Bay Avenue Corridor Study

City Council

February 27, 2024

Bay Avenue Corridor Study
Background and Purpose

Evaluates long-term improvements

- Highway 1
- Hill Street
- Monterey Avenue
- Crossroads Loop
- Capitola Avenue
- Park Avenue

Goals

- Enhance multimodal safety
- Manage traffic flow
- Improve community livability

Integrates Past Initiatives

- 2024 Bay/Hill Quick Build
- Roundabout at Capitola Avenue

Bay Avenue Corridor Study

Recommended Action

01

Confirm the preferred long-term improvements for the Bay Avenue corridor

02

Move forward with public engagement and refine the conceptual design

03

Seek grant funding for the final design and construction phases

Bay Avenue Corridor Study

City Council

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Kimley»Horn

What is a Corridor Study?

A planning study used to assess current and future needs of a transportation route to improve mobility, safety, operations, and economic development for all users.

Bay Avenue Corridor Study Objectives

Determine feasible long-term improvements for the Bay Avenue corridor between Highway 1 and Park Avenue

1. Enhance access and safety for all users including vehicles, pedestrians, and cyclists
2. Maintain acceptable traffic operations along the corridor
3. Compliment the Bay Avenue Vision, mobility, and economic goals in the Capitola General Plan
4. Prepare a long-term plan to pursue grant funding opportunities

Corridor Study Overview

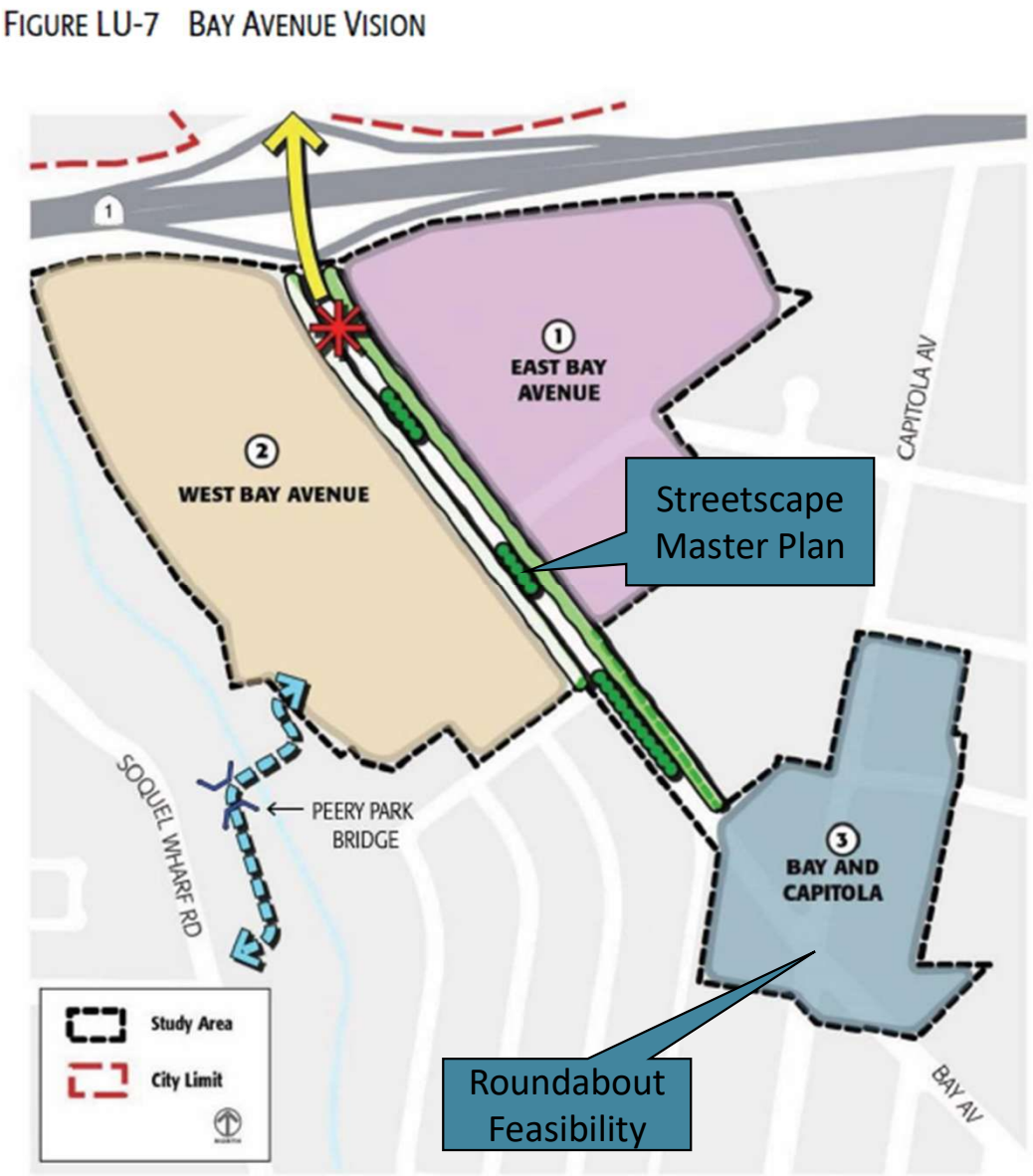
1. Project Background
2. Existing Conditions & Traffic Data
3. Corridor Alternatives & Multimodal Improvements
4. Corridor Analysis Results
5. Next Steps & Action Items

1. Project Background

Capitola General Plan

- Goal LU-10:
  - Maintain and enhance Bay Avenue commercial district as a thriving destination with businesses that serve Capitola residents and visitors.

- Goal MO-4:
  - Provide a roadway system that enhances community aesthetics and promotes a high quality of life



Capitola Land Use Map

Residential Designations

- Single-Family Residential (R-1)
- Multi-Family Residential (R-M)
- Mobile Home (R-MH)

Mixed-Use Designations

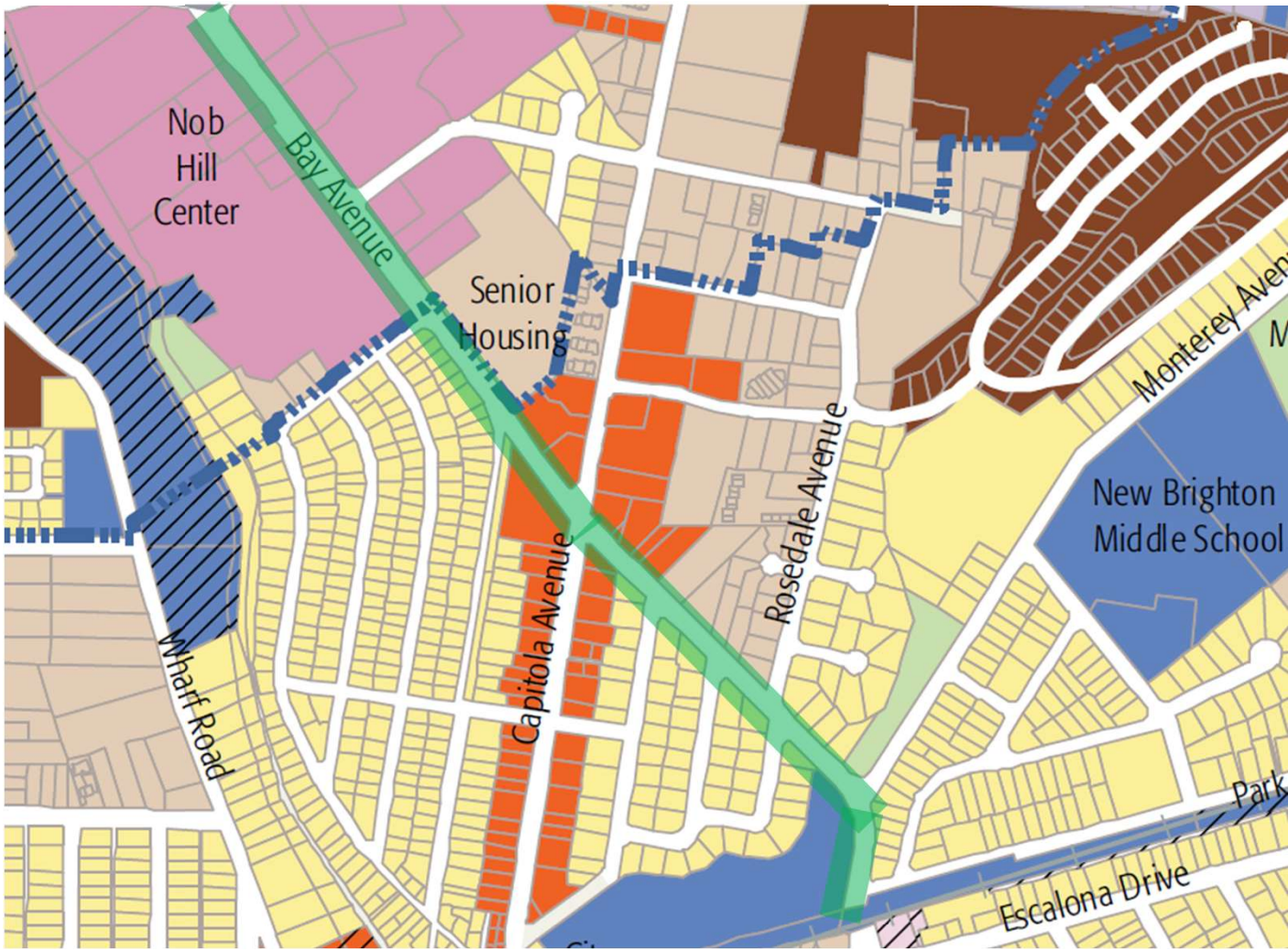
- Village Mixed-Use (MU-V)
- Neighborhood Mixed-Use (MU-N)

Other Designations

- Parks and Open Space (P/OS)
- Public/Quasi-Public (P/QP)
- Visitor Serving (VS)

Commercial/Industrial Designations

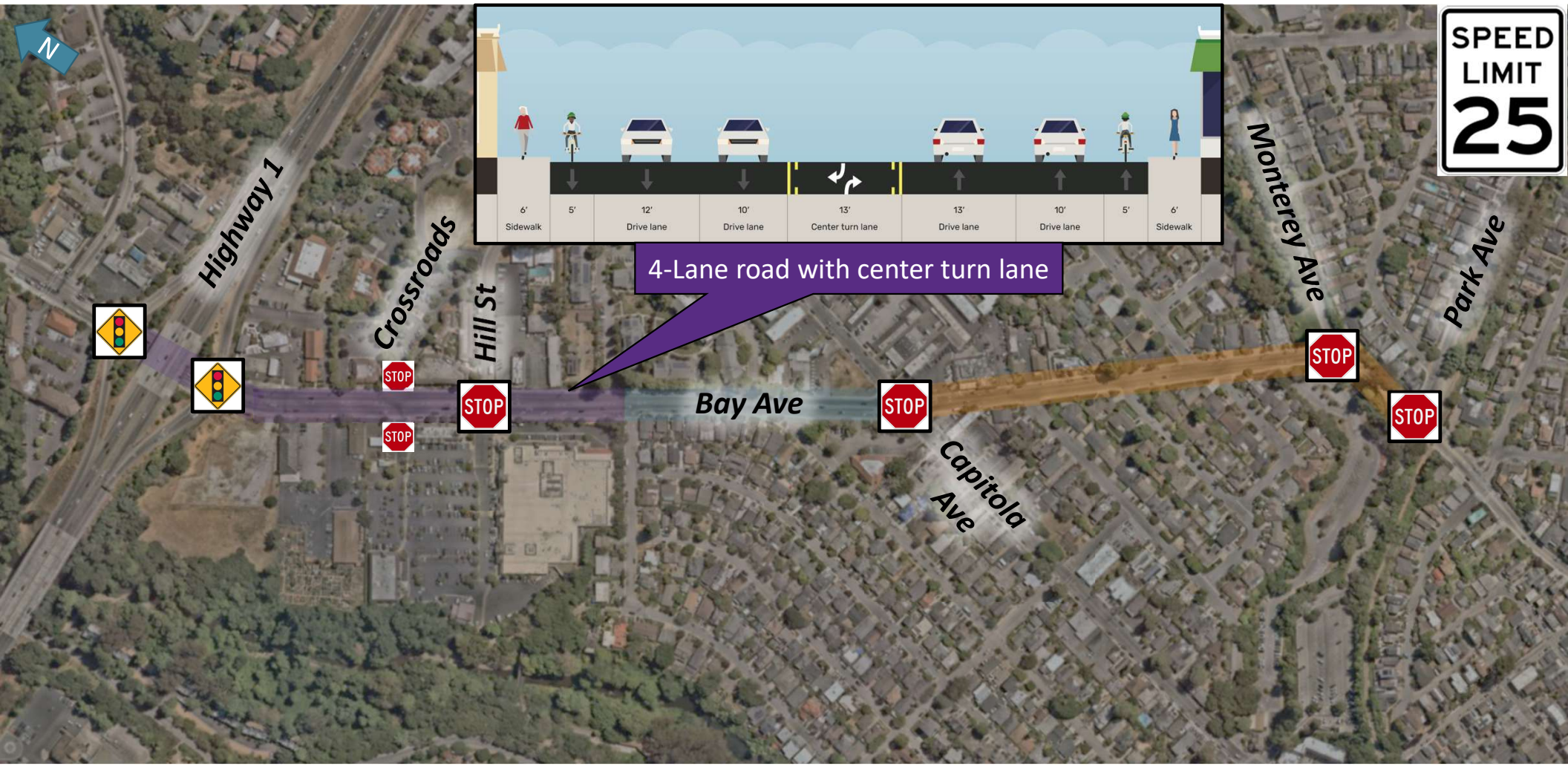
- Regional Commercial (C-R)
- Community Commercial (C-C)
- Visitor Accommodations (VA)
- Industrial



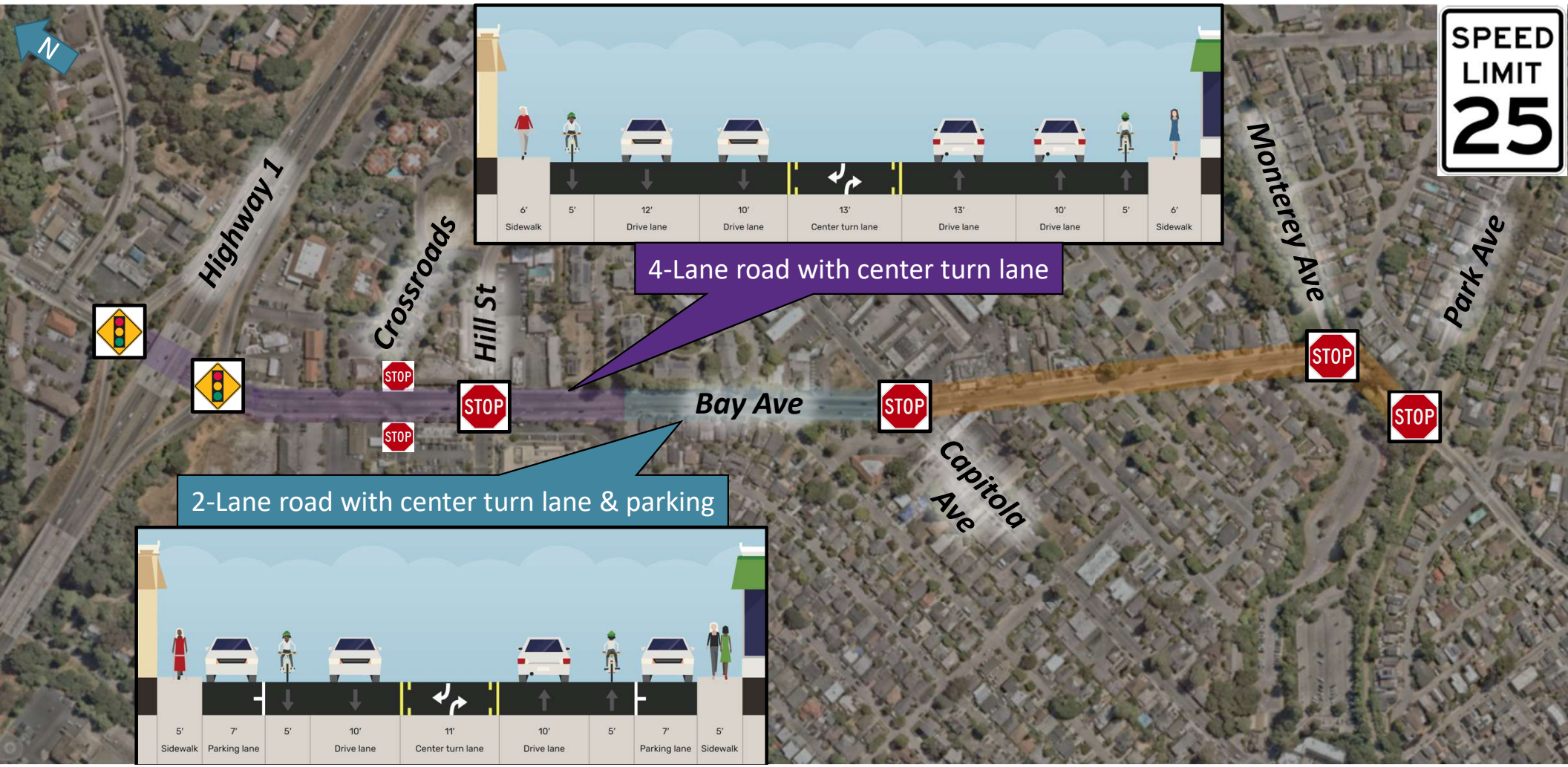
Project Study Area

2. Existing Conditions & Traffic Data

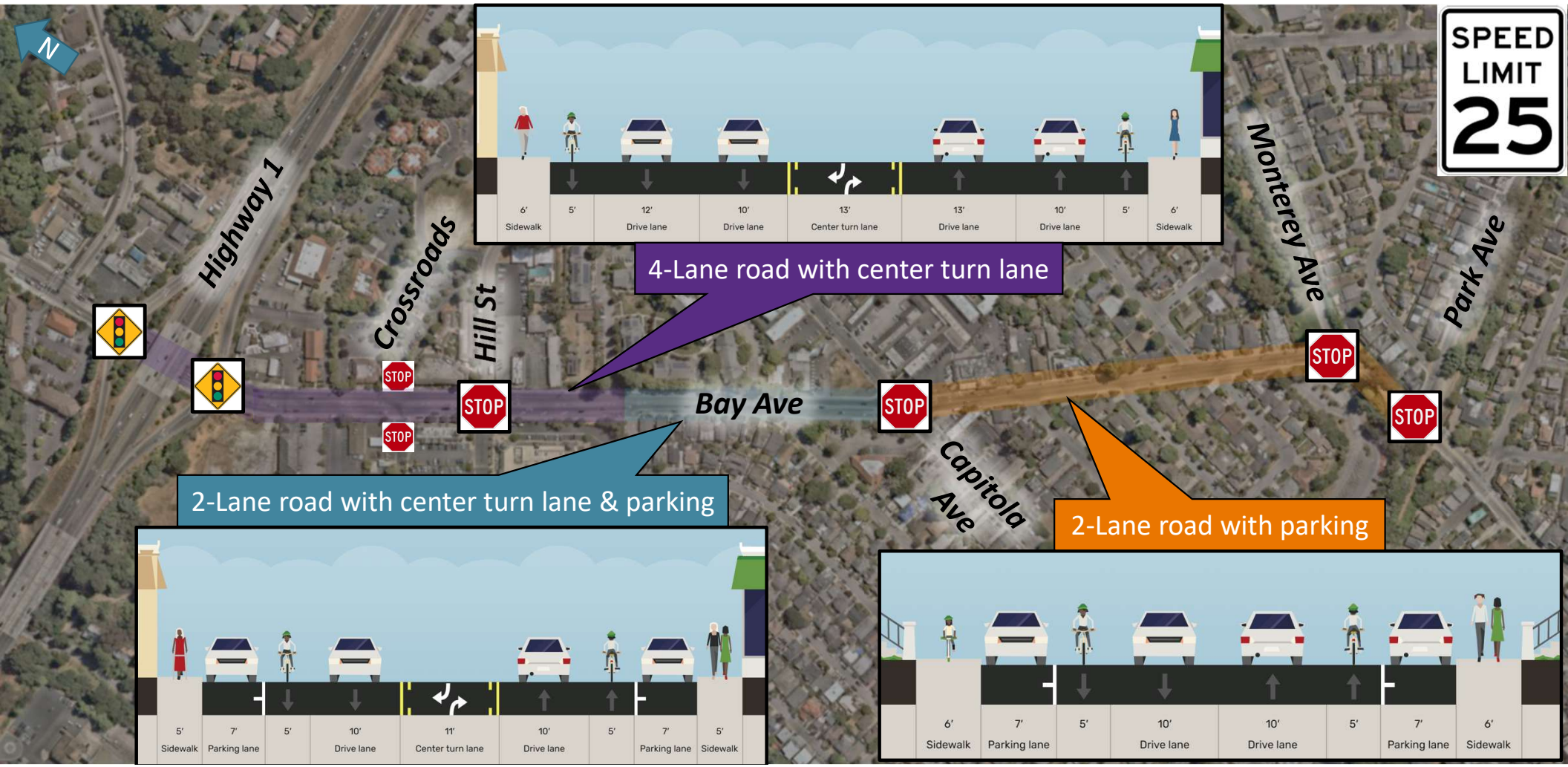
Pre-Existing Conditions – Roadway



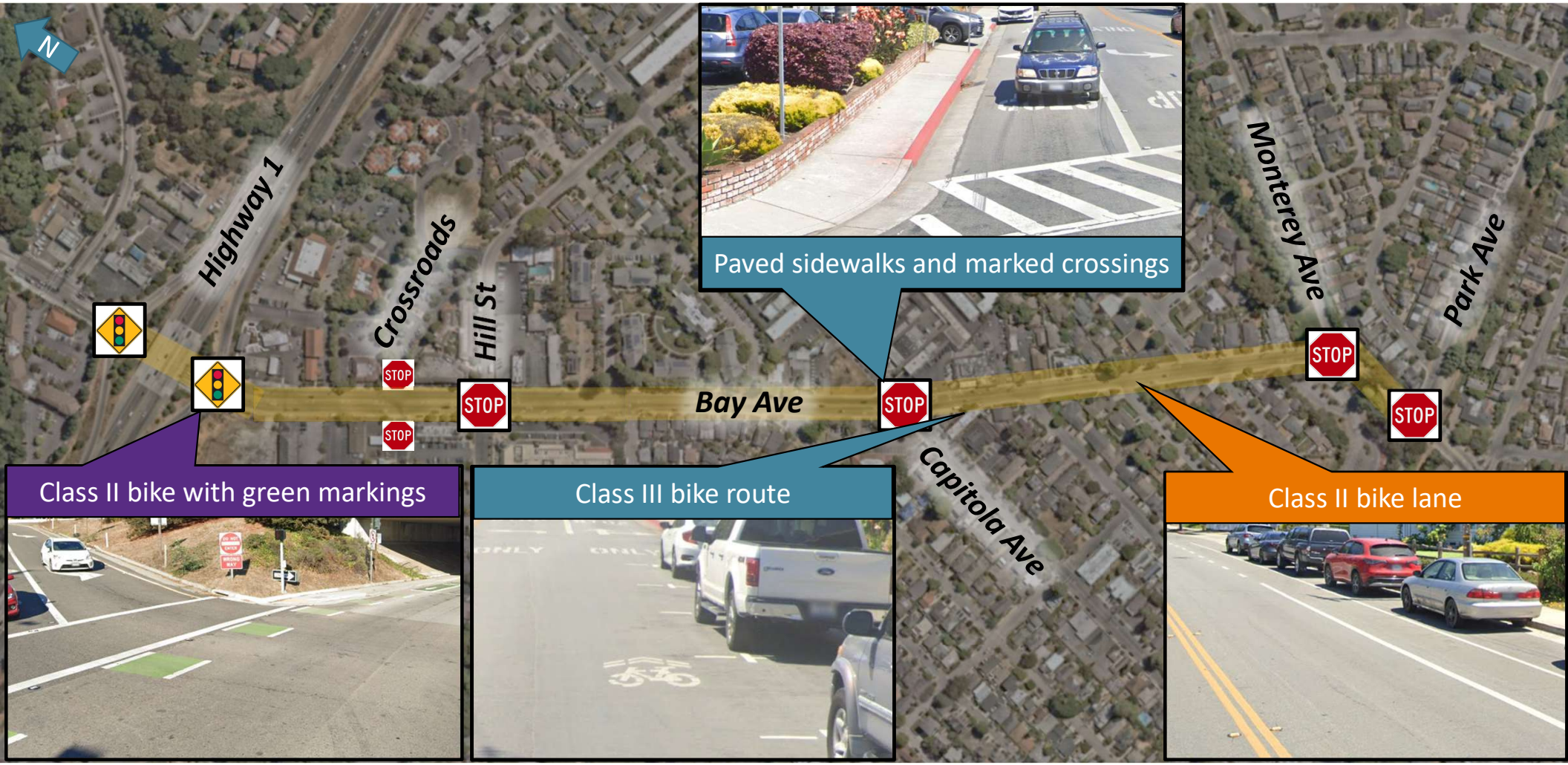
Pre-Existing Conditions – Roadway



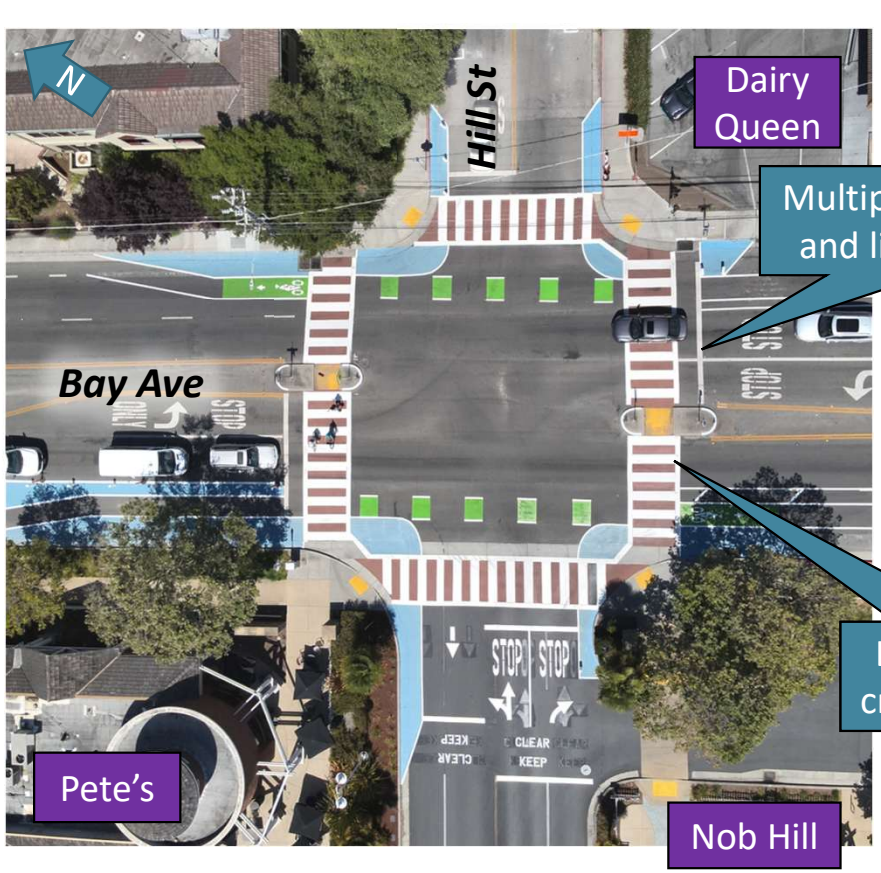
Pre-Existing Conditions – Roadway



Existing Conditions – Bike & Pedestrian

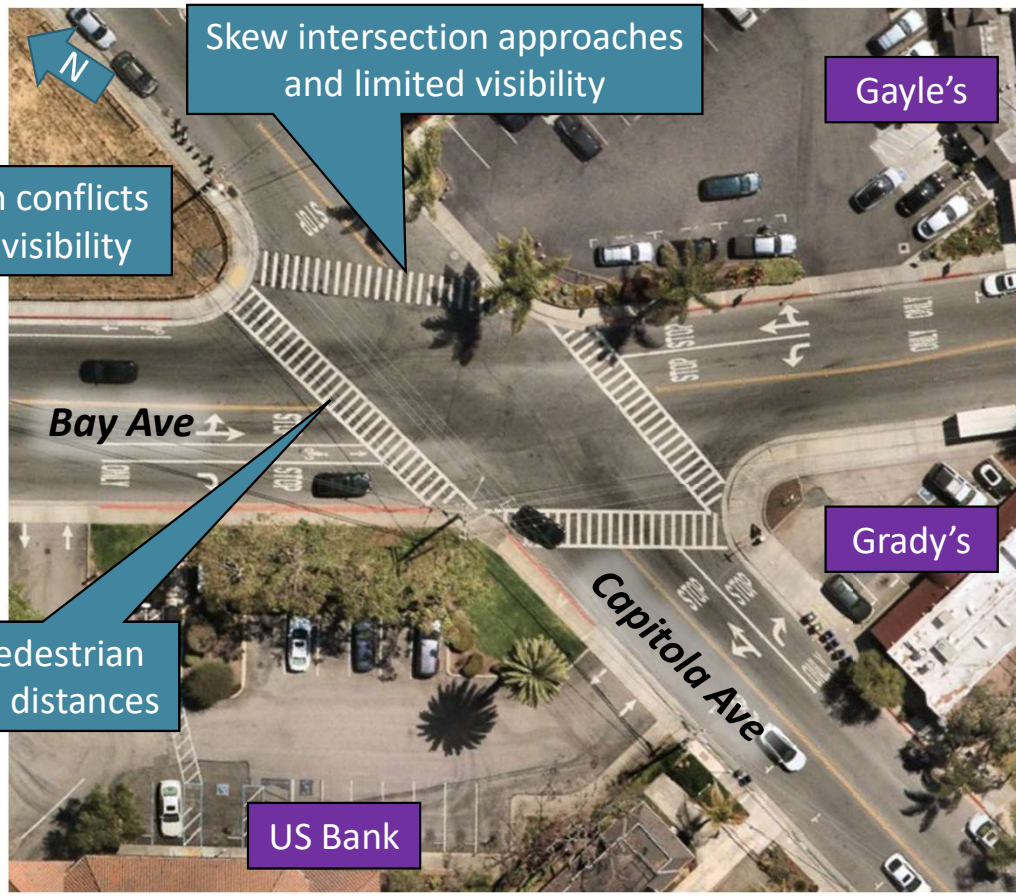


Existing Conditions – Intersection

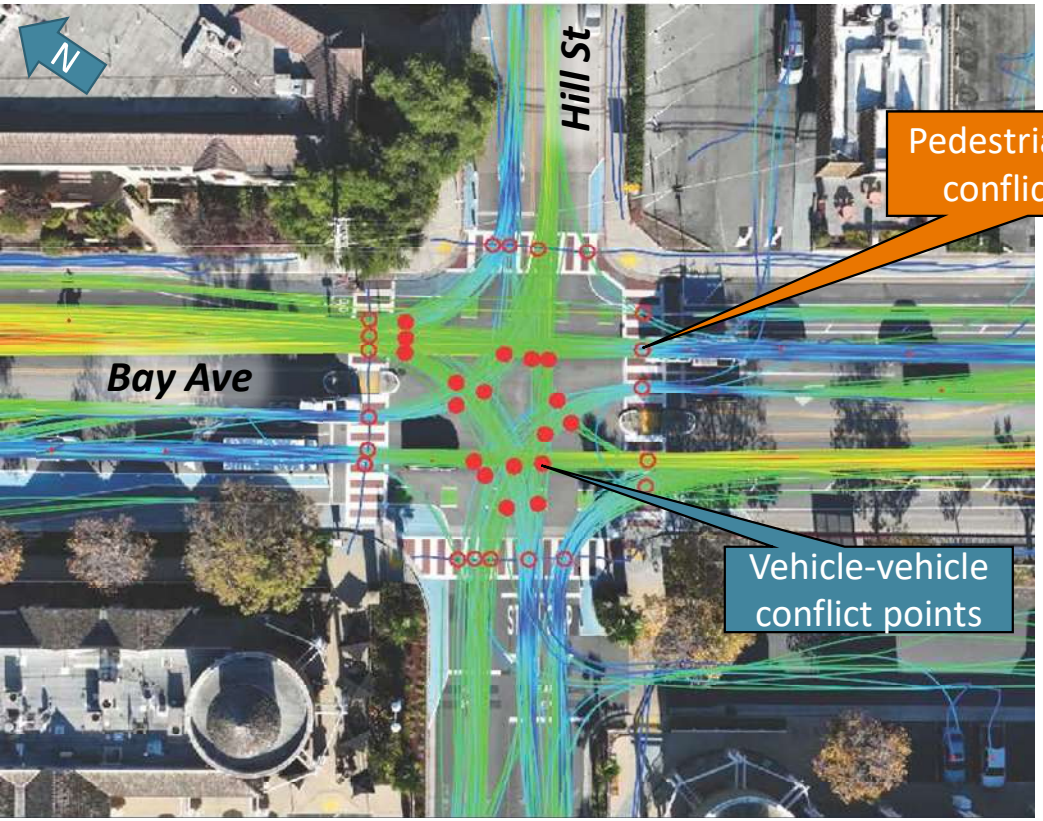


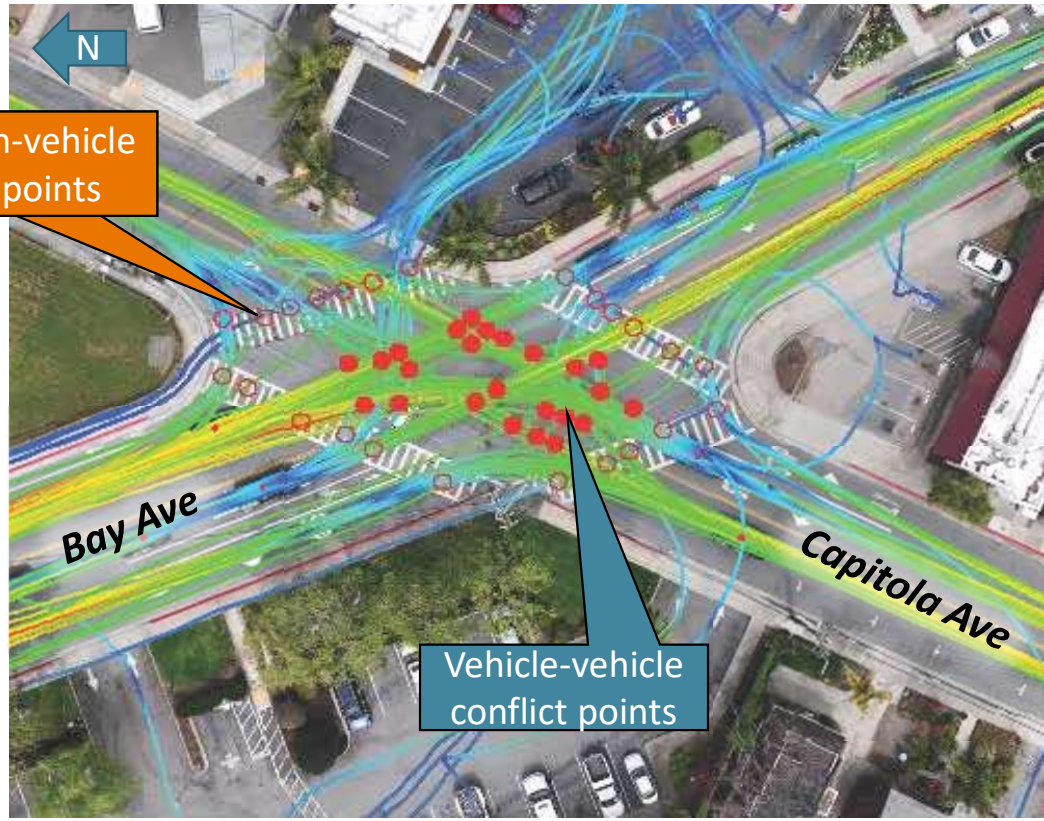
Multiple turn conflicts and limited visibility

Long pedestrian crossing distances

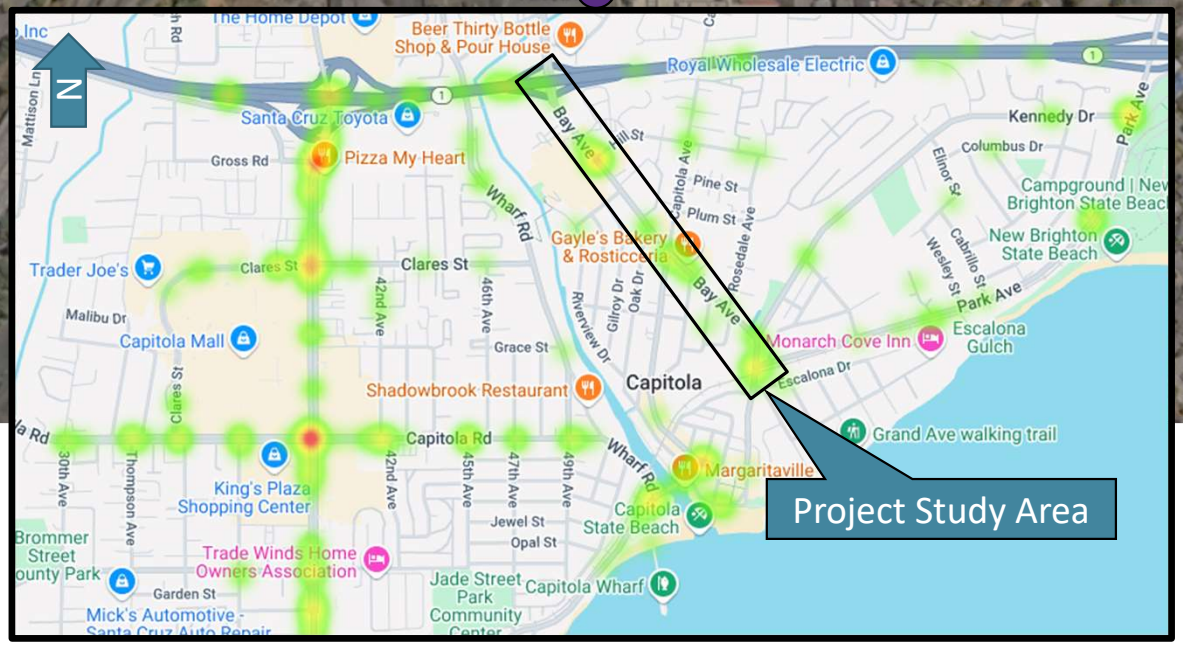


Existing Conditions – Near Miss Analysis





Collision Data – 2013 to 2024



3. Corridor Alternatives & Multimodal Improvements

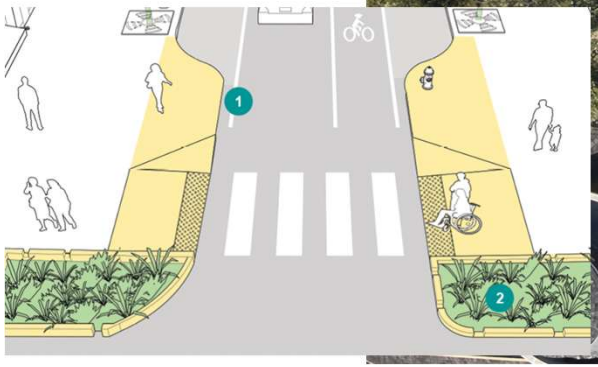
Corridor Alternatives

0 No-Build	1 Stop Control & Road Diet	2 Roundabout Control	3 Signal Control
			

Alternative 1 – Stop Control & Road Diet

- Traffic calming features improve bike & ped safety
- Lower capital costs & preserve existing intersection infrastructure
- Tradeoff - reduced roadway operations with stop control

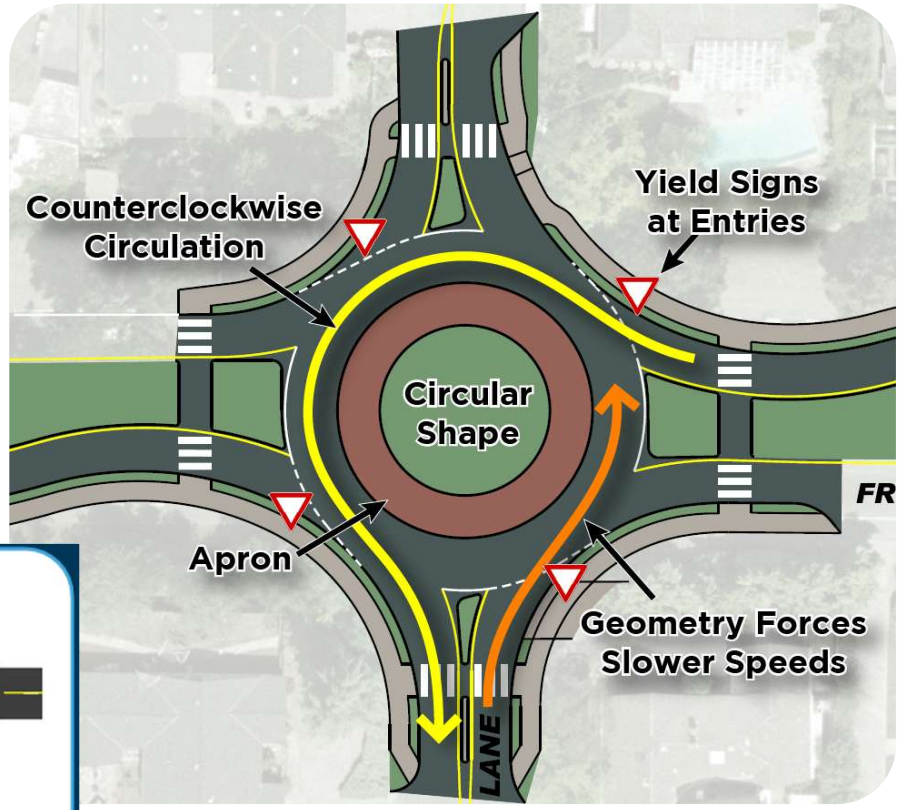
Wharf/Clares

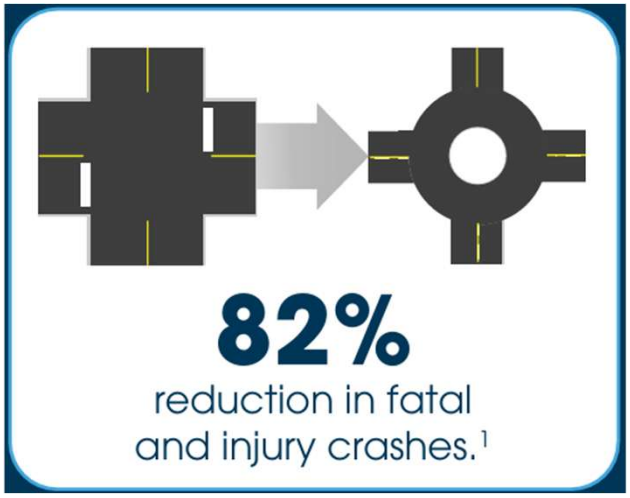


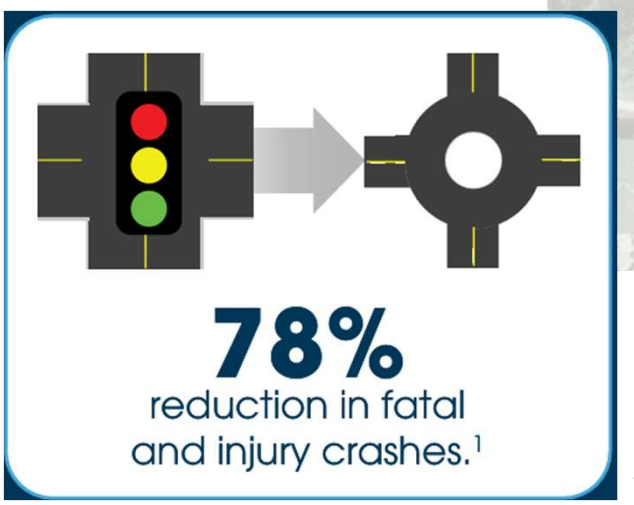
Bay/Hill

Alternative 2 – Roundabout Control

- Traffic Control - Yield at entry
- Traffic Deflection – Vehicles directed into One-way counterclockwise flow
- Geometrics – Circular road & entry angles designed to slow vehicle speeds





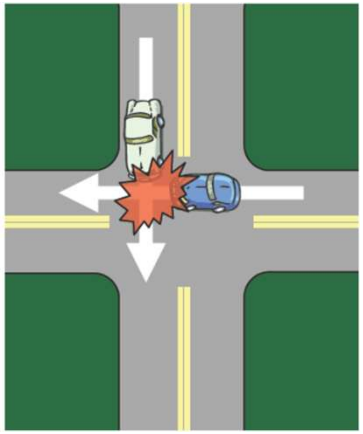


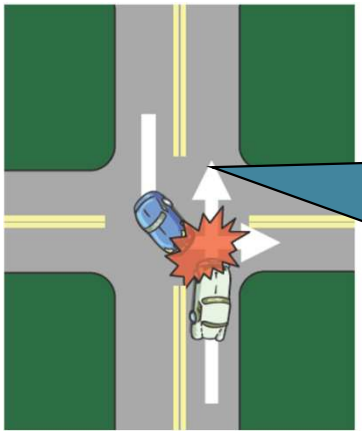
Source: FHWA

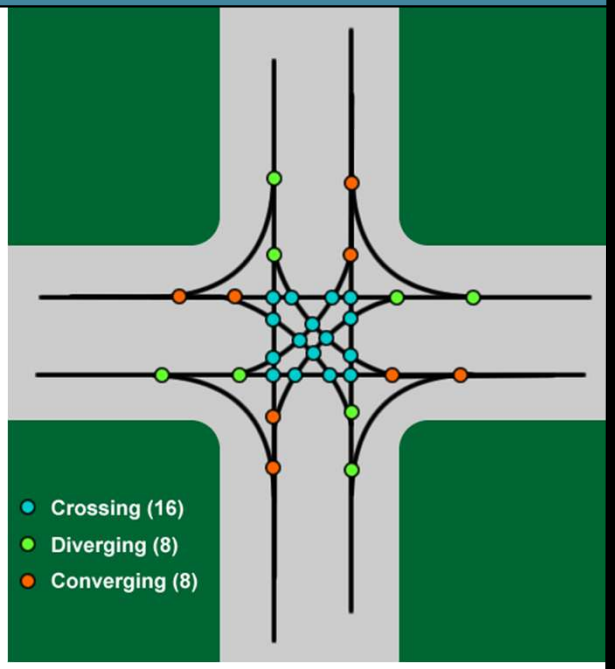
Alternative 2 – Roundabout Control

Typical 4-leg Intersection

HIGH SPEED



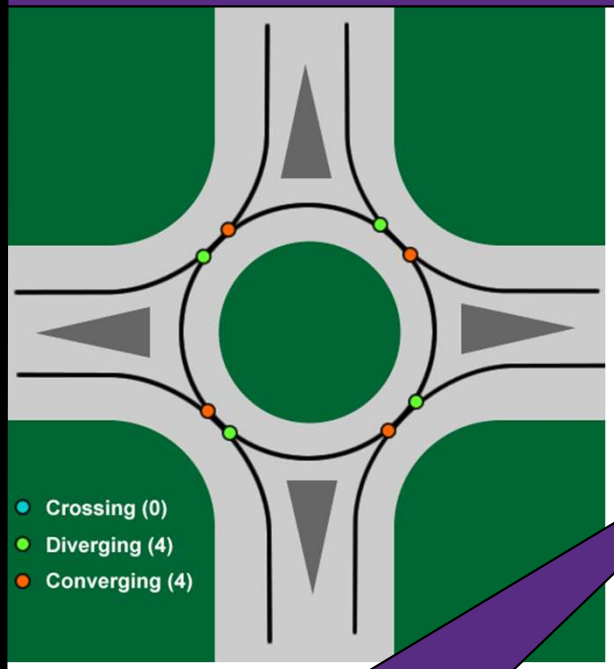


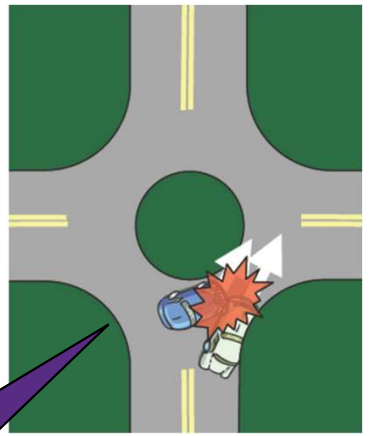


32 Conflict Points

Potential collisions are high severity broadside or head-on impacts

Roundabout





LOW SPEED

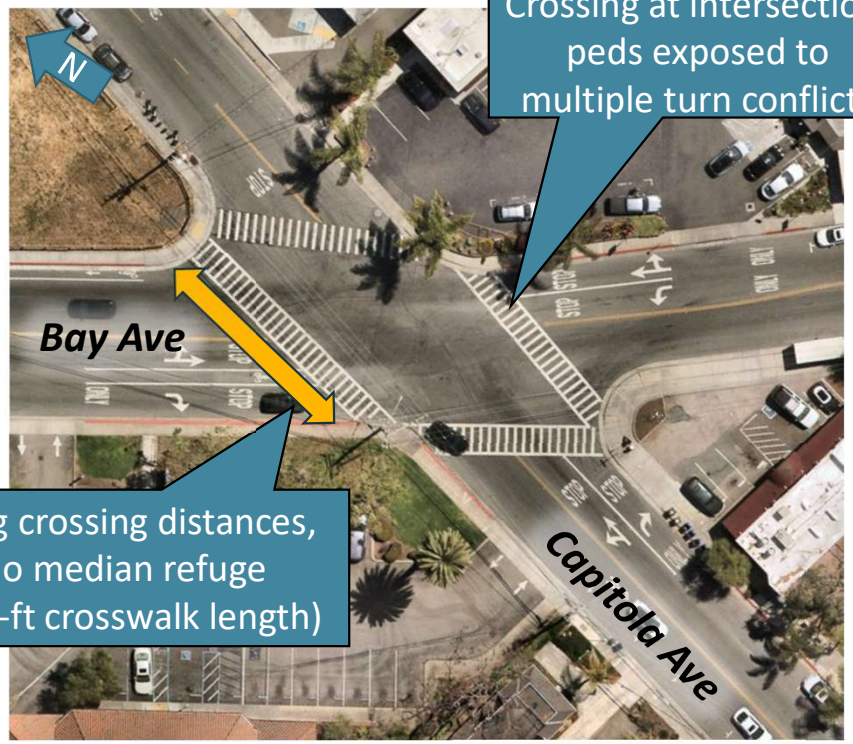
8 Conflict Points

Potential collisions are low severity sideswipe or rear-end impacts

Source: FHWA

Alternative 2 – Roundabout Control

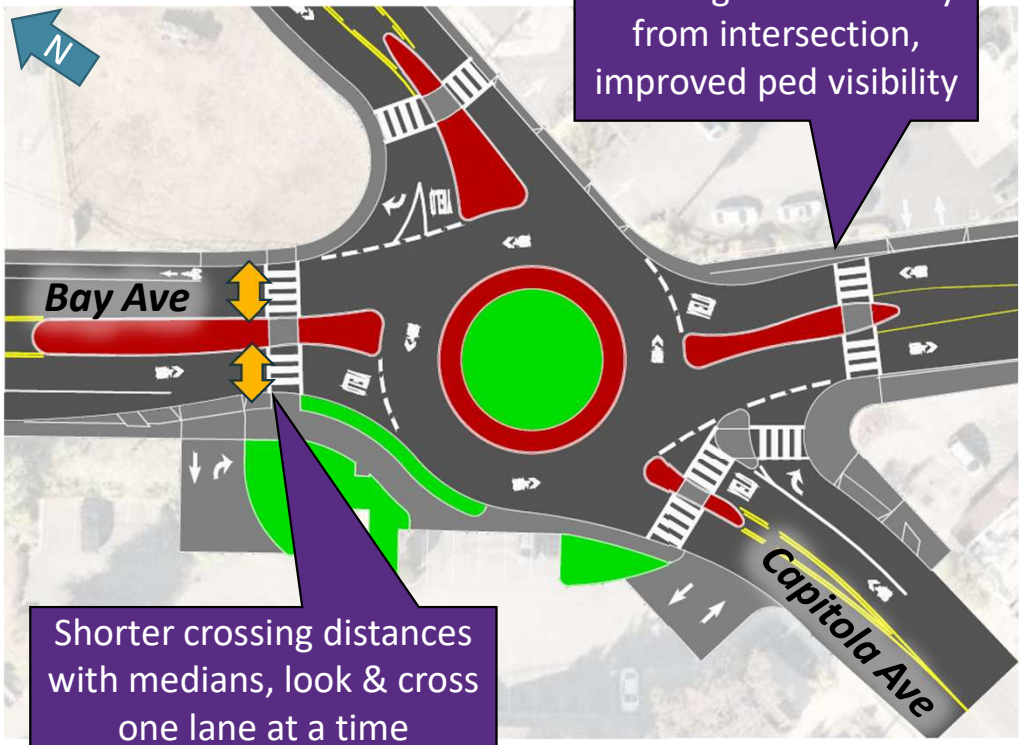
Existing 4-leg Intersection



Crossing at intersection, peds exposed to multiple turn conflicts

Long crossing distances, no median refuge (~80-ft crosswalk length)

Roundabout



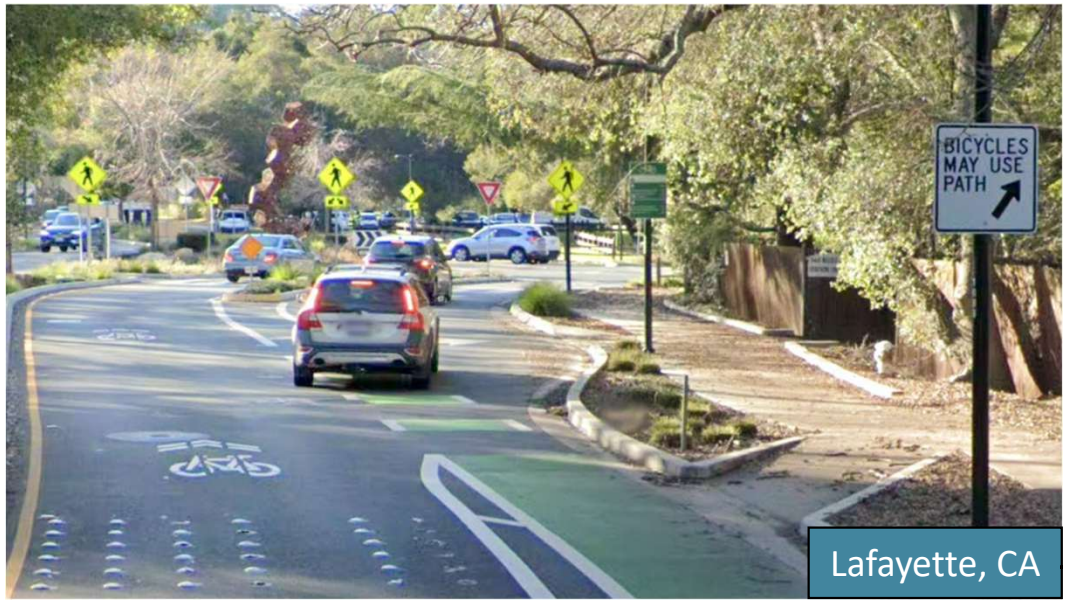
Crossings shifted away from intersection, improved ped visibility

Shorter crossing distances with medians, look & cross one lane at a time (~30-ft crosswalk length)

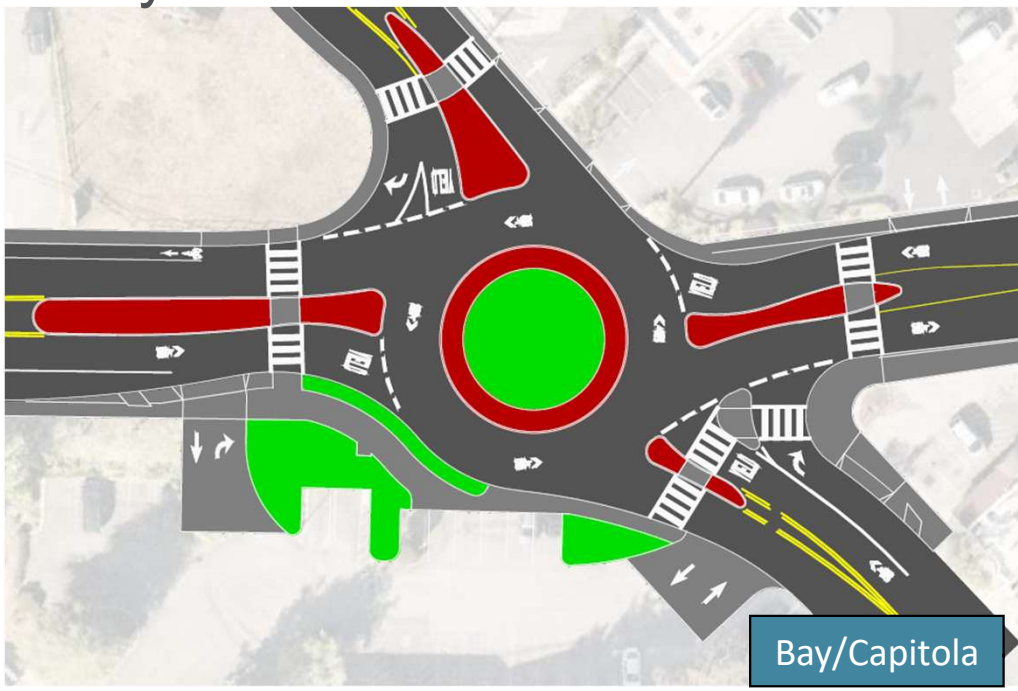
Bay/Capitola

Alternative 2 – Roundabout Control

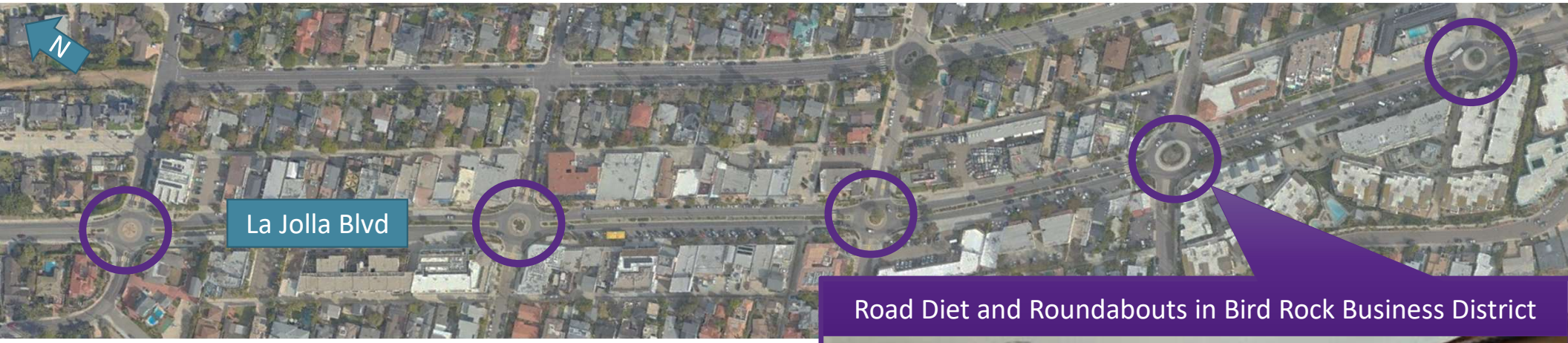
- Reduced conflict points & collision severity
- Separated ped & bike facilities improve safety
- Improved operations & capacity
- Tradeoff - higher capital costs & right-of-way impacts



Lafayette, CA


Bay/Capitola

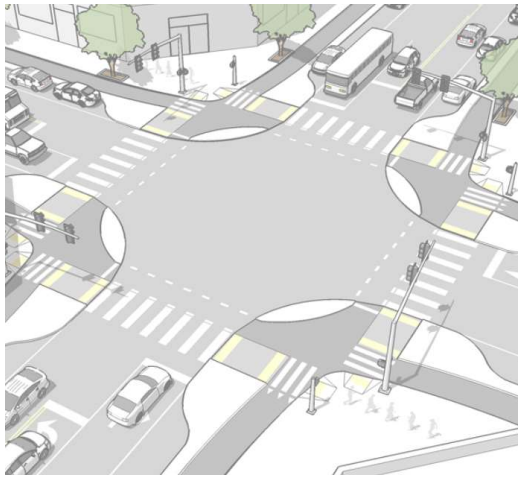
Roundabout – La Jolla (San Diego, CA)



Road Diet and Roundabouts in Bird Rock Business District

Alternative 3 – Signal Control

- Designated crossing phases & quick user adaptation
- Improved operations & capacity
- Potential bike & ped improvements with protected intersection design
- Tradeoff - higher capital & maintenance costs, aesthetics, collision severity

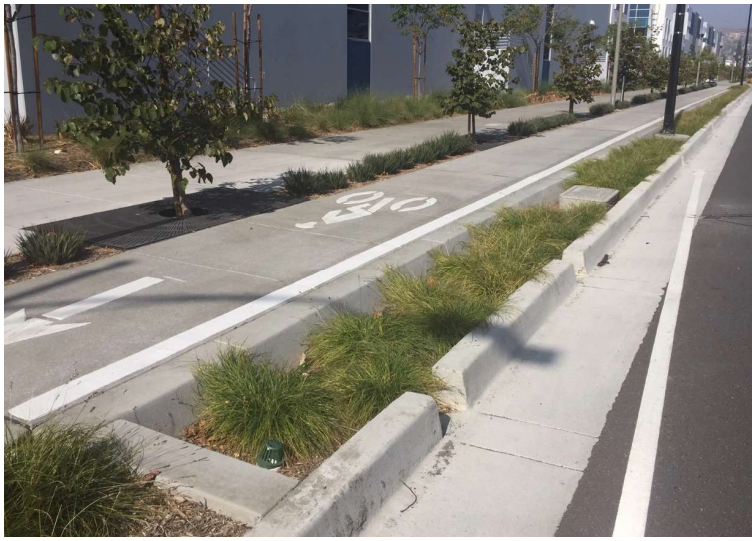


San Luis Obispo, CA

Fremont, CA

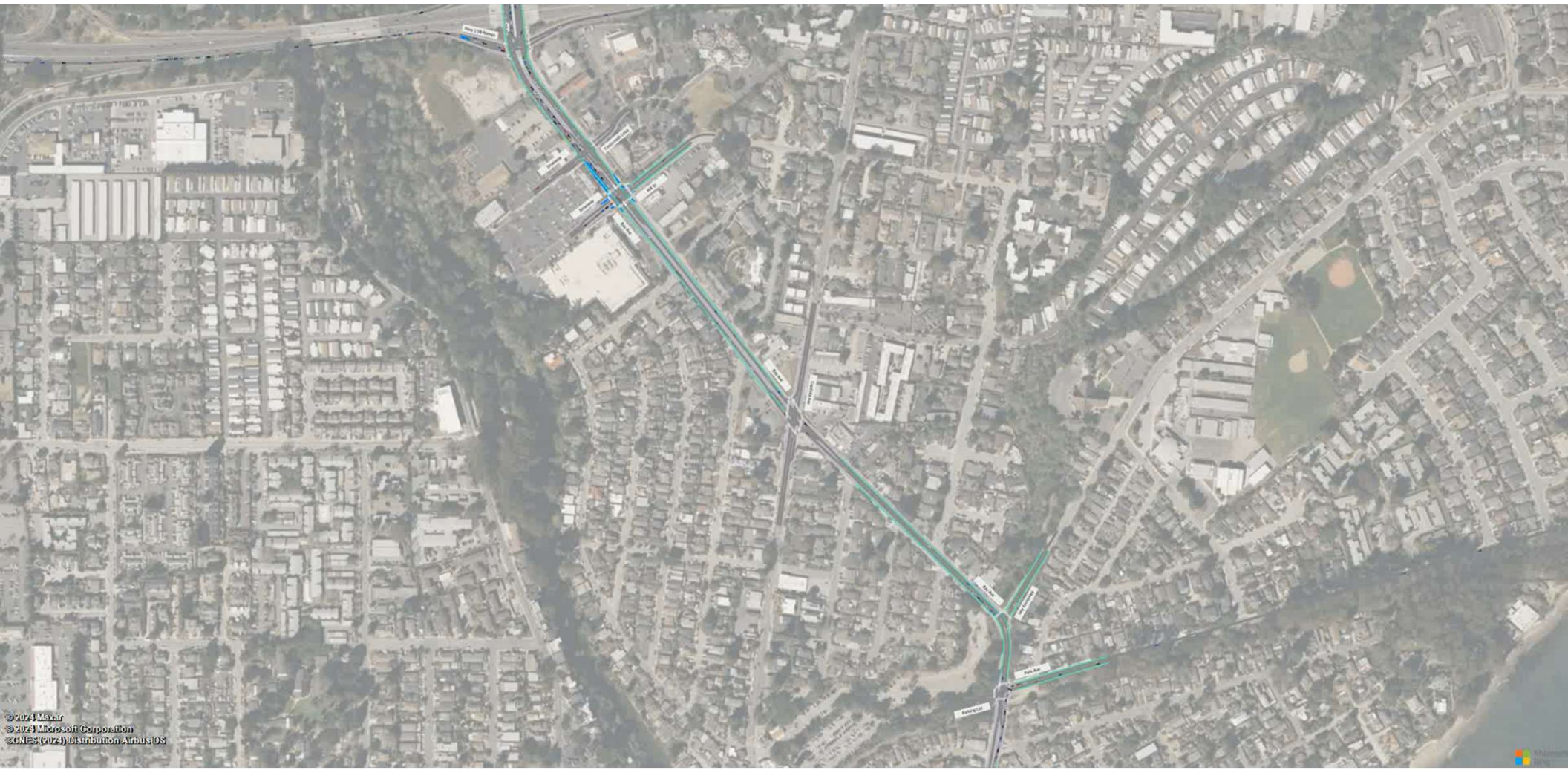
Other Multimodal Considerations

- Maintain existing parking and driveway access
- Buffered class IV bikeways
  - Striping, bollards, or hardscape
- Protected mid-block crossings
  - Rectangular Rapid Flashing Beacons (RRFB)

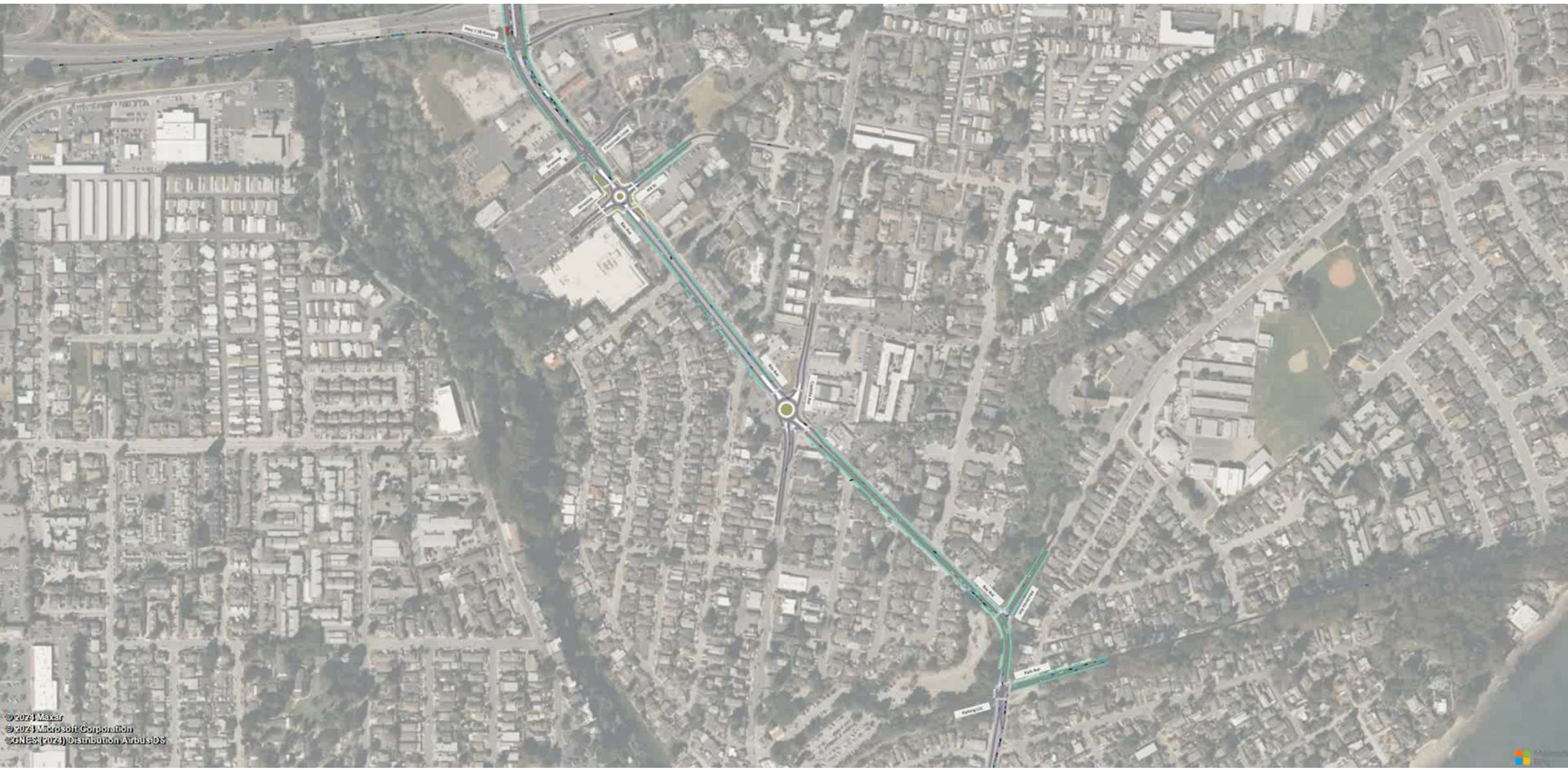


4. Corridor Analysis Results

Future Conditions (PM) – Alt 1 Stop



Future Conditions (PM) – Alt 2 Roundabout



Alternatives Summary – Economic

Criteria	Alternative 0 No Build	Alternative 1 Stop & Road Diet	Alternative 2 Roundabout	Alternative 3 Signal
Capital Construction Cost	Low	Low	Higher	High
Right of Way Impact	Low	Low	High	Moderate
Operation & Maintenance Cost	Low	Low	Moderate	High
Environmental Benefit	Moderate	Moderate	High	Moderate
Grant Funding Availability	Poor	Moderate	High	Moderate

Alternatives Summary – Operations

Criteria	Alternative 0 No Build	Alternative 1 Stop & Road Diet	Alternative 2 Roundabout	Alternative 3 Signal
Vehicle Delay	High	Higher	Low	Moderate
Transit & Emergency Vehicle Access Improvement	Poor	Poor	Moderate	Moderate
Driver Adaptation Time	Low	Low	High	Moderate

Alternatives Summary – Safety

Criteria	Alternative 0 No Build	Alternative 1 Stop & Road Diet	Alternative 2 Roundabout	Alternative 3 Signal
Collision Severity Potential	Moderate	Moderate	Low	High
Bicycle Access Improvement	Poor	Moderate	Good	Moderate
Pedestrian Access Improvement	Poor	Moderate	Good	Moderate

5. Next Steps & Action Items

Recommendations

- Pursue the roundabout alternative as the preferred long-term improvement for the Bay Avenue corridor
  - The stop and signal alternatives can be feasible to address budget constraints and short-term corridor needs

Council Actions

- Direction on corridor alternatives for refinement and outreach
- Follow up meeting with input from public outreach

5. Next Steps & Action Items

Short-Term

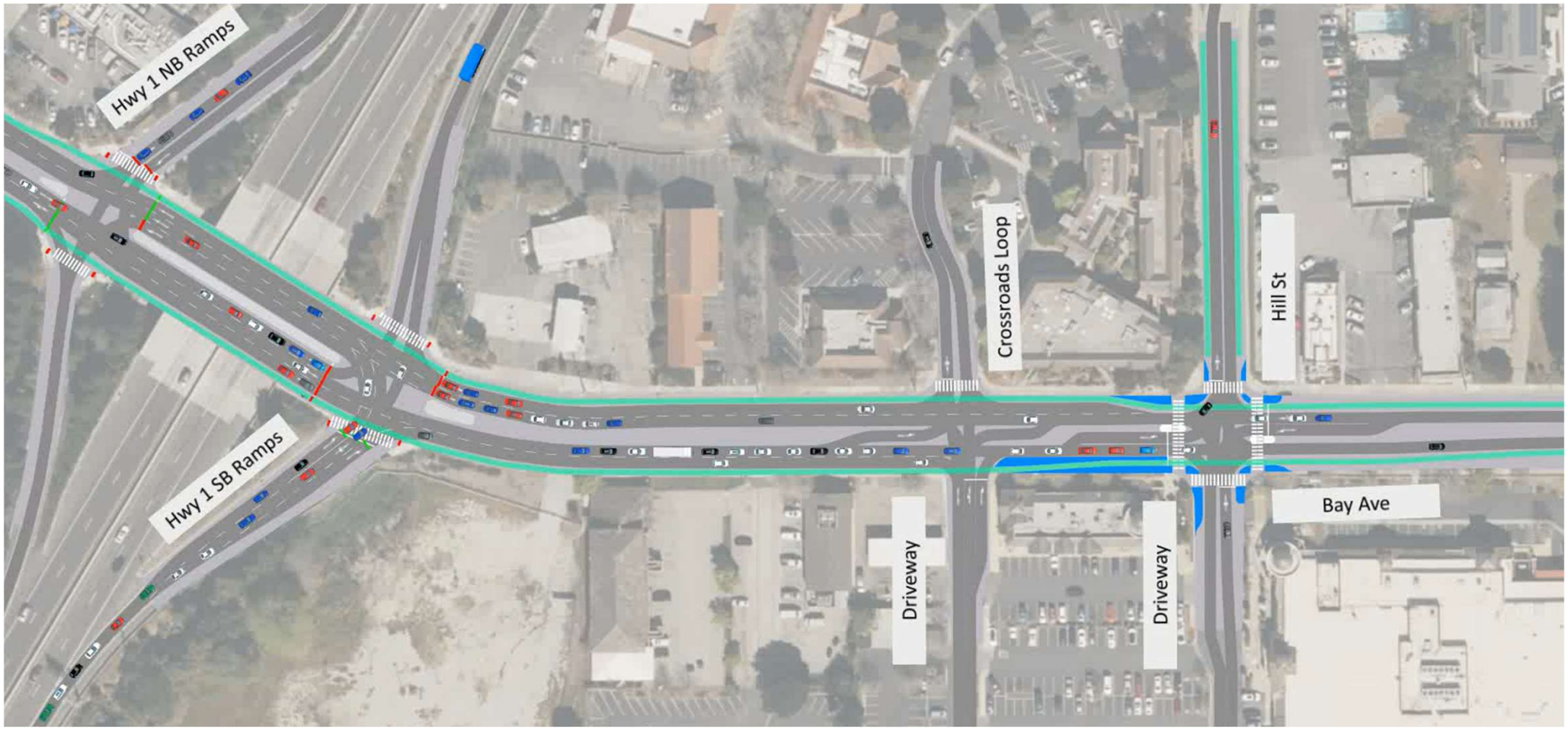
- Conduct corridor public outreach
- Prepare concept designs

Long-Term

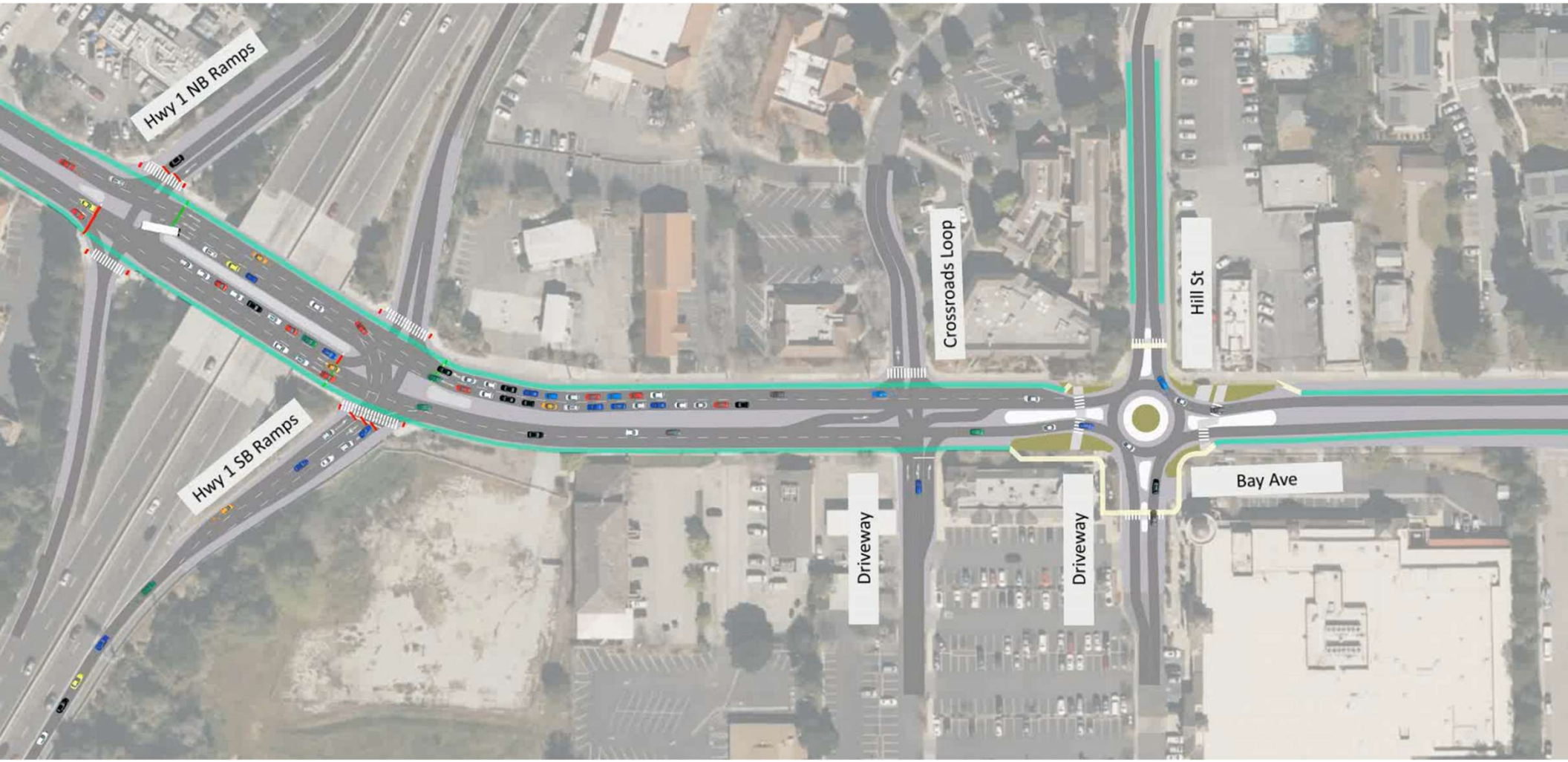
- Pursue grant funding opportunities
- Design corridor improvements
- Construct corridor improvements pending available funds

Questions & Discussion

PM Peak – Highway 1 & Hill St (Stop)



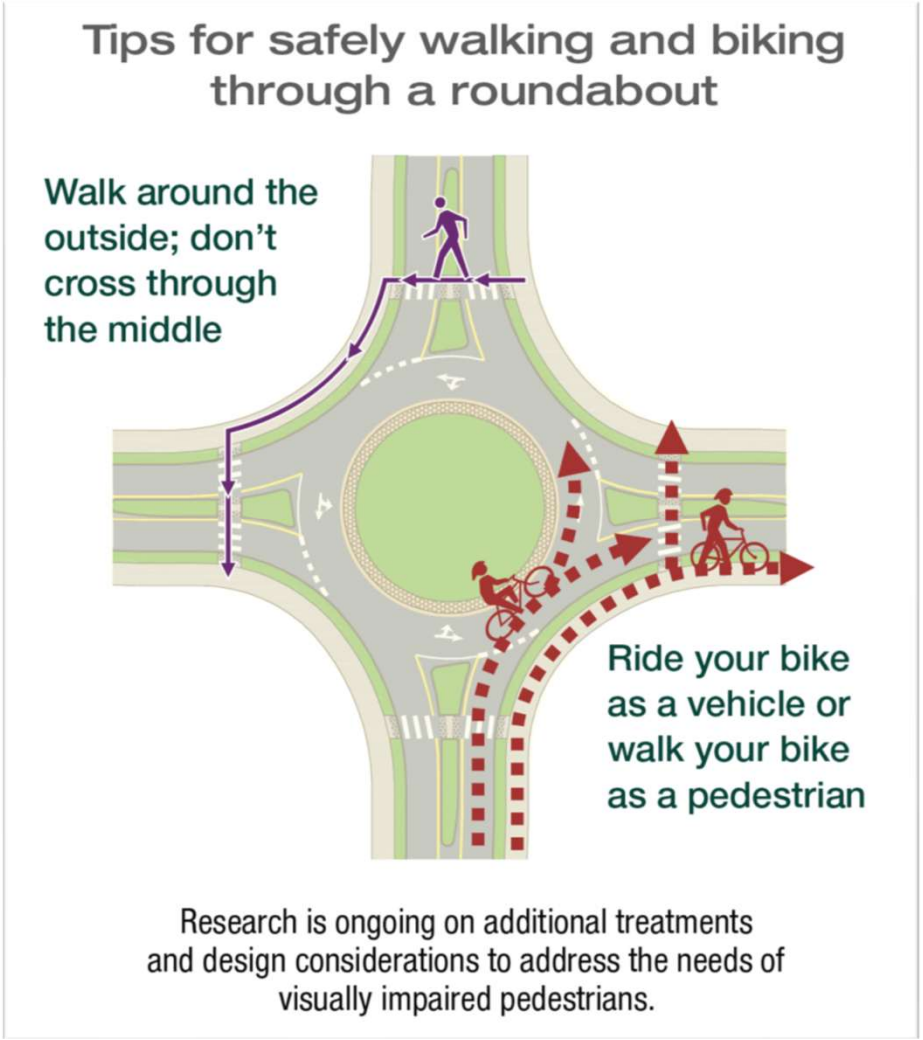
PM Peak – Highway 1 & Hill St (Roundabout)



AM Peak – Monterey & Park (Stop)

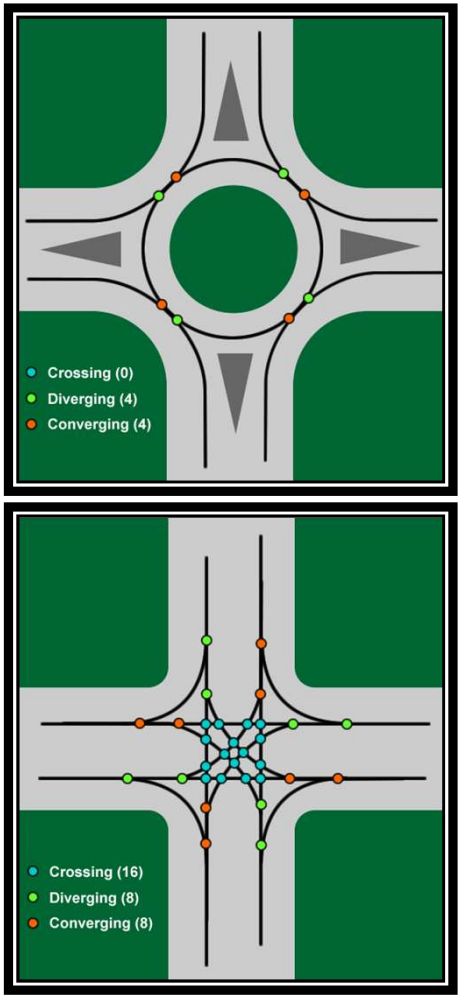
PM Peak – Monterey & Park (Stop)

Pedestrian and Bicycle Circulation



Roundabouts are Good for Older Drivers

- Lower Speeds through roundabout
- Forgiving, mistakes not lethal
- Longer decision-making time
- No demand to accurately judge closing speeds of fast traffic
- Low energy crashes
- No wide visual scans
- Simple decision-making
- By 2020, the 85-percentile design driver will be someone aged 65 or older

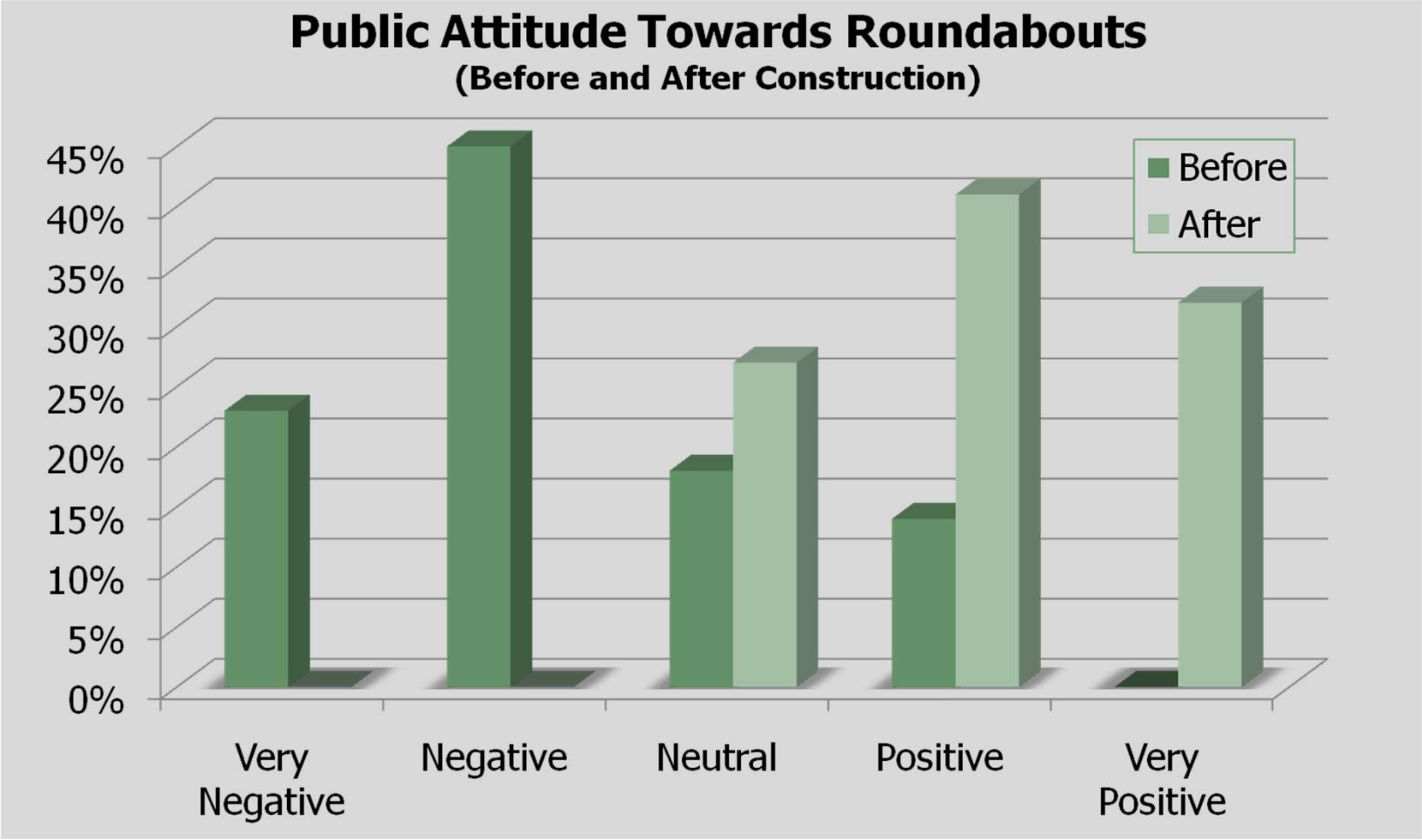


Source: Mark Doctor, P.E., FHWA Resource Center

Benefits Comparison

	Roundabout	Traffic Signals
Vehicle and Driver Safety	Eliminates high-speed crashes and reduces fatalities and injuries by 70+%	Numerous vehicle and pedestrian conflict points on standard intersection (32 vehicle/24 pedestrian)
Pedestrian and Bicyclist Safety	Shorter one-directional crossings provide greater pedestrian focus and awareness	Vehicles are more focused on signal changes than on pedestrian movements
Space/ Development Footprint	Reduces additional right-of-way between links of intersections	May require additional turn lanes in future if traffic volumes or traffic patterns change
Cost and Sustainability	Less expensive than a signal for greenfield construction (new location)	Increase in fuel consumption and emissions due to stopped and delayed vehicles during red lights
Traffic Capacity	Creates equal priority for all approaches	Typically prioritizes mainline traffic allowing progression of high volumes approaches
Access Management	Provides equal priority of driveway/business access	Requires drivers to make additional left turns or right turns to access certain properties/businesses
Aesthetics	Provides attractive entries and gateways to communities	Various lighting and signing distractions can impact the overall aesthetic appeal for the user
Maintenance	Pavement markings, lighting, and some landscape maintenance may be more intensive than signals	Requires staff time required to maintain signals, provide retiming, and conduct repair

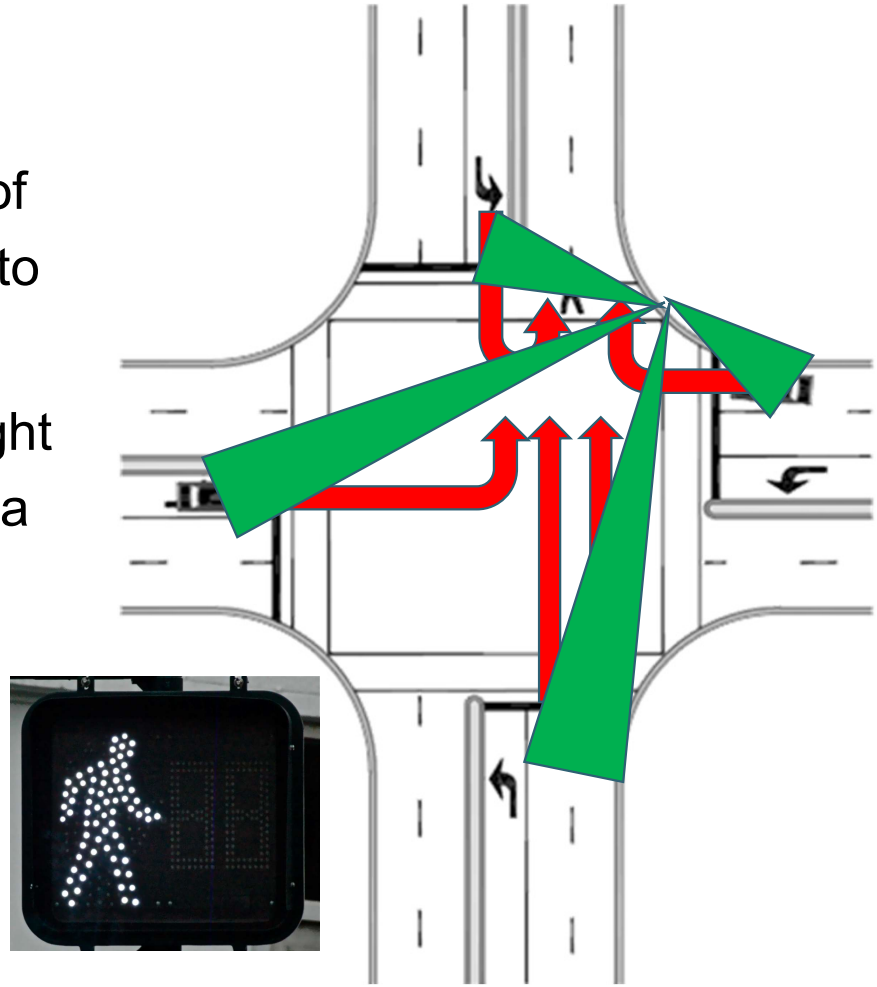
Roundabout Perception



Source: US Department of Transportation: Federal Highway Administration

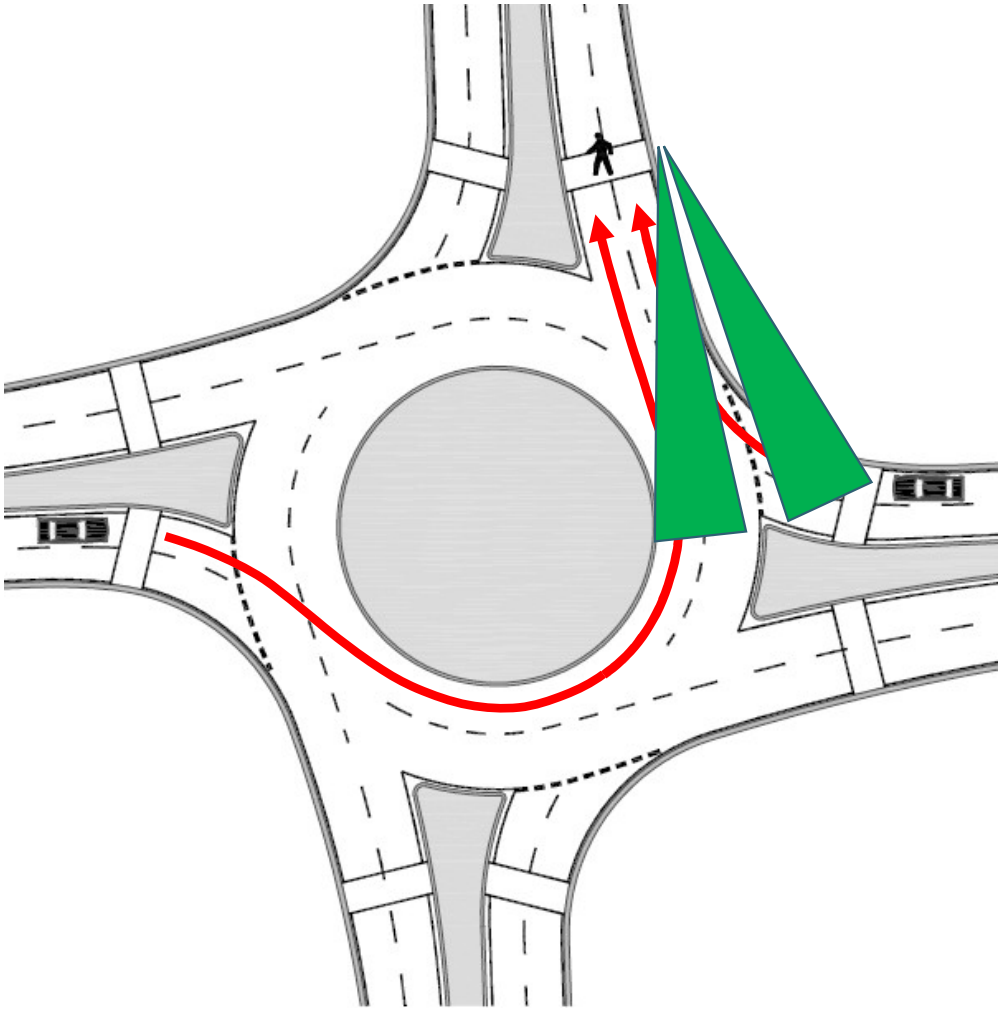
Safety vs. Security at Signalized Intersections

- Pedestrian experiences an exaggerated level of security because the signals tell them it's safe to cross
- Most crashes occur when drivers turn left or right across the crosswalk while the pedestrian has a walk indication



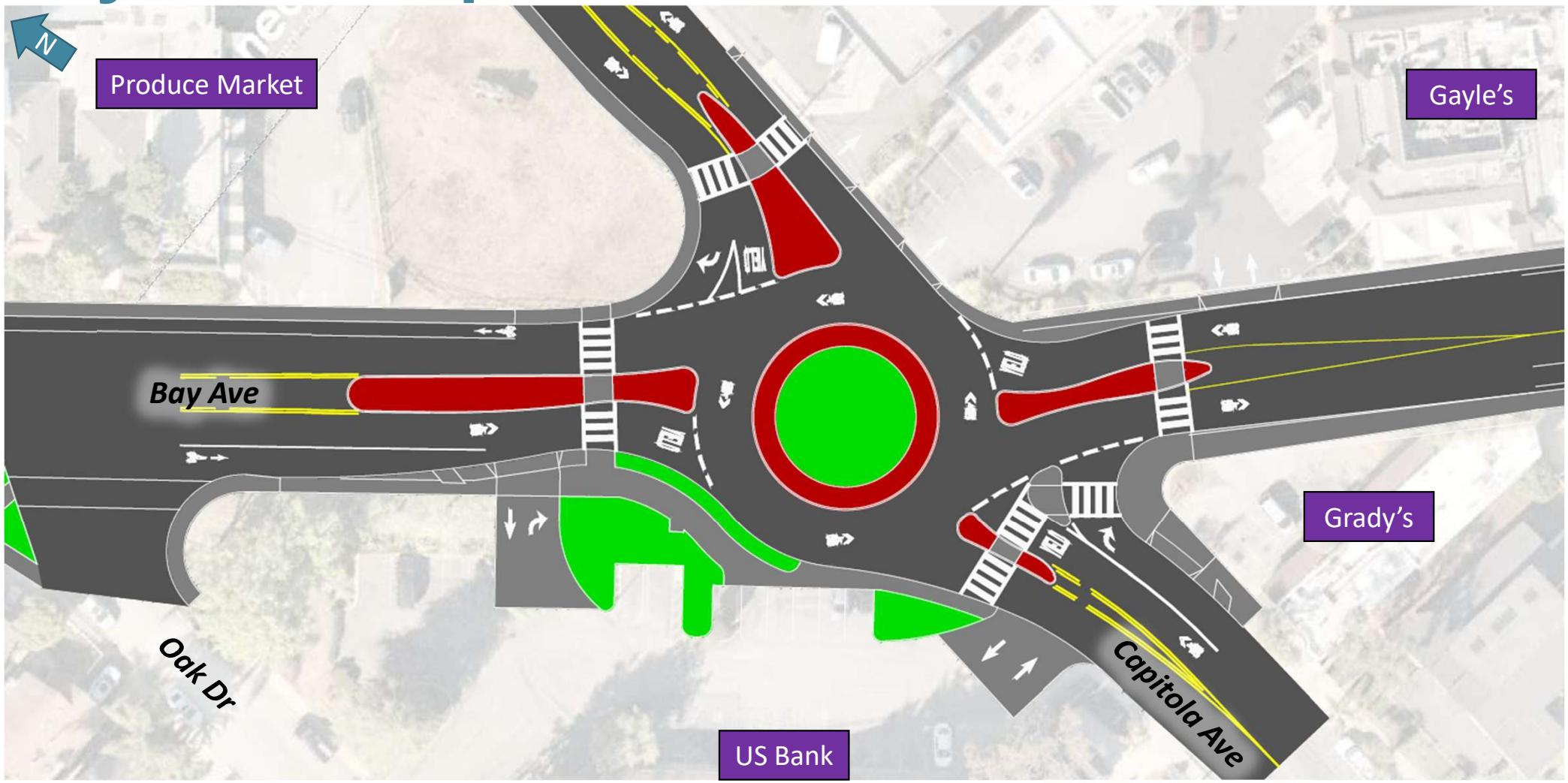
Safety vs. Security at Roundabouts

- Pedestrian feeling of security more closely matches their actual level of safety



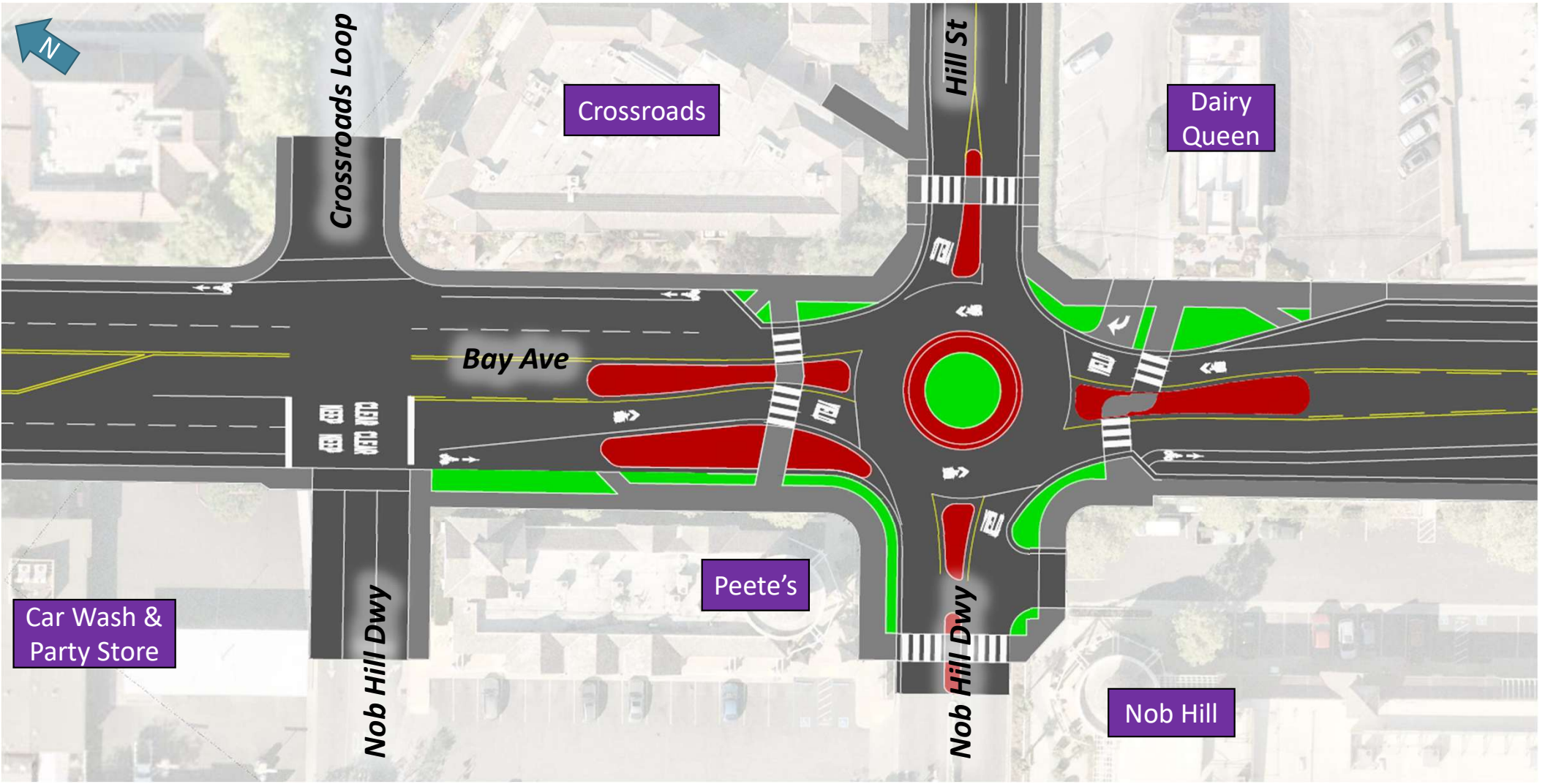
Bay Ave – Capitola Ave

CONCEPT LAYOUT FOR ILLUSTRATIVE PURPOSES



Bay Ave, Hill St, Crossroads

CONCEPT LAYOUT FOR ILLUSTRATIVE PURPOSES



La Jolla Boulevard, Bird Rock, San Diego

- Reduced lanes from 5 to 2, added angled parking, widened sidewalks, landscaped medians, added 5 roundabouts at intersections
  - Lowered speeds from 40mph to 20mph
- Traffic volumes have stayed constant at 22,000 cars/day
- New investment in restaurants, coffee shops, offices, drugstore and nearby infill housing
  - 20% increase in sales tax revenue


78 Feet


14 Feet