedale Avenue and Lomita Avenue, Camino Alto/Corte Madera Avenue near Chapman Avenue, and Corte Madera Avenue at Redwood Avenue.

#### ***East Blithedale Avenue***

- Near Lomita: 6 separate collisions involving bicycles
- Near Camino Also: 1 collision involving a bicycle
- Near Ashford: 4 separate collisions involving bicycles, 1 collision involving a pedestrian

#### ***Lomita Avenue***

- No reported collisions between 2004 and 2008

#### ***Camino Alto/Corte Madera Avenue***

- Near Kite Hill: 1 collision involving a bicycle
- Near Overhill: 3 separate collisions involving bicycles
- Near Chapman (Mill Valley): 2 separate collisions involving bicycles
- Near Chapman (Corte Madera): 6 separate collisions involving bicycles
- Near Redwood: 4 separate collisions involving bicycles
- Near California Lane: 1 collision involving a bicycle
- Near First Street: 2 separate collisions involving bicycles

#### ***Redwood Avenue***

- No reported collisions between 2004 and 2008

#### ***Montecito Drive***

- No reported collisions between 2004 and 2008

#### ***Meadowsweet Drive***

- Near Conow: 1 collision involving a bicycle
- Near Sanford: 1 collision involving a bicycle
- Near Lupine: 1 collision involving a bicycle

#### ***Casa Buena Drive***

- No reported collisions between 2004 and 2008

### ***Madera Boulevard***

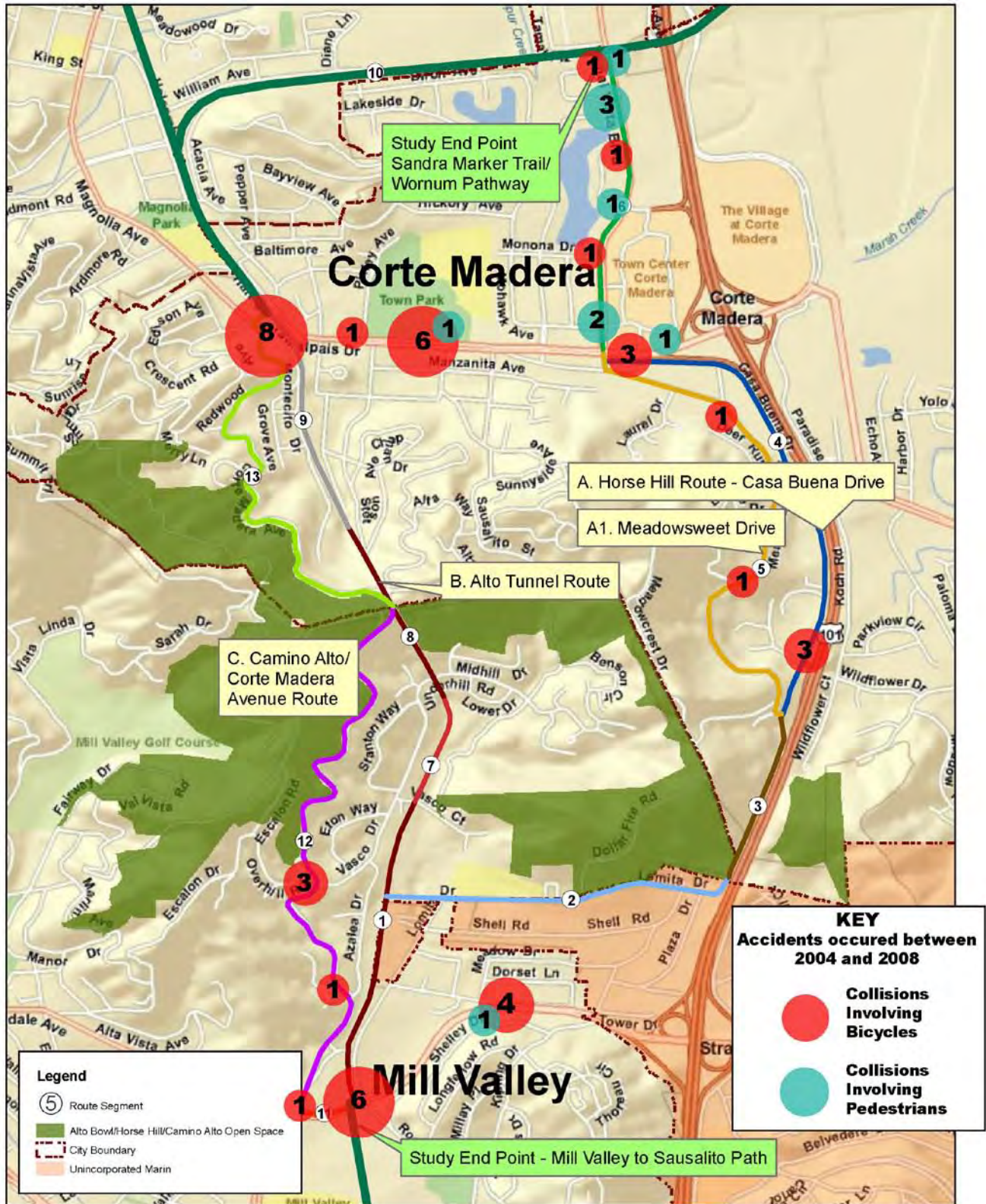
- Near Mohawk: 2 separate collisions involving pedestrians
- Near Monona: 1 collision involving a bicycle
- Near Council Crest: 1 collision involving pedestrian

### ***Tamal Vista Boulevard***

- Near Wornum: 1 collision involving a bicycle; 1 collision involving a pedestrian
- Near Sandpiper Circle: 1 collision involving a pedestrian
- Near Council Crest: 1 collision involving a bicycle
- Near Chickasaw Court: 2 separate collisions involving pedestrians



Figure 2: Collisions Map





## 4. Opportunities

Based upon a review of the various routes between Mill Valley and Corte Madera, the following opportunities for improvements at specific locations were identified.

### *East Blithedale Avenue*

1. Install curb ramp on south side of East Blithedale Avenue, just west of the Mill Valley-Sausalito pathway, to enable direct access to the pathway for eastbound bicyclists. Installation of a curb ramp would substantially reduce the amount of right-hand u-turns made by bicyclists at the Lomita Avenue intersection and the number of bicyclists riding along the southern sidewalk between Camino Alto and Lomita Avenue.



Picture 4

Install curb ramp near entrance to bike path

2. Enlarge bicycle queuing space on the southwest corner of the East Blithedale Avenue/Lomita Avenue intersection along the Mill Valley to Sausalito path to allow more bicyclists to wait during red traffic signal phases and to reduce conflicts with other bicyclists and pedestrians.



Picture 5

Provide more room for bicyclists waiting to cross E. Blithedale



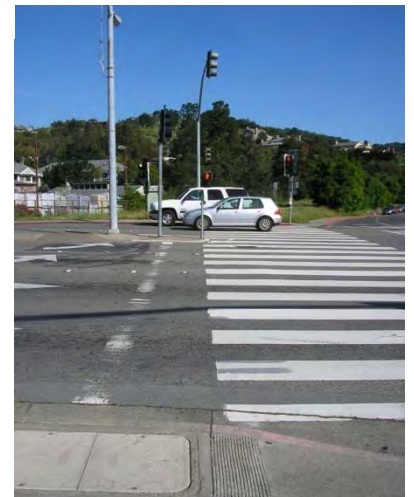
Picture 1

Add pavement to enlarge bicycle queuing space

3. Relocate the western crosswalk's limit line farther to the west to encourage motorists to stop farther back from the crosswalk and to improve sight lines. The limit line is currently about three feet behind the crosswalk and should be moved to about five to seven feet back from the crosswalk.

Picture 8

Shift stop bar left and further from crosswalk



4. Install shared lane use markings on East Blithedale Avenue's

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outside traffic lanes between Camino Alto and Lomita Avenue since many bicyclists travel between the Mill Valley-Sausalito pathway and Camino Alto, and vice-versa. (Note: this departs from recent MUCTD standard identifying use of sharrows as appropriate adjacent to parking, however, San Francisco and other communities are using sharrows to designate bike routes in locations without curbside parking).



Picture 11

Put share lane use markings along outside lane

5. Install SHARE THE ROAD signs.

### ***Lomita Avenue***

1. Install shared lane use markings along Lomita Avenue.
2. Install SHARE THE ROAD signs.

### ***Camino Alto/Corte Madera Avenue***

1. Consider uphill bicycle lanes (i.e., northbound on Camino Alto and southbound on Corte Madera Avenue) and establish a pedestrian pathway on one side of the roadway. Ideally the climbing lanes should be seven feet wide, or a minimum of five feet. The pedestrian path should be a minimum of four feet, and ideally five to six feet.

2. Install SHARE THE ROAD signs.

3. At Corte Madera Avenue just south of Redwood Avenue, reconfigure the seven head-in angled parking spaces on the east side of the street to back-in angled parking to enable improved sight lines between parking motorists and northbound bicyclists.



Picture 28

Convert to angled, back-in parking

4. At Corte Madera Avenue's intersection with Redwood Avenue, consider creating a northbound bike queuing lane between the right turn lane and the through lane. Relocate the existing bike loop detector to this lane.

Picture 24

Add queuing lane to intersection



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### ***Redwood Avenue***

1. Replace the standard crosswalk across Redwood Avenue at Montecito Drive with a high-visibility crosswalk to draw more attention to the crosswalk. Add high-visibility advance crosswalk and crosswalk signing.



Picture 19

Convert to high visibility crosswalk

2. Consider extending Redwood Avenue's curbs at Montecito Drive to reduce the crosswalk's length and improve visibility between approaching motorists and pedestrians and bicyclists using the crosswalk. The curbs could be extended across the bus lane to create enlarged bus stops.



Picture 21

Extend curbs to reduce crosswalk length

3. Consider removing the westbound-to-southbound left-turn lane from Redwood Avenue into Montecito Avenue to create a center refuge island for crossing pedestrians and bicyclists.



Picture 23

Replace left hand turn lane with median



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4. Consider raising Redwood Avenue's intersection with Montecito Drive to encourage slower vehicle travel speeds through the intersection.



Picture 16  
Raise intersection

### *Montecito Drive*

Alternative 1. Relocate the bicycle path along route segment 9 to follow Montecito Drive within the Corte Madera Plaza (the parallel sidewalk is only eight feet wide). Reconfigure the head-in 90-degree parking to back-in angled parking to enable improved sight lines between parking motorists and bicyclists.



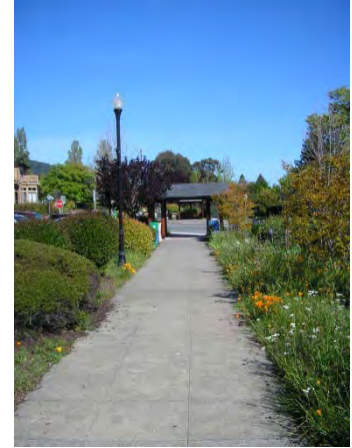
Picture 31  
Covert to angled, back-in parking

2. Designate the Montecito Drive intersection with Redwood Avenue as an exit only. Entrance and exit would remain available at First Street.
3. Install SHARE THE ROAD signs.
4. Installs shared lane use markings along Montecito Drive



Picture 34  
Existing 8' wide path

Alternative 2. Widen the path to 12' and relocate the bus stop shelter at the end of the path to one side of the path-coordinate with transit agency. Install class I pathway signs and markings



Picture 33  
Relocate shelter

### ***Meadowsweet Drive***

1. Install shared lane use markings along Meadowsweet Drive.
2. Install SHARE THE ROAD signs.

### ***Casa Buena Drive***

1. Investigate whether STOP sign traffic control would be warranted for installation at Casa Buena Drive's intersection with the on-ramp to southbound US 101 to reduce conflicts between northbound bicyclists and southbound vehicles turning left onto the US 101 on-ramp.
2. Install shared lane use markings along Meadowsweet Drive.
3. Install SHARE THE ROAD signs.

### ***Madera Boulevard***

1. Reconfigure Madera Boulevard's intersection with Tamalpais Drive to improve channelization and provide simultaneous north-south traffic signal phases, consistent with improvements planned in the Greenbrae Corridor Improvement Project.

### ***Tamal Vista Boulevard***

Consider the following improvements, and/or other improvements consistent with the Greenbrae Corridor Improvement Project:

- 1. Install shared lane use markings along Tamal Vista Boulevard.
- 2. Install SHARE THE ROAD signs.
- 3. Investigate the feasibility of providing Class II bicycle lanes on Tamal Vista Boulevard between Madera Boulevard and Wornum Way.