

OPTIONAL CURB EXTENSION FOR BIKES BASED ON  
VEHICLE SPACING ALONG THE CORRIDOR  
CONTINGENT ON FUTURE DEMAND AND LAND USE

SAMPLE PROTECTED  
CORNER (OPTION 2)

SAMPLE SHARED RIGHT TURN  
ZONE (OPTION 1)

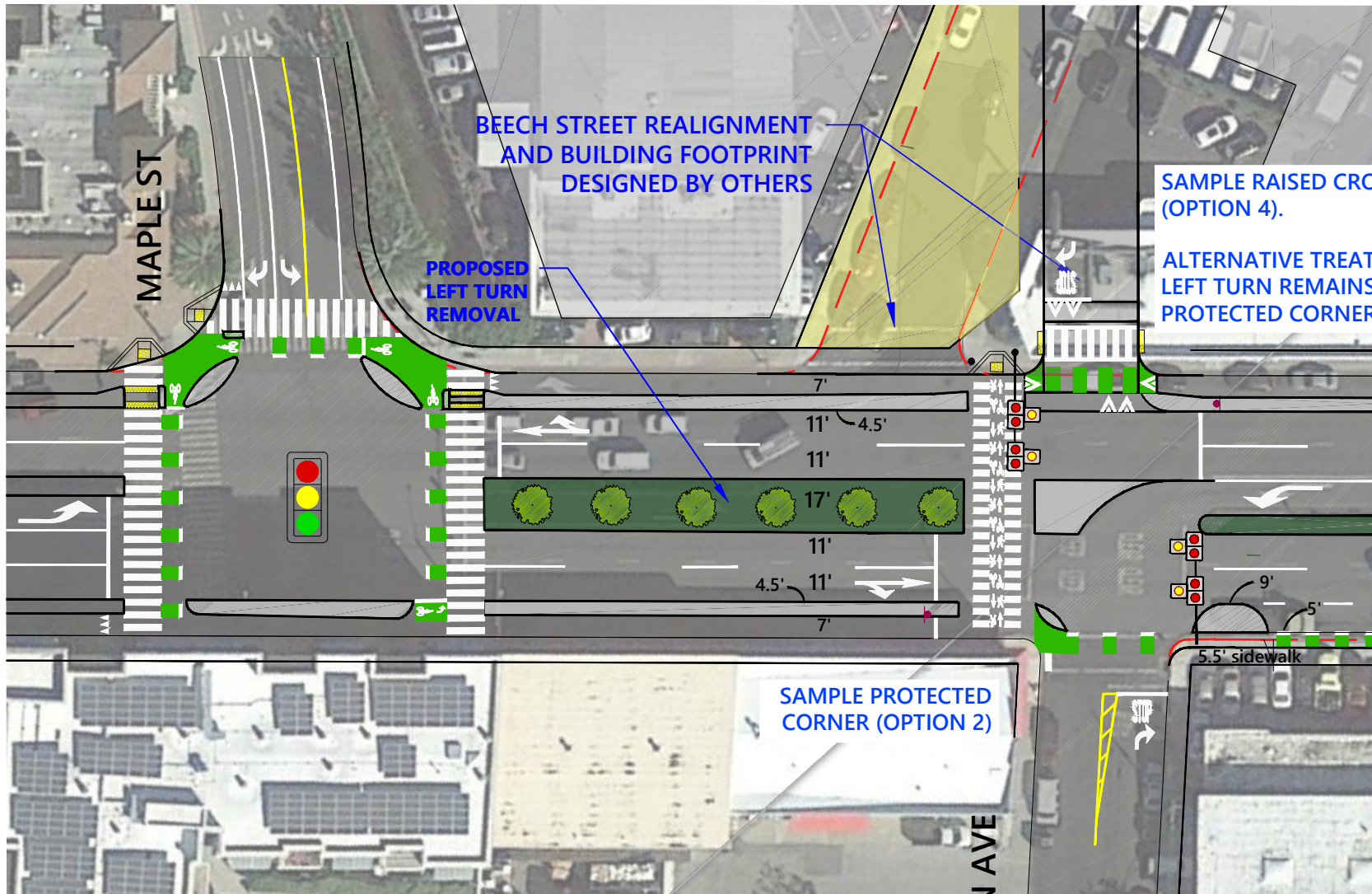
**LEGEND**

- OPPORTUNITY FOR GREEN INFRASTRUCTURE (GI) LOW SHRUBS OR GRASSES
- LANDSCAPE MEDIANS:  
6 FT TO 17 FT USE LOW SHRUBS OR GRASSES  
17 FT ADD NEW CANOPY TREES
- SAMPLE INTERSECTION TREATMENTS
- PROPOSED TRAFFIC SIGN
- HARDSCAPE AREA
- FUTURE DEVELOPMENT AREA
- EXISTING CURB
- PROPOSED CURB
- REMOVED CURB
- BUFFER WITH SOFT-HIT POST

CONCEPTUAL - NOT FOR CONSTRUCTION  
DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED

- 1 Shared Right Turn Zone**  
(see page 31)
- 2 Protected Corner/Intersection**  
(see page 32)
- 3 Separate Right Turn Phase**  
(see page 33)
- 4 Raised Crossing**  
(see page 34)

Jan 14, 2019 CADD FILE: N:\Projects\2017\_P\Projects\SR17-0927\_SumTransGrandBlvdCompleteStreets\CAD\1st\_Submittal\0927-Aerial\_Redwood\_City\_Beech\_Street\_Realignment\_R1.dwg



LEGEND



LANDSCAPE MEDIANS:  
6 FT TO 17 FT USE LOW SHRUBS OR GRASSES  
17 FT ADD NEW CANOPY TREES



HARDSCAPE AREA



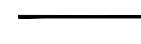
FUTURE DEVELOPMENT AREA



REMOVED CURB



EXISTING CURB



PROPOSED CURB



PROPOSED TRAFFIC SIGN

CONCEPTUAL - NOT FOR CONSTRUCTION  
DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED

Beech Street Realignment: Alternative Layout

Figure A

## Addressing Safety at Intersections

Intersection treatments summarized in the following sections were chosen on a technical basis, following best practices for intersection design along protected bikeways and feedback from the Complete Streets Advisory Committee while considering the constraints and context of El Camino. The focus for these treatments is minimizing potential “right hook” conflicts between vehicles and bicycles at intersections. Main considerations include existing traffic control, available right-of-way, and the volume of conflicting right turns during the peak periods.



OPTION 1

### Shared Right Turn Zone

#### What is it?

Cars and bikes share the same road space in shared right turn zones, which help position vehicles closer to the curb to help facilitate the right turn and reduce “right hook” collisions with bicyclists. A dashed green bike lane is used to indicate that cars and bikes may “mix” in this area.

#### Location Considerations



#### Design Considerations

- Only recommended for physically constrained locations

#### Pros

- Does not require dedicated right-of-way for bicyclists at intersections in constrained locations
- Allows vehicles to merge with bikes against the curb prior to turning, reducing the likelihood of the “right hook”

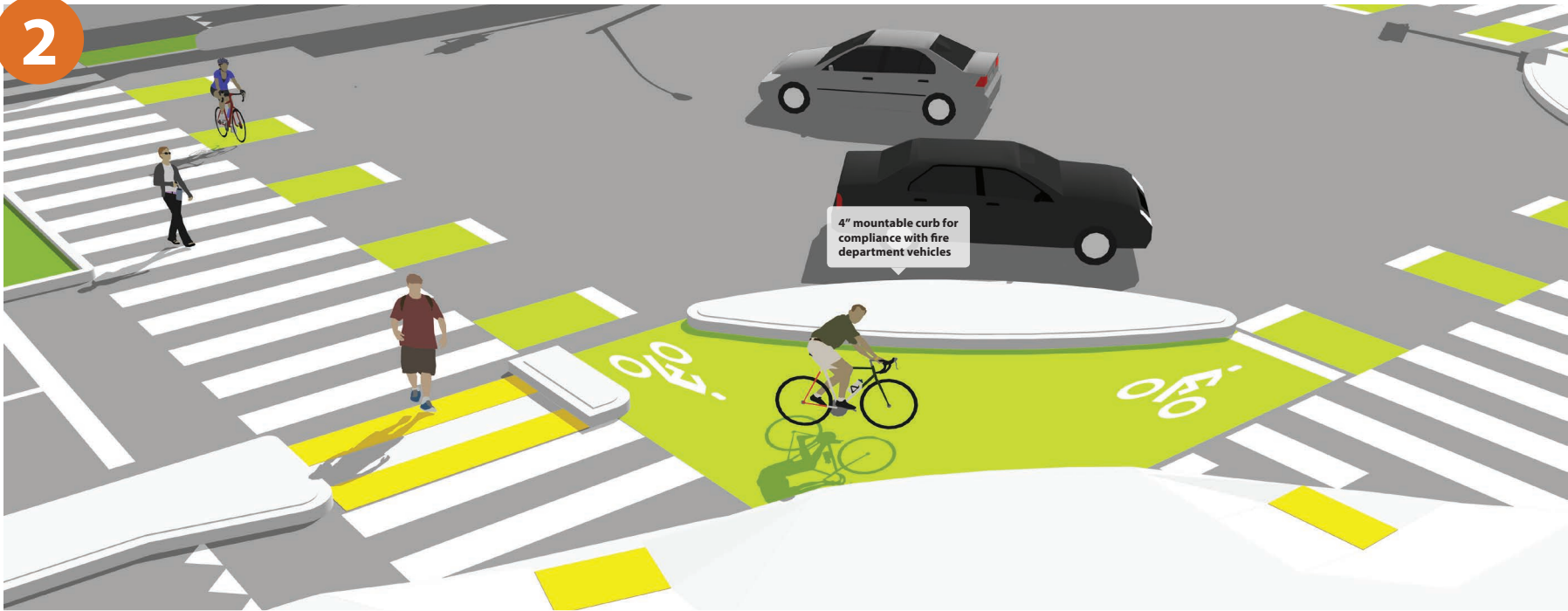
#### Cons

- Requires vehicles to look over their shoulder to avoid conflicts with bicyclists
- Does not provide physical separation for vehicles and bicyclists

#### Where Does this Work on El Camino Real?



2



OPTION 2

## Protected Corner/Intersection

### What is it?

Protected intersections clearly define pedestrian and bicyclist operating spaces and minimize potential conflicts between users. For example, the corner refuge island protects bicyclists from right-turning vehicles by physically separating the bike lane up to the point where the bicyclist crosses the side street, while reducing vehicle turning speeds and guiding vehicles to meet the bicycle crossing at a near-90 degree angle to improve sight lines of oncoming bicycles.

### Location Considerations

TRAFFIC CONTROL VOLUME OF RIGHT TURNS



### Design Considerations

- Requires space for set-back placement of bike crossing (i.e. locations with additional space due to on-street parking removal or slip-lane closures)
- Recommended where it's important to facilitate left turns for cyclists

### Pros

- Extends the physical barrier of the protected bike lane into the intersection, creating a refuge and a clear path of travel for bicyclists
- Provides a forward stop bar for cyclists to provide a "head start" and improve visibility of bicyclists
- Setback crossing prevents vehicles from turning right into their blind spot, thus improving visibility of bicyclists and pedestrians
- Reduces vehicle exposure for pedestrians/bicyclists
- Helps facilitate left turns for bicyclists

### Cons

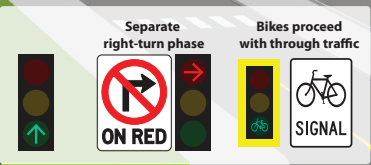
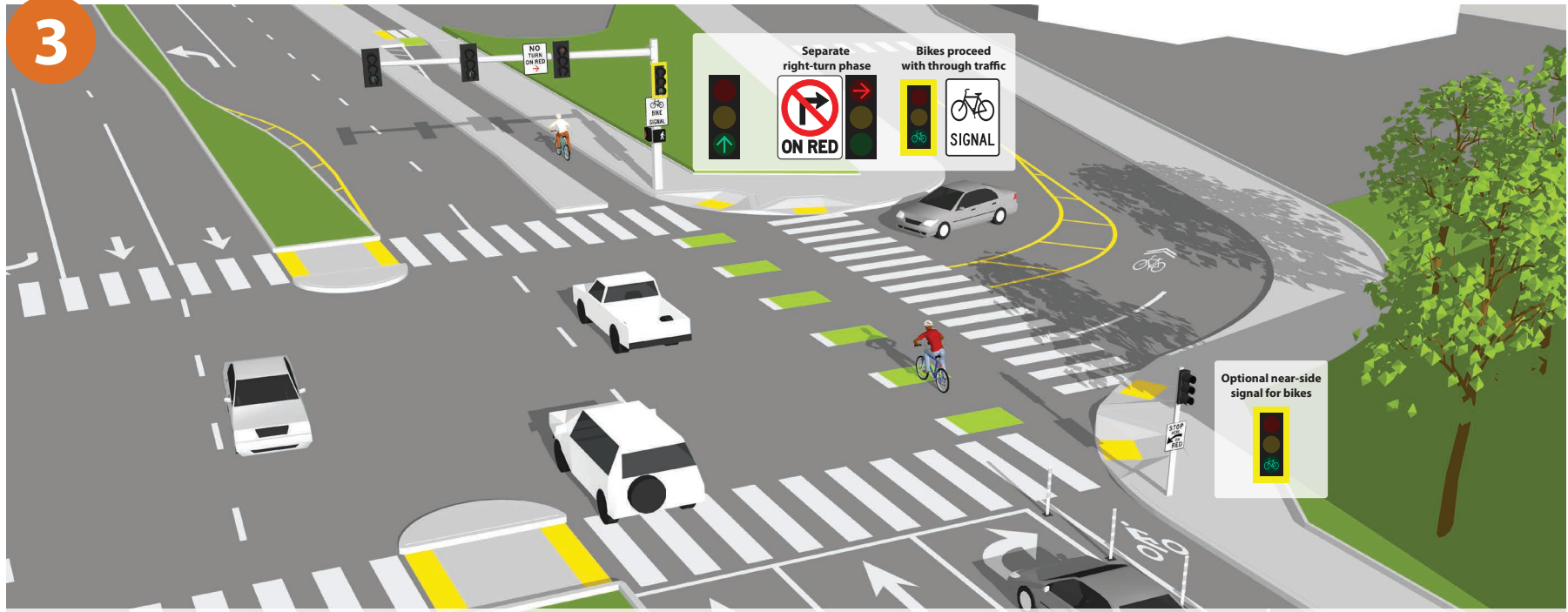
- Requires adequate space for dedicated right-of-way for people who walk and bike and for corner refuge islands

### Where Does this Work on El Camino Real?

REDWOOD CITY



3



**OPTION 3**  
**Separate Bicycle Phase**

**What is it?**

Protected bicycle phases are desirable in locations where high volumes of right turning vehicles conflict with a parallel separated bike lane. Provision of a protected bicycle phase requires a dedicated right turn lane and should be tested for potential impacts to intersection delay and queueing.

**Location Considerations**



**Design Considerations**

- Dedicated right turn pocket required
- Consider electronic LED blank-out signs to emphasize no right turn on red during bicycle phase

**Pros**

- Separates signal phase for right-turning vehicles and bicyclists, removing the "right hook" conflict

**Cons**

- Requires dedicated right turn pocket, pocket length
- Can result in longer cycle lengths at signals, and thus increased delay, at intersections where right-turn vehicle volumes are high

**Where Does this Work on El Camino Real?**





**OPTION 4**  
**Raised Crossing**

**What is it?**

Raised crossings are an effective strategy for reducing crashes between motorists and bicyclists because they slow vehicle speeds, increase visibility of people walking and biking, and increase motorist yielding behavior. Raised crossings are usually appropriate only on minor road crossings and driveways and could be considered for separated bike lane crossings where motorists are required to yield to bicyclists while turning or crossing.

**Location Considerations**

**TRAFFIC CONTROL**    **VOLUME OF RIGHT TURNS**



**Design Considerations**

- Only appropriate at driveways or minor stop-controlled side streets that are intended to be calmer (<30mph) with lower volumes (no through traffic)
- Most appropriate for side streets with right in/right out movements only; for locations with left turn access, crossing should be set back 18' minimum to allow space for vehicle to wait before/after making a left turn
- Not appropriate on truck routes

**Pros**

- Slows vehicle traffic when entering and exiting side streets and driveways
- Creates a "gateway" feel for entering neighborhood roadways or parking lots

**Cons**

- Requires space for approach ramp (i.e. locations with additional space due to on-street parking removal or slip-lane closures)
- If placed along a bike lane that is not already raised, can create discomfort for bicyclists ramping up and ramping down in succession

**Where Does this Work on El Camino Real?**

