



**DATE:** November 25, 2014

**CATEGORY:** New Business

**DEPT.:** Public Works

**TITLE:** **Shoreline Boulevard Transportation Corridor Study**

### **RECOMMENDATION**

1. Approve the proposed conceptual plan for the Shoreline Boulevard Transportation Corridor improvements.
2. Direct staff to begin work on the next steps presented in this report that would provide for phased implementation of the plan.

### **BACKGROUND**

The Shoreline Regional Park Community Transportation Study (Transportation Study), completed in 2013, identified a series of transportation improvement strategies to respond to anticipated increases in employment and development in the North Bayshore Area as the result of the 2030 General Plan. Implementation of these and other transportation improvement strategies will be critical for the City to achieve the following North Bayshore commute mode-share targets endorsed by the Council in March 2013:

<b>Travel Mode</b>	<b>Commute Mode-Share Target</b>
Ride-Sharing (Carpools and Vanpools)	10%
Transit (Public and Private)	35%
Active Transportation	10%
Single-Occupant Vehicle (SOV)	45%

The purpose of the Shoreline Boulevard Transportation Corridor Study (Corridor Study) is to determine the feasibility of, and develop a conceptual design for, integrated transit, bicycle, and pedestrian facilities in the Shoreline Boulevard Corridor from the

Downtown Transit Center to North Bayshore (in support of the commute mode shift targets).

For this study, the Shoreline Corridor is defined as Shoreline Boulevard, portions of Middlefield Road, Moffett Boulevard, Stierlin Road, and the Terra Bella Avenue area west of Shoreline Boulevard (Figure 1).

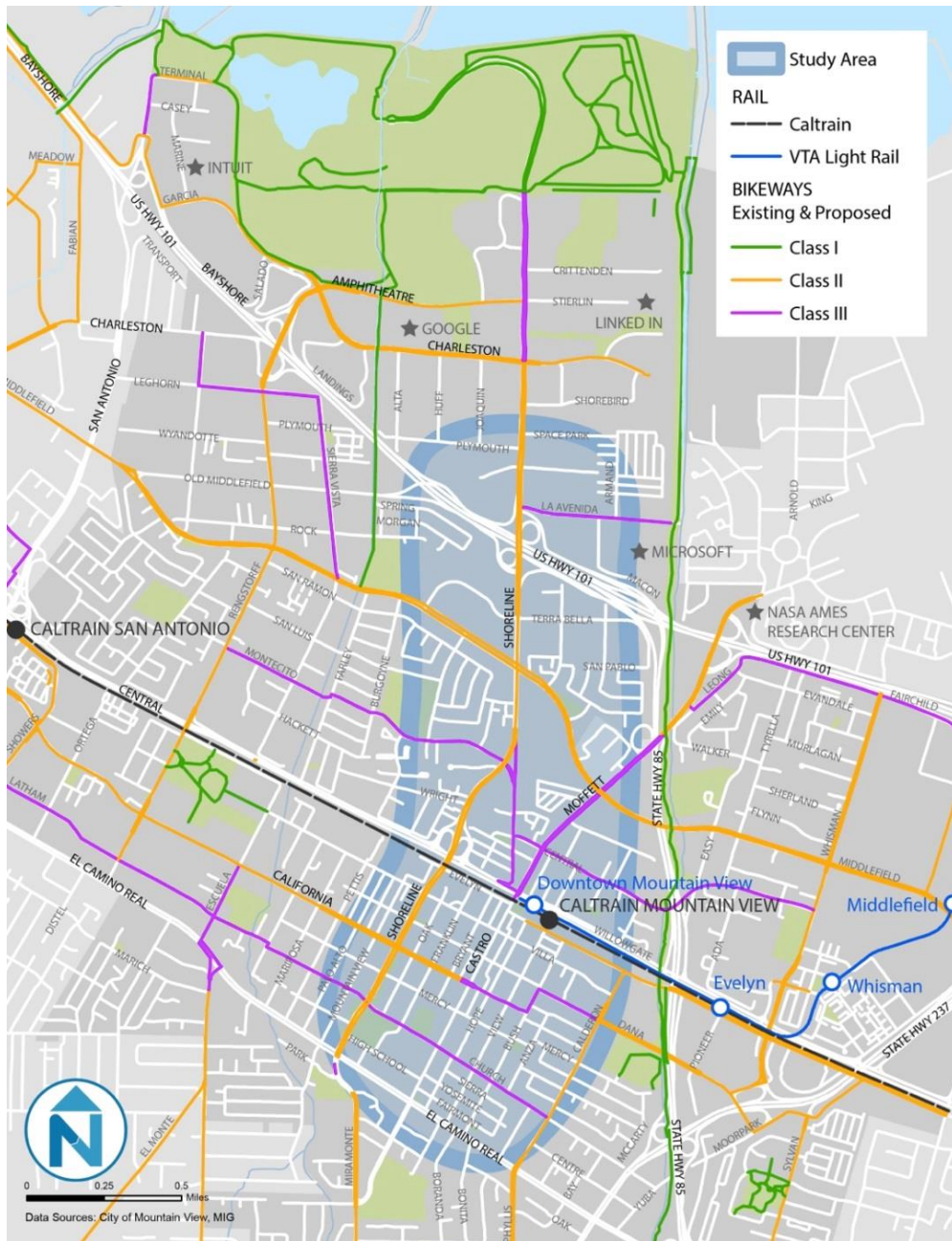


Figure 1 – Corridor Area Map

The Corridor Study begins action on two key transportation improvement strategies identified in the 2013 Transportation Study—Active Transportation and Expanded Transit Connections—and is being closely coordinated with the development of the North Bayshore Precise Plan.

The City Council received an introduction to, and initial findings of, the Corridor Study at a Study Session on April 8, 2014. The Council reviewed more detailed concepts for each of the transportation improvement alternatives and the results of an initial evaluation of the improvement alternatives at a Study Session on June 24, 2014. At that Study Session, the Council provided direction on a preferred concept for the Corridor, including the following:

1. **Bicycle and Transit Improvements Along the Corridor**—Cycle tracks and other high-quality bicycle facilities, dedicated transit lanes, and other provisions that will support anticipated higher volumes of bicycle and shuttle users on the Corridor.
2. **New Pedestrian and Bicycle Bridge Crossing of U.S. Route 101 West of Shoreline Boulevard**—Connection to cycle tracks and enhanced pedestrian facilities planned as part of the North Bayshore Precise Plan.
3. **Transit Center Improvements**—Improved pedestrian and bicycle access and expanded transit facilities to respond to anticipated increases in Caltrain and VTA light rail ridership and the demand for additional shuttle services linking the Transit Center to North Bayshore businesses.

## ANALYSIS

### Community Outreach

An initial series of public workshops and events (a community workshop and mobile workshops/site visits at the Transit Center and various North Bayshore companies) was held in early February. A second community workshop and a stakeholder workshop were held in May.

Community outreach activities in support of the Corridor Study have continued since the Council's June Study Session discussion, with information disseminated and input solicited, through the project website ([shorelinecorridor.com](http://shorelinecorridor.com)) and the project e-mail notification list.

A third community workshop for the Corridor Study was held on October 16 to seek community input regarding the proposed conceptual plan for the Corridor. Approximately 30 people attended the meeting. A stakeholder workshop was also held on October 16, with approximately 25 North Bayshore business, property owner, and transportation agency representatives in attendance. Most attendees at the meetings indicated support of the proposed Corridor improvements. Some of the design suggestions for enhancing pedestrian and bicyclist protections received during the October 16 meetings have been incorporated into the final revisions to the proposed conceptual plan. A summary of public input received during the latest round of community outreach is provided in Attachment 1.

Corridor Study updates were also provided to the Bicycle/Pedestrian Advisory Committee (B/PAC) on May 20 and October 29.

### **Proposed Conceptual Shoreline Corridor Plan**

The preferred package of Corridor improvements have been developed to support the increased number of transit and bicycle commuters called for in the North Bayshore Precise Plan, providing multimodal mobility, safety, convenience, and urban design within the Shoreline Boulevard Corridor. Expected peak-period use (7:00 to 10:00 a.m. and 4:00 to 7:00 p.m.) of the Corridor based on those mode-shift targets includes an estimated 2,000 bicycle commuters and over 3,000 transit and shuttle users.

Figure 2 highlights the location and key components of the recommended package of Corridor improvements:

- Construction of a new bicycle/pedestrian bridge and connecting cycle track over U.S. Route 101.
- Enhancements to existing bicycle facilities on the U.S. Route 101 overpass.
- Improvements to the intersection at Shoreline Boulevard/Terra Bella Avenue, including a new scramble phase for bicyclists and pedestrians.
- New protected intersection features at the Shoreline Boulevard and Middlefield Road intersection.
- Construction of a center-running, reversible transit lane on Shoreline Boulevard from Middlefield Road to Plymouth Avenue.

- Installation of one-way cycle tracks on Shoreline Boulevard from Stierlin Road to Terra Bella Avenue, including a protected bicycle lane with vehicle access to the Buddhist Temple via the Stierlin Road slip lane.
- New protected intersection features at the Montecito Avenue and Shoreline Boulevard intersection.
- New bicycle lanes on Stierlin Road, with additional pedestrian and traffic calming features.
- Intersection improvements to enhance safety and accessibility at the Castro Street/Moffett Boulevard/Central Expressway intersection.
- Pedestrian and bicycle access improvements, plus loading and operational changes for shuttles, at the Mountain View Transit Center.

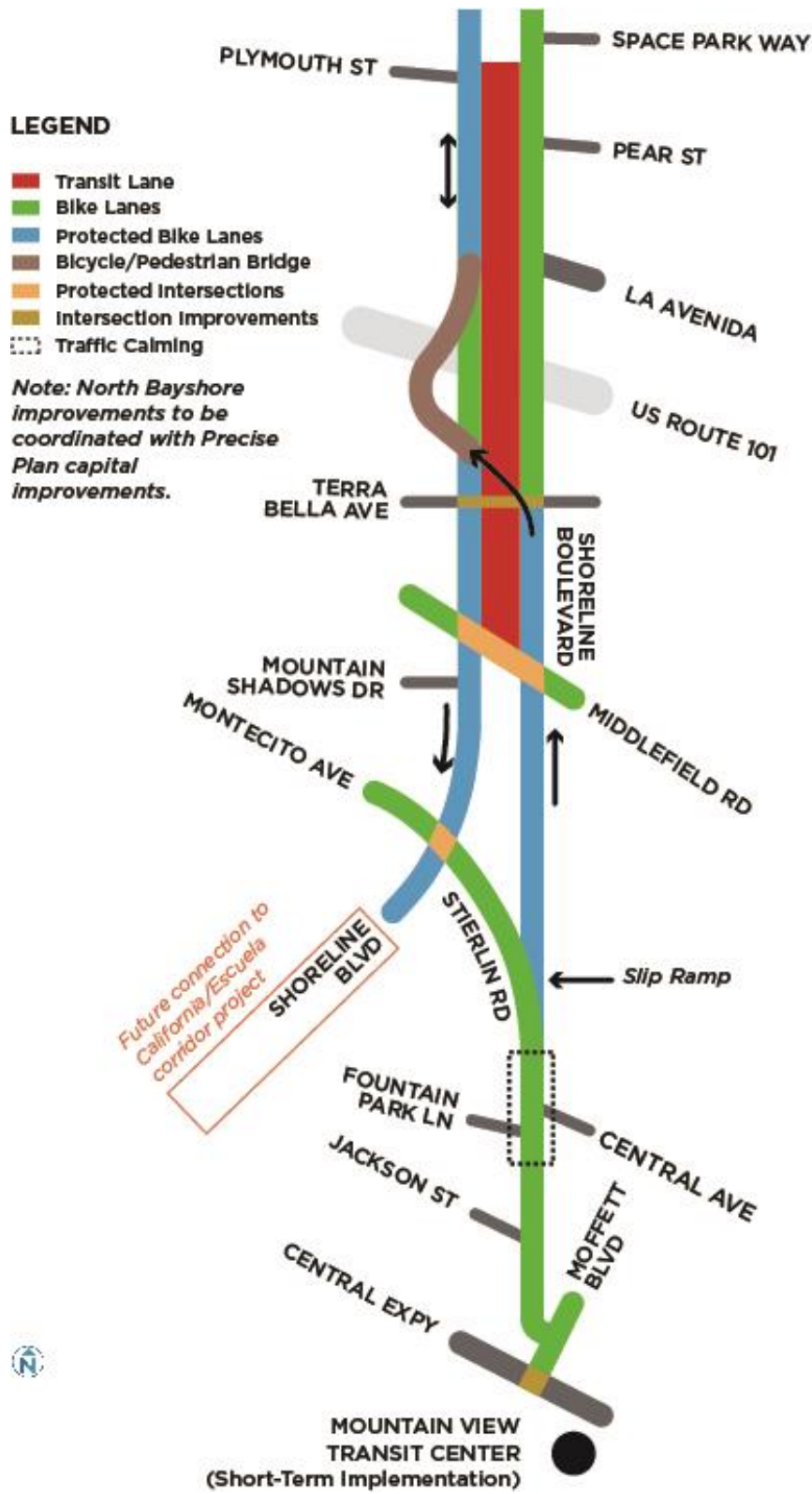


Figure 2 – Summary of Corridor Improvements



A discussion of key design elements and operational issues, along with a description of the proposed improvements, arranged by Corridor segment, is provided below.

### **Key Design and Operational Issues/Features**

Provided below are definitions and descriptions of the key design and operational improvements for the Corridor. The next section of the report details how and where these improvements will be installed/implemented along the Corridor.

### **Protected Bicycle Lanes (Cycle Tracks)**

The Corridor improvements include one-way (6.5') and two-way (13') protected bicycle lanes along Shoreline Boulevard. Adjacent to the bicycle lane in most locations will be a 6' buffer, providing physical separation and room for trees and landscaping. Figure 3 provides examples from other communities.



**Figure 3 – Examples of One-Way Cycle Tracks**

### **Protected Intersections**

Intersections can be especially challenging for bicyclists and pedestrians because of the number of potential conflict points. The recommended design at two intersections (Shoreline Boulevard at Middlefield Road and Shoreline Boulevard at Montecito Avenue) calls for a physical barrier all the way up to, and partially into, the intersection, creating a “protected” environment to separate bicycles from vehicles. Key components of the protected intersection design are illustrated in Figure 4 and include:

- Distinct crossing zones for bicyclists and pedestrians.

- High-visibility crosswalks and pavement markings to clearly define the route that should be taken through the intersection.
- Advance stop lines for bicyclists, which position them in front of motorists.
- Corner refuge islands to provide a protected space for bicyclists waiting to go straight and increasing visibility for right-turning drivers.
- A separate signal phase for bicycles and pedestrians, which allows bicyclists and pedestrians to get ahead of right-turning vehicles (requires “No Right Turn on Red” for motorists).



**Figure 4 – Protected Intersection Signal Phasing**

### **Driveways**

A key design challenge for protected bicycle lanes is the conflict point with vehicles at driveways. Key mitigations include providing high-visibility signage and pavement markings and raising the protected lane and adjacent sidewalk.



### Reversible Transit Lane

The reversible transit-only lane extends approximately three-fifths of a mile in the median of Shoreline Boulevard, from Middlefield Road north to Plymouth Street/Space Park Way. The single lane would operate northbound on weekday mornings and southbound in the afternoon. Operational elements include:

- **Dedicated transit signals** at Middlefield Road and Pear Avenue to facilitate transitions in and out of the transit lane.
- **Physical barriers** to prevent vehicles from entering into the lane. A minimum of 2' is required, but 5' landscaped buffers are preferred.
- **Pavement markings and signage** to designate access controls.

### Right-of-Way Impacts

The estimated right-of-way impacts to the Corridor are summarized in Figure 5. The right-of-way impacts are more significant north of Middlefield Road because this section includes both the proposed transit and protected bicycle lanes. South of Middlefield Road the impacts are more limited.

Street	From	To	Potential Right-of-Way Required	
			West Side	East Side
Stierlin Road	Washington Street	Wright Avenue	0' to 6'	0'
Stierlin Road	Wright Avenue	Slip Lane	0' to 6'	0' to 3'
Shoreline Boulevard	Montecito Avenue	Middlefield Road	1' to 7'	0' to 7'
Shoreline Boulevard	Middlefield Road	Terra Bella Avenue	12' to 17'	8' to 15'
Shoreline Boulevard	Terra Bella Avenue	U.S. Route 101 Ramp (South)	15' to 17'	0' to 18'
Shoreline Boulevard (Bridge)	U.S. Route 101 Ramp (South)	La Avenida	26'	0'
Shoreline Boulevard	La Avenida	Pear Avenue	4' to 35'	0' to 17'
Shoreline Boulevard	Pear Avenue	Plymouth Street (Existing)	16' to 21'	4' to 23'
Shoreline Boulevard	Plymouth Street	Space Park Way	17'	15'

**Figure 5 – Estimated Right-of-Way Impacts**

These requirements represent the maximum design, incorporating all proposed elements including the landscape buffers. In the first phase, the proposed design can be modified to reduce the right-of-way impacts. In particular, the landscape buffers can be reduced to a minimum needed for protection, but without landscaping. An initial phase of the transit lane, for example, could be implemented with less required right-of-way than the complete project. Actual right-of-way impacts will ultimately depend on the design and scope of the interim improvements.

### **Tree Impacts and Landscaping**

The center-running transit lane would remove approximately 80 existing median trees between Terra Bella Avenue and Space Park Way. Based on a preliminary assessment, it is believed that none of these trees are Heritage trees.

However, it is likely that there are some Heritage trees in the adjacent right-of-way along the Shoreline Corridor. An inventory by an arborist is currently under way. As the project proceeds, staff will work to modify the design to preserve identified Heritage trees to the greatest extent possible. Potential design modifications could include reducing landscape buffers or shifting sidewalk alignments.

The proposed Corridor design includes landscape buffer areas to replace the trees lost and create a tree canopy adjacent to the Shoreline Boulevard cycle track. Based on preliminary estimates, if the landscape buffer areas are fully developed, as many as 290 new trees could be planted. Tree replacement estimates are conceptual in nature at this time and would be refined during design.

### **Other Potential Design and Operations Elements**

- Pavement Markings and Signage—Utilize green pavement markings for bicycle lanes and the red pavement markings for transit lanes, with painted areas primarily located at entry and potential conflict areas.
- Lighting—Utilize a combination of existing “cobra-head” fixtures (20’ to 30’ in height) and pedestrian-scale fixtures, such as post-top (“acorn”) lights (typically 12’ to 15’).
- Stormwater Management—Consider opportunities for permeable paving to reduce stormwater runoff and bioretention facilities to collect and filter runoff.
- Transit and Shuttle Operating Plan—Transit improvements in the Corridor are designed to serve expanded transit service between the Transit Center and North

Bayshore, supporting planned mode-shift targets. This service would be provided by a combination of the Mountain View Transportation Management Association (TMA), individual employers, and VTA. New services would consolidate and expand current North Bayshore shuttle services to Caltrain and VTA light rail and add a base level of all-day service. Peak-period usage is estimated to exceed 3,000 riders and would require 100 to 150 transit and shuttle trips.

This plan for connecting (“last mile”) service is designed to accommodate increased rail ridership resulting from Caltrain electrification and other capacity improvements (e.g., longer trains) and expanded light rail service connecting to the future BART Milpitas station. It is expected that rail transit usage at the Mountain View Transit Center could double or triple in the next 5 to 10 years (based in part on Caltrain and VTA projections) assuming sufficient rail capacity is provided.

- Customer Information and Marketing—As service and ridership grows at the Transit Center and along the Corridor, it will be important to develop effective customer information, branding, and other marketing programs. One opportunity that could be pursued in cooperation with the TMA would be the development of a website and smart phone app tailored to transit and bicycle services in the Corridor. A good model for both transit service and customer information is the Stanford transit system at the Palo Caltrain station.

### **Description of Conceptual Shoreline Corridor Plan By Segment**

#### **Shoreline Boulevard – Space Park Way/Plymouth Street to La Avenida**

The segment of Shoreline Boulevard from Space Park Way to La Avenida includes a two-way cycle track and a reversible median transit lane. This segment falls within, and is coordinated with, the North Bayshore Precise Plan. The design of improvements in this area will be further refined based, in part, on future development proposals along this portion of Shoreline Boulevard.

Plymouth Street would serve as the northern terminus of the median transit lane. Southbound transit vehicles would enter the transit lane at this location, while northbound transit vehicles would exit the center transit lane at this point and transition to the through lanes on Shoreline Boulevard. Transit vehicle movements would be controlled by separate traffic signal phases. The transit lane will be separated from vehicle lanes with a 5' landscaped buffer.

At the Pear Avenue intersection, new bus stops would be constructed. Two options at the intersection have been identified for northbound left turn movements. One option would retain both of the existing left-turn pockets, while the second option would eliminate one of these left-turn pockets (potentially as an interim phase to implement the new bus lane). Existing peak-hour vehicle counts do not justify two left-turn lanes at this intersection, but future higher-density development may suggest greater demand for the two left turns.

A two-way protected bicycle facility (cycle track) would be implemented on the west side of Shoreline Boulevard to connect with the cycle track facilities planned as part of the North Bayshore Precise Plan to the north and transition to the new bicycle/pedestrian bridge over U.S. Route 101. Existing bicycle lanes would be maintained and enhanced to provide access to/from the existing bicycle lanes on the U.S. Route 101 overcrossing. The pedestrian realm would also be significantly improved with the installation of wider sidewalks, including a landscaping zone, consistent with the pedestrian improvements envisioned in the North Bayshore Precise Plan.

# MOUNTAIN VIEW SHORELINE CORRIDOR PLAN

## Space Park Way to La Avenida Street

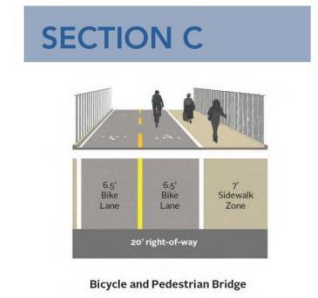
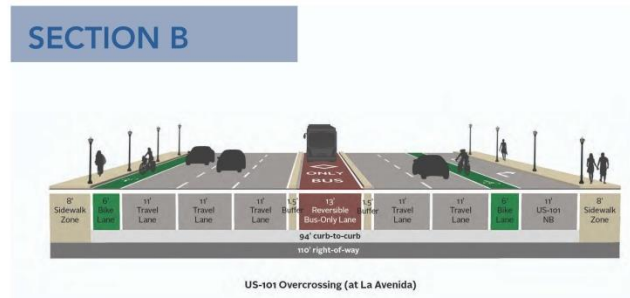
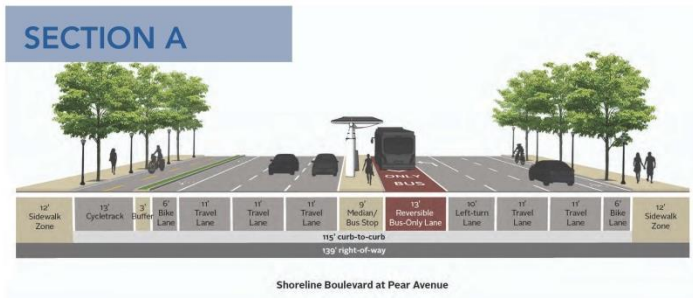


Figure 6 – Space Park Way to La Avenida



## **Shoreline Boulevard – La Avenida to Terra Bella Avenue**

Recommended improvements in this segment of Shoreline Boulevard include the center-running, reversible transit lane on the U.S. Route 101 overpass, requiring the removal of the existing median. The transit lane would be separated from traffic via raised buffers on both sides. The existing bicycle lanes on the U.S. Route 101 overpass would be retained and enhanced with high-visibility pavement and signage, especially at the ramp merge zones. The on-ramps to U.S. Route 101 would be realigned to tighten turning radii, reducing vehicle speeds, and mitigating potential conflicts with merging bicyclists.

The width of the travel lanes in this section (and throughout the Corridor) would be reduced to a maximum of 11' with the dual objective of reallocating roadway space to transit and bicycle improvements and reducing vehicle speeds.

The median transit lane would continue south of the U.S. Route 101 overcrossing, with additional physical separation provided in the form of two 5' buffers. Because the bus lane would require the removal of the existing median trees, the buffers provide space to mitigate tree loss by the planting of new trees and/or appropriate landscaping.

A design feature in this segment is the proposed removal of the left-turn lane that provides access to the on-ramp for southbound State Route 85 vehicles traveling north on Shoreline Boulevard. Elimination of the left-turn movement and turn pocket at the on-ramp entrance would provide the following benefits:

- Provides additional space to accommodate the center-running transit lane without significantly impacting parcels adjacent to Shoreline Boulevard.
- Improves both transit travel times and traffic level of service on Shoreline Boulevard, eliminating an underutilized signal phase at this location.

This access point to southbound State Route 85 at this location has limited utility and usage (e.g., turn volume) because it requires vehicles to head north on Shoreline Boulevard to eventually double back south.<sup>1</sup> With the proposed closure of this on-ramp, access to State Route 85 southbound would still be available via a more direct route on Middlefield Road and Moffett Boulevard, a short distance from the existing Shoreline Boulevard on-ramp. Closure of this turn lane would not affect access to U.S. Route 101 or access to State Route 85 from the North Bayshore.

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<sup>1</sup> Existing traffic counts indicate that approximately 75 vehicles are making this left turn during the morning and afternoon peak hours.

Existing bicycle lanes on Shoreline Boulevard would be maintained and enhanced. As discussed in greater detail below, a two-way cycle track is provided on the west side of Shoreline Boulevard, north of Terra Bella Avenue, providing a connection to a new pedestrian/bicycle bridge over U.S. Route 101.

# MOUNTAIN VIEW SHORELINE CORRIDOR PLAN

## Highway 101 to Terra Bella Avenue



### SECTION D



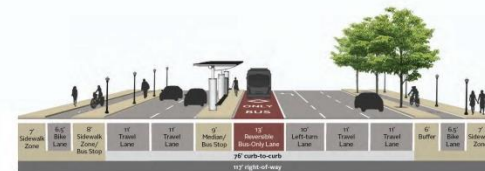
US-101 Overcrossing

### SECTION E



Shoreline Boulevard at 101 Overcrossing (Southside)

### SECTION F



Shoreline Boulevard at Terra Bella Avenue

Figure 7 – Highway 101 to Terra Bella Avenue

## U.S. Route 101 Bicycle/Pedestrian Bridge

To remove bicyclists and pedestrians from the heavy traffic and ramp merging conflicts on the existing Shoreline Boulevard interchange, a separate bicycle/pedestrian bridge is proposed across U.S. Route 101. The bridge is envisioned as a clear span and would provide two 6.5' lanes for bicycles and a 7' lane for pedestrians (20' total width).

The bridge would transition from a two-way cycle track on the west side of Shoreline Boulevard (beginning north of Terra Bella Avenue) and follow the southbound off-ramp from U.S. Route 101. The bridge would ramp up shortly after it turns to the west away from Shoreline Boulevard. It would then turn north and the alignment would straighten as it crosses over U.S. Route 101.

On the north side of U.S. Route 101, the bridge would touch down in existing Caltrans property just to the west of U.S. Route 101 northbound on-ramp. The bridge would ramp down on the west side of Shoreline and then transition into the two-way cycle track proposed to connect with other improvements identified in the North Bayshore Precise Plan (described above).



Figure 8 – Bicycle/Pedestrian Bridge Examples

## Shoreline Boulevard – Terra Bella Avenue to Middlefield Road

The Shoreline Boulevard/Terra Bella Avenue intersection will provide the transition from one-way protected bicycle lanes to the south and the two-way cycle track connecting to the new bicycle/pedestrian bridge. This intersection would require signal modification to implement a scramble phase for pedestrians and bicyclists. This phase would stop all vehicle movements and facilitate a diagonal crossing for

northbound bicyclists to the cycle track and bridge. The Terra Bella Avenue intersection would also include new stops to serve the reversible transit lane.

The intersection maintains existing left-turn pockets, which will require that the transit lane buffer be eliminated on the north and south intersection approaches. The median transit lane and buffers would continue south of Terra Bella Avenue to Middlefield Road. To accommodate the transit lane, the two-way left turn lane will need to be eliminated for this block of Shoreline, requiring vehicles to make U-turns at either Terra Bella Avenue or Middlefield Road to access the other side of Shoreline Boulevard.

South of Terra Bella Avenue, one-way protected bicycle lanes would be implemented on both sides of Shoreline Boulevard. A 6' buffer would separate bicycle lanes from vehicle lanes and provide adequate room for trees or low-profile landscaping. This section, if the landscaped buffers were fully developed, would have the most significant right-of-way impacts. However, as discussed above, there are design adjustments that could help mitigate those impacts.



# MOUNTAIN VIEW SHORELINE CORRIDOR PLAN

## Shoreline Boulevard at Middlefield Road

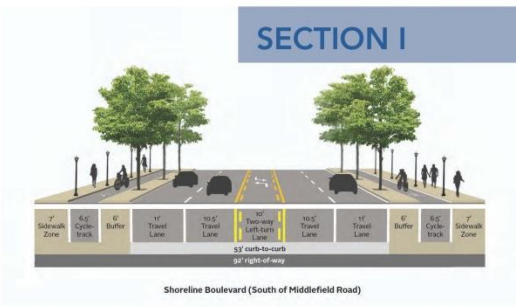
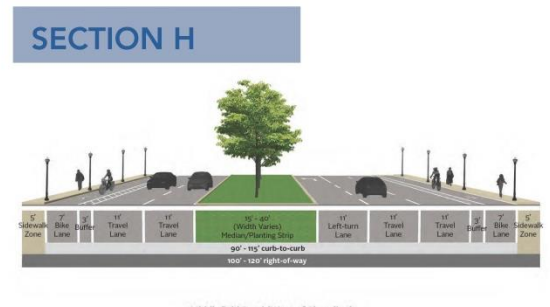
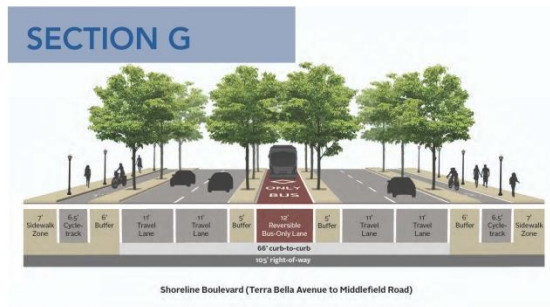
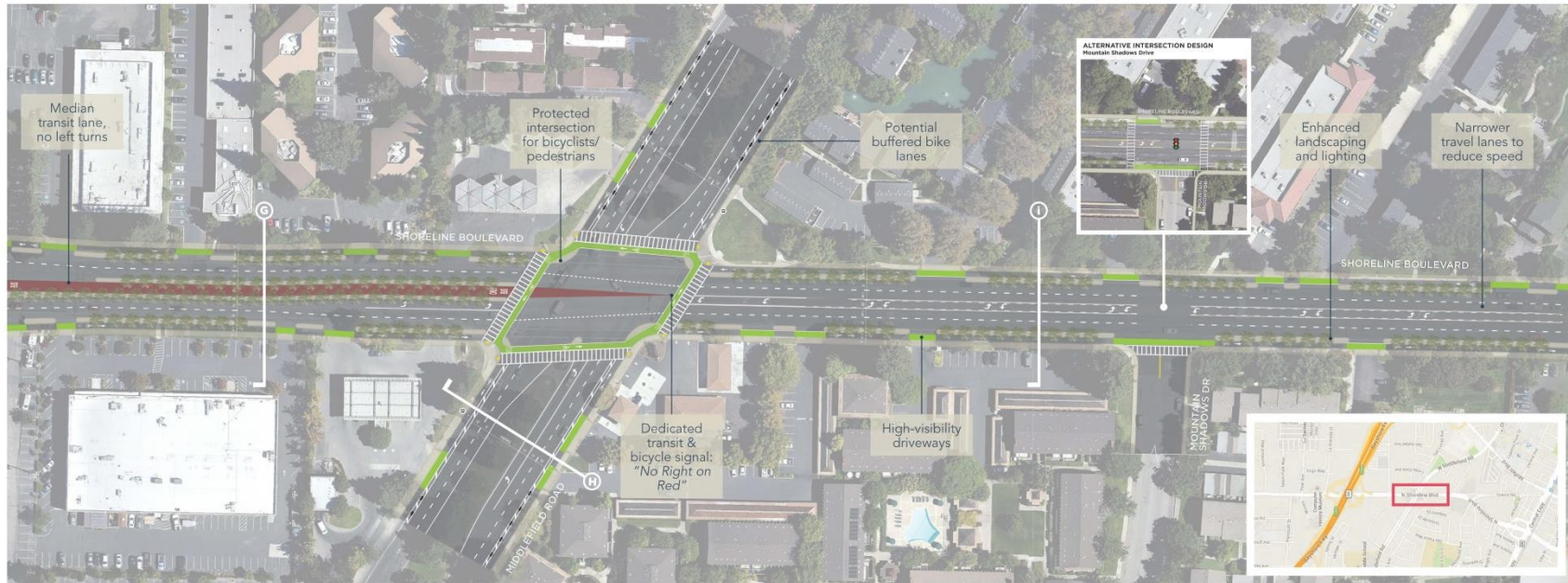


Figure 9 – Shoreline Boulevard at Middlefield Road

## **Shoreline Boulevard – Middlefield Road to Stierlin Road**

The Shoreline Boulevard/Middlefield Road intersection would be transformed to offer enhanced protections for bicyclists and pedestrians. The intersection is described in more detail above. Bicycles and pedestrians would travel through the intersection on separate traffic signal phases and vehicles would be prohibited from turning right on a red light.

Middlefield Road would be the southern terminus of the reversible transit lane. Northbound transit vehicles would enter the lane at this location from the left-most through lane, while southbound transit vehicles would exit the center lane here. A separate traffic signal phase will be used to safely facilitate these movements in this intersection.

To accommodate the space needed for both the transit lane and the cycle tracks, additional right-of-way will be required at the Shoreline Boulevard/Middlefield Road intersection. In particular, there will likely be impacts to businesses at this intersection requiring reconstruction of the frontage and site improvements, and potentially affecting driveways, but retaining adequate access. Additional engineering/design work, as well as dialogue with the impacted property owners, will be required before the final design of the intersection improvements and required right-of-way can be determined.

South of Middlefield Road, the one-way protected bicycle lanes would continue all the way to Stierlin Road/Montecito Avenue with similar design elements as north of Middlefield Road. The existing center left-turn lane would be preserved, as well as access to existing driveways.

Proposed improvements in this segment of Shoreline Boulevard also include the option of installing an additional signalized crossing for pedestrians. The distance between Stierlin Road/Montecito Avenue and Middlefield Road intersections is more than one-quarter mile and there are currently no marked pedestrian crossings. Pedestrians regularly jaywalk across Shoreline Boulevard to reach the Safeway store and other destinations.

To address this concern, three potential crossing options were developed:

- A fully signalized intersection at Mountain Shadows Drive.
- A fully signalized intersection near the Safeway store and the Buddhist Temple.
- A pedestrian-activated crossing near the Safeway store.

Based on a traffic study of an additional signal, service levels would not be impeded. Council input regarding these options is requested so that they can be further evaluated, and a preferred option selected, in next phase of design and engineering.

### **Middlefield Road**

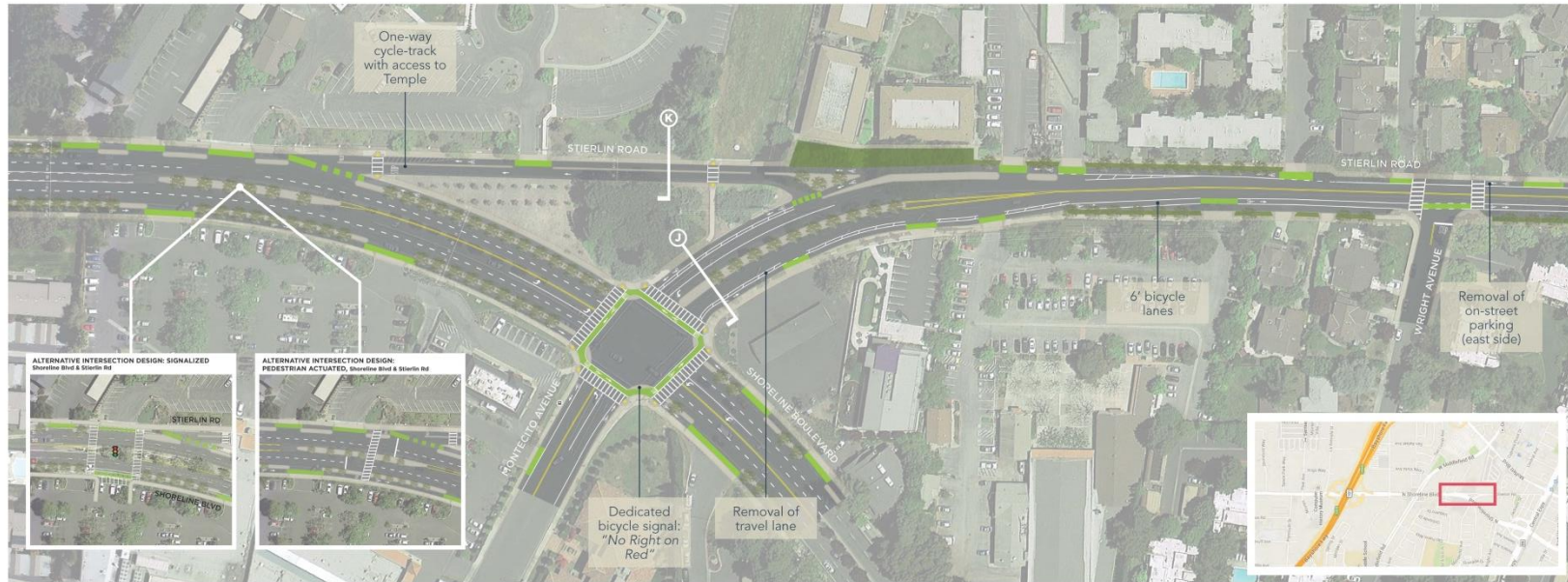
Middlefield Road's existing Class II bicycle lanes are an important link in the City's bicycle network, particularly because they offer a direct connection to and from the Permanente Creek Trail – a crucial access point into North Bayshore.

Middlefield Road itself was not a primary focus of the Corridor Study, but some preliminary concepts for bicycle improvements on this street have been developed as a potential interim phase to improve bicycle connections into North Bayshore. Section H on Figure 9 highlights a potential near-term improvement to Middlefield Road that would reduce travel lane widths and allow an expansion of the existing bicycle lanes to 7' and the striping of a 3' buffer. The Bicycle Transportation Plan update will more comprehensively evaluate potential improvements to Middlefield Road.

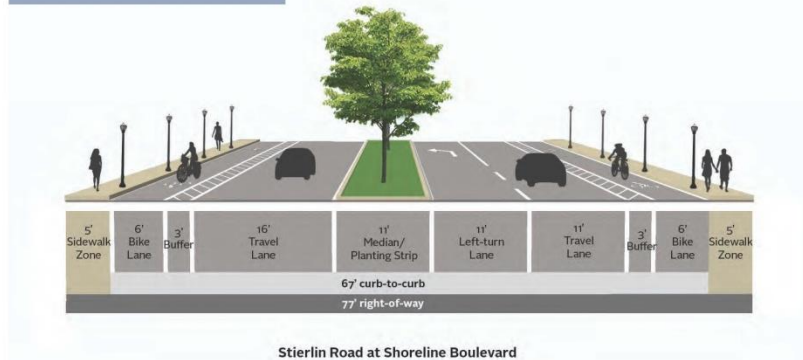


# MOUNTAIN VIEW SHORELINE CORRIDOR PLAN

## Stierlin Road / Montecito Avenue / Shoreline Boulevard



### SECTION J



### SECTION K



Figure 10 – Stierlin Road/Montecito Avenue/Shoreline Boulevard

## **Stierlin Road and the Stierlin Road/Montecito Avenue/Shoreline Boulevard Intersection**

In this Corridor segment, the Stierlin Road slip lane would be reconfigured to provide northbound bicyclists a connection from Stierlin Road to Shoreline Boulevard via a one-way protected bicycle lane. Access to the Buddhist Temple from the slip lane would still be available via an 11' travel lane, which would be realigned at the southern end to improve bicycle safety. The existing driveway to the Temple, as well as access to the Hetch Hetchy right-of-way, would be maintained. Access for emergency vehicles and light trucks into the Temple property would not be impacted by the changes.

The Stierlin Road/Montecito Avenue/Shoreline Boulevard intersection would be modified to improve conditions for bicyclists and pedestrians. Similar to Middlefield Road, this intersection would offer "protected" treatments for bicyclists and pedestrians and facilitate the connection for southbound bicyclists from the one-way protected bicycle lane on Shoreline Boulevard to Stierlin Road.

Further south, Class II bicycle lanes would be implemented on Stierlin Road, offering a direct connection between Shoreline Boulevard and the Downtown Transit Center. The new bicycle lanes would require the removal of existing on-street parking on the east side of Stierlin Road in order to accommodate the lanes within the existing right-of-way. The Stierlin Road bicycle lanes would transition to the Central Expressway/Moffett Boulevard/Castro Street intersection via the bicycle and pedestrian paseo to be built as part of the 100 Moffett Boulevard development.

Traffic calming elements would also be installed on Stierlin Road to reduce vehicle speeds and improve safety for bicyclists and pedestrians. These elements include:

- Reducing the posted speed limit to 25 miles per hour (from 30 miles per hour).
- Reducing travel lane widths to 10'.
- Installing a raised intersection at Fountain Park Lane/Central Avenue.
- Installing curb bulb-outs and high-visibility crosswalks at all intersections to reduce pedestrian crossing distances.

As mentioned briefly above, the proposed bicycle lanes on Stierlin Road would require the removal of on-street parking on the east side of the street in order to provide adequate room for the bicycle lanes within the existing curb-to-curb right-of-way. To



better understand the potential impacts to the neighborhood of eliminating this on-street parking, a study was conducted to inventory the existing number of parking spaces and assess existing parking occupancy rates. Parking counts were conducted on two Thursdays and two Sundays in summer and fall of 2014. Key findings from the study include:

- Stierlin Road has approximately 110 on-street spaces—47 on the west side and 63 on the east side. Approximately 21 spaces on Stierlin Road are already approved for removal as part of the 100 Moffett Boulevard development. The proposed Shoreline Corridor improvements will require the removal of the remaining spaces on the east side to install the proposed new bicycle lanes.
- Peak occupancy of on-street spaces on Thursday was 26 percent and 33 percent on Sunday. At peak demand, a maximum of 16 vehicles were parked on the east side of Stierlin Road.
- Peak occupancy for the entire study area for both on- and off-street spaces was 33 percent on Thursday and 41 percent on Sunday.
- Based on the observed parking conditions, there is sufficient parking available on the west side of Stierlin Road, on adjacent blocks, and in off-street lots to accommodate demand in the neighborhood even with the elimination of parking on the east side of Stierlin Road.

# MOUNTAIN VIEW SHORELINE CORRIDOR PLAN

## Stierlin Road to Central Expy / Moffett Blvd / Castro Street

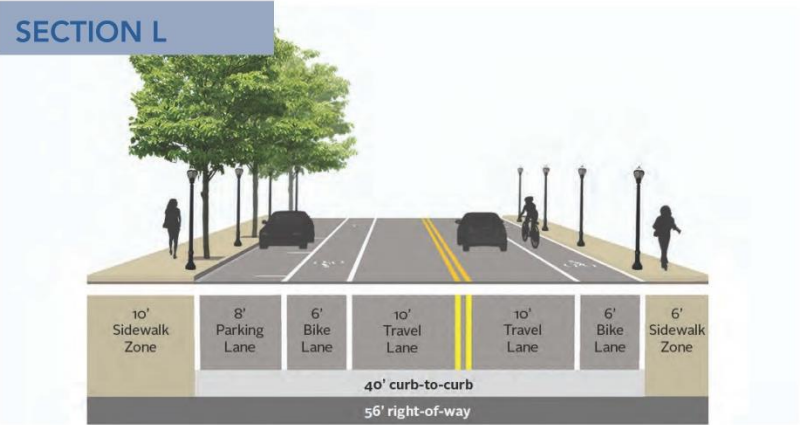


Figure 11 – Stierlin Road to Central Expressway/Moffett Boulevard/Castro Street

## Castro Street/Moffett Boulevard/Central Expressway Intersection

The intersection of Castro Street/Moffett Boulevard/Central Expressway is an important link in the Corridor for bicyclists and pedestrians, yet it also poses a significant barrier to travel. The complexity of the movements at the intersection, high vehicle volumes, and need to safely accommodate the passage of Caltrain trains all contribute to constrain the accommodation of bicyclists and pedestrians. It is already a heavily utilized intersection, with roughly 400 pedestrian and bicycle crossings in the peak hour, the highest number in the County's expressway system.

Furthermore, the anticipated increases in transit and shuttle activity at the Transit Center, new nearby residential development, and plans for high-quality bicycle infrastructure highlight the need for a comprehensive solution, potentially including a future grade separation at this intersection. Recognizing the need for near-term action, the Corridor Study proposes several interim strategies for improving current conditions (shown in Figure 12) as longer-term, more comprehensive solutions are developed. The near-term strategies include:

- Reconfigure Northbound Castro Street—It is proposed that northbound Castro Street, between the train tracks and Central Expressway, be reconfigured to eliminate the left-turn lanes onto westbound Central Expressway. The new alignment would allow for two through lanes, a bicycle lane, and a designated right-turn lane onto eastbound Central Expressway (currently estimated at 193 in the morning peak hour and 138 in the evening peak hour). The existing lanes would likely need to be shifted to ensure proper alignment with the receiving lanes on northbound Moffett Boulevard. Motorists would still be able to access westbound Central Expressway from Castro Street by using east-west streets to access Shoreline Boulevard.

This reconfiguration would provide the following benefits:

- Creation of a designated bike lane on Castro Street with a separate lane for right-turning vehicles would reduce bicycle and vehicle conflicts.
- Without the left-turn movement, the signal timing can be adjusted to provide an additional phase for pedestrian crossings of Central Expressway.
- Removal of the left-turn movement would help clear the intersection more quickly during the approach of Caltrain trains.

These proposed intersection changes will require additional study and discussion with the County and other stakeholders before any decisions regarding implementation can occur.

- Closure of Free-Running Right-Turn Lanes – At two corners of the intersection, the sidewalk would be extended and additional pedestrian refuge space would be provided, while right-turn pockets would allow for adequate vehicle storage. By eliminating the free right-turn lanes, vehicle conflicts with pedestrians and bicycles would be reduced and turning movements would occur at lower speeds. A similar design is included in the plans for the 100 Moffett Boulevard development.
- Signal Phasing – While eliminating the left-turn movement on northbound Castro Street will add pedestrian crossing time, additional crossing time will likely be needed as pedestrian and bicycle usage increases. It is recommended that the City continue to work with the County to evaluate how more time can be allocated to pedestrians and bicyclists to cross Central Expressway.
- High-Visibility Crosswalks and Bicycle Pavement Markings – High-visibility crosswalks (also known as ladder or zebra crosswalks) are recommended for installation on all legs of the intersection to increase the visibility of pedestrians. The crosswalks would also be moved back from the intersection to provide for bicycle space.

It is further recommended that pavement markings and signage be installed to provide space and visibility for bicyclists. These provisions include: *Bicycle Boxes* (providing a designated area at the head of a traffic lane where bicyclists wait for a green light); *Two-Stage Turns* (providing bicyclists with a designated area for left-turn movement via two separate through movements with the corresponding green light); and *Intersection Crossing Markings* (to clearly indicate the safe path of travel for a bicyclist through an intersection and into the receiving bicycle lane).

- Transit Stop on Central Expressway (Medium- to Long-Term) – The plan for this intersection also includes a potential new transit stop on the north side of Central Expressway, just west of Moffett Boulevard. This transit stop would accommodate additional shuttle and bus service, particularly proposed service to/from North Bayshore. Because this stop would further increase the number of pedestrians crossing Central Expressway, it is proposed as a *medium- to long-term recommendation*, likely implemented in conjunction with a future grade separation. Other strategies for shuttle stops on Central Expressway should continue to be explored with the County.



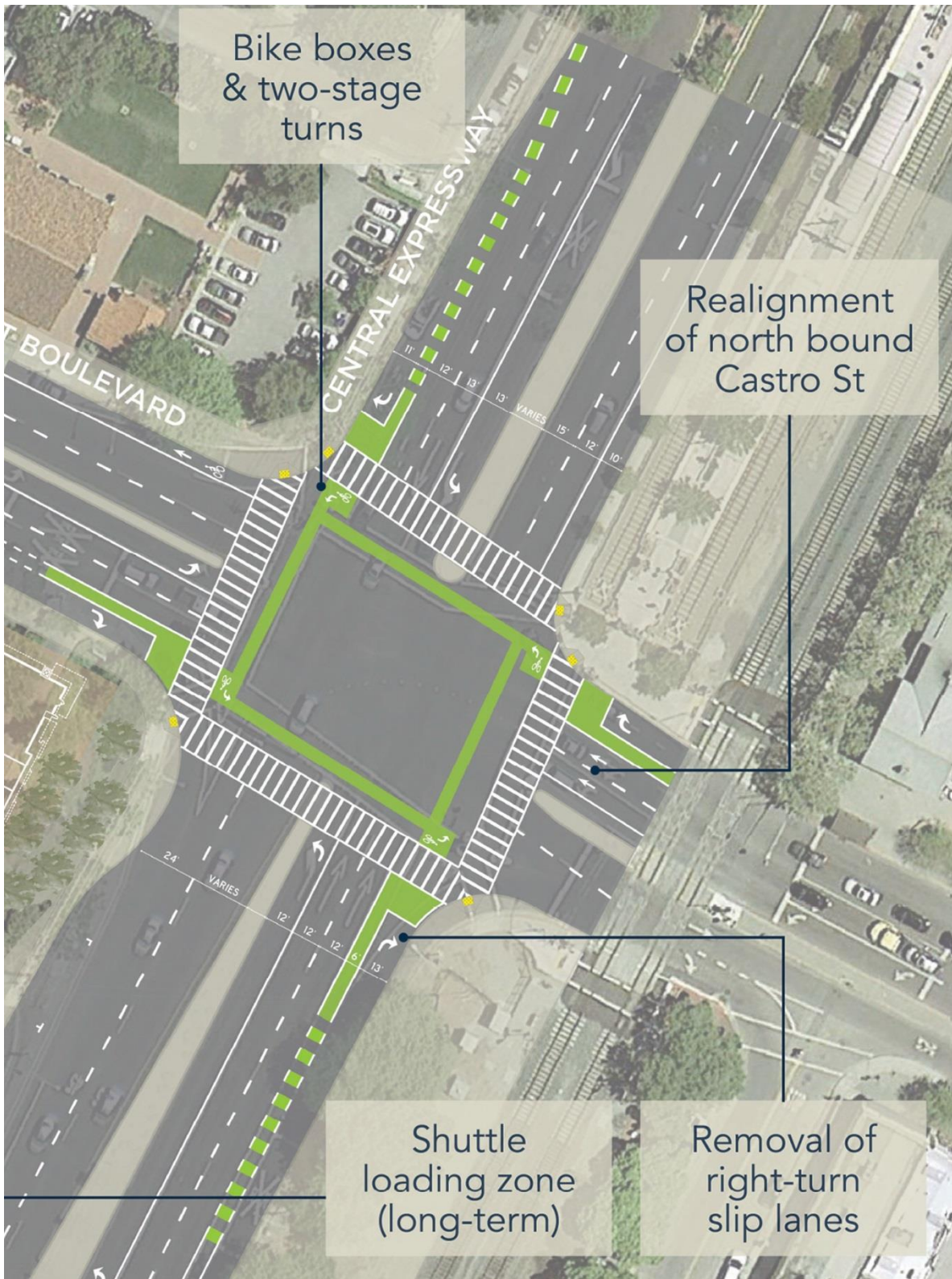


Figure 12 – Central Expressway Intersection

### Transit Center/Caltrain Station – Near-Term Improvements

The Mountain View Transit Center (Transit Center) is a key local and regional intermodal facility. The Transit Center serves Caltrain commuter rail, VTA light rail and buses, public and private shuttle services, taxi service, bicycle parking, and a Bay Area Bike Share station.

In recent years, the importance of the Transit Center has grown substantially. It is the third most utilized station in the Caltrain system, largely because it is the closest Baby Bullet station to many Silicon Valley employers, and has become a major and growing regional node for employer shuttles. A major current concern is shuttle vehicle congestion, particularly during the morning peak (7:00 a.m. to 10:00 a.m.) when there are more than 100 buses and shuttles utilizing the Transit Center. Another key issue today is the adequacy of bicycle storage and access.

Given these issues, the Corridor Study proposes a package of short-term recommendations regarding the operations and management of the Transit Center. These include pedestrian circulation improvements, additional private shuttle loading locations, and station amenities as shown in Figure 13 and summarized below:

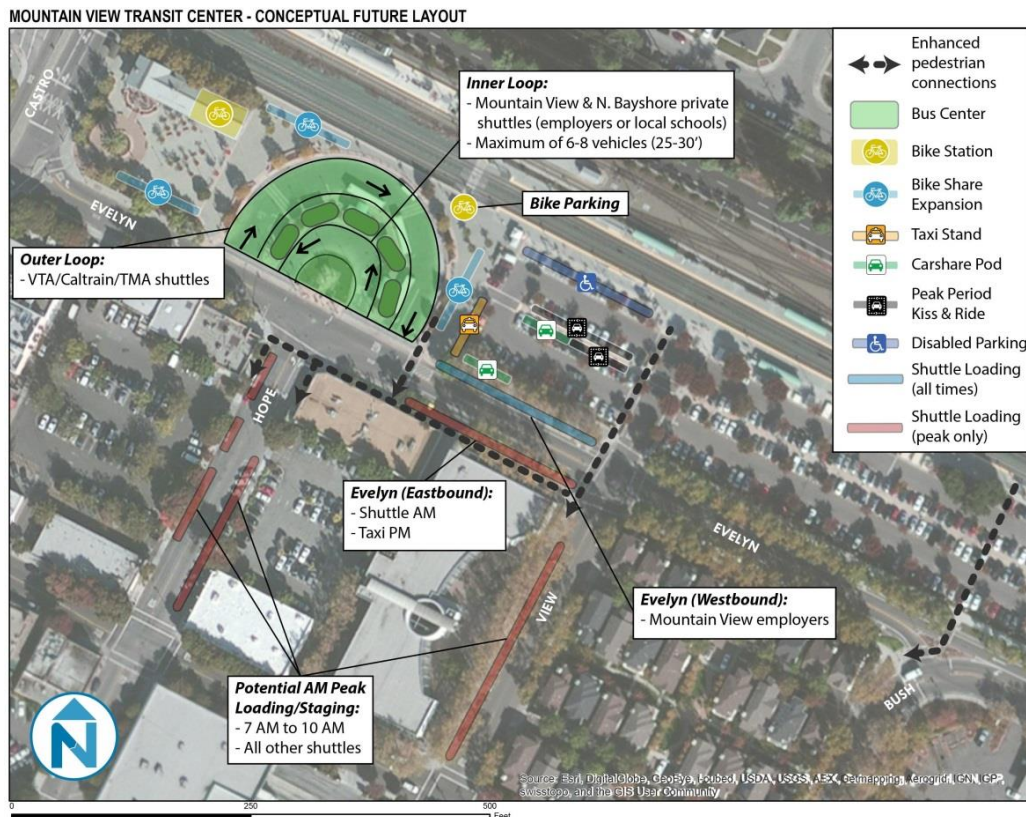


Figure 13 – Mountain View Transit Center



- Shuttle Operations and Loading

The following short-term changes are recommended to improve current shuttle operations and loading and to proactively manage ongoing growth in shuttle activity:

- **Outer Loop**—At all times of the day, the Outer Loop will only be open to VTA buses, existing Caltrain public shuttles, Mountain View Community Shuttles, and future Mountain View TMA shuttles.
- **Inner Loop**—In the morning, only Mountain View employers, along with student loading for local schools, will be eligible to use the inner circle with priority for public and TMA shuttles. During the afternoon commute period, all private shuttles would be eligible to use the inner loop.
- **Evelyn Avenue**—Non-Mountain View employers will be eligible to use Evelyn Avenue westbound from View Street. This space should be able to continue to accommodate Microsoft (currently utilizing this space), NASA, and others. Eastbound Evelyn Avenue from Hope to View Streets would continue to be used for shuttle bus operations in the morning peak period, reverting to taxi operations after 10:00 a.m.
- **Hope and View Streets**—Between Evelyn Avenue and Villa Street, both sides of Hope Street and the west side of View Street should be reserved for shuttle bus operations in the weekday morning peak period (7:00 a.m. to 10:00 a.m.). Regular parking provisions would apply at other times. The new loading area could be used by a variety of employer shuttles, including Apple, Hewlett Packard, Abbott, VM Ware, and Netflix. This change would affect 24 parking spaces on Hope Street and 14 spaces on View Street.

Based on measured demand on Hope and View Streets in the morning, parking impacts are expected to be minimal. Parking counts were taken on September 30 and October 1, 2014, and determined that parking occupancies on Hope and View Streets do not exceed 52 percent, and the off-street lots do not exceed 45 percent. In short, there is adequate parking supply in the immediate area to accommodate the existing morning parking demand on these blocks.

- **Active Management and Permitting**—Given the increasing complexity of shuttle operations at the Transit Center, the City, VTA, and the TMA should

consider “active” management of the area, with a staffed position to monitor and enforce loading operations during peak periods. All shuttles should also be permitted, potentially through a program administered by VTA.

- Bicycle and Pedestrian Access

The following short-term changes would improve bicycle and pedestrian access:

- Implement high-visibility crosswalks on Evelyn Avenue at Hope, View, and Bush Streets.
- Provide new pedestrian access through the existing fence on Evelyn Avenue at Bush Street.
- Enhance bicycle connections to the Stevens Creek Trail, including improved wayfinding and potential enhancement of the existing bicycle lanes on Evelyn Avenue.

- Station Amenities and Operation

The following short-term changes would improve station operations:

- Expand the number of Bike Share pods near the bus loading area, depending on the timing and scope of expansion of Bay Area Bike Share Program.
- Development of a staffed bicycle station, including secure bicycle parking, bicycle repairs, and associated retail, at the existing station building or at a new location. Details regarding how this service/amenity might operate and be funded at the Transit Center will need to be explored further.
- Additional bicycle racks and e-bike lockers adjacent to the station platforms.
- Reallocate a limited number of existing parking spaces to a peak-period “Kiss-n-Ride” area in order to better accommodate passenger drop-off and loading and improve pedestrian safety in the parking lot.
- Provide car-share parking in the Transit Center parking lot.
- Improve signage, wayfinding, and real-time transit information.

### **Transit Center/Caltrain Station Master Plan**

The Corridor Study undertook a preliminary assessment of mid- to long-term improvements that would help improve station access and transit capacity. These concepts included a potential elevated walkway and concourse over the station and Central Expressway and expansion of the Transit Center. The improvements would be costly and may not effectively integrate with other future station upgrades. Additionally, feedback from Caltrain and station users indicated that underpasses rather than elevated structures would better serve pedestrians and bicyclists.

As a result of this initial assessment, it is recommended that a comprehensive Master Plan for the Caltrain Station and Transit Center be developed. The need for a Master Plan is particularly timely given a number of issues that will affect the operation of the station in the near future. These include:

- Increased rail transit service. Caltrain is planning up to a 40 percent peak-period ridership increase in the next 5 to 10 years with the Electrification Project and VTA expects a 100 percent light rail ridership increase with the start of BART Express Service. Additionally, California High-Speed Rail service along the Peninsula Corridor could add as many as eight (nonstop) trains per hour within the next 10 to 15 years. Implications of expanded service include an increase in pedestrian, bicycle, and rail conflicts and greater vehicle delays at the Castro Street crossing.
- Increased rail transit ridership in response to rising demand combined with City mode-shift goals for new development. Caltrain ridership could more than double from 4,000 (today) to more than 10,000 passengers and VTA Light Rail ridership could also increase substantially. Implications (already being felt) include platform congestion to safely accommodate demand, increased numbers of pedestrians and bicycles crossing tracks and nearby streets, and increased parking demand at the station and in neighborhoods.
- Increased traffic volumes and congestion at Central Expressway and Castro Street/Moffett Boulevard resulting in greater traffic and congestion and increased delays and conflicts for pedestrians and bicyclists.
- Increased bicycle demand and activity, requiring greatly expanded bicycle storage, bike-sharing, and other bicycle facilities.
- Increased demand for connecting shuttles and transit, creating the need to expand boarding areas at the Transit Center.

- Opportunities for commercial or housing development on portions of the surface parking lot, with parking consolidated in a structure.

Potential alternatives for improving station capacity (e.g., boarding platforms), station access, parking and vehicle operation, and other issues are inter-related and will require a comprehensive evaluation to determine the best plan. Concepts for the station and Transit Center that could be addressed in a comprehensive plan include the following:

- Grade separation of Castro Street at the Caltrain tracks and/or Central Expressway, with separate pedestrian/bicycle undercrossing.
- Grade separation of pedestrian/bicycle movements (over/under) between Caltrain platforms, light rail platforms, and Transit Center, and across Central Expressway.
- Caltrain platform improvements (e.g., longer, wider, level boarding, upgraded shelters).
- An expanded or new Transit Center to handle increases in shuttle and transit services.
- Improved pedestrian/bicycle access to platforms and the Transit Center.
- Increased capacity of bicycle facilities (e.g., bike-sharing, bicycle station, bicycle parking).
- A parking structure to accommodate existing or expanded parking, a plan for potential housing and/or employment development on portion of current parking area.
- Other elements (e.g., car sharing, electric vehicle charging, public art, gateway elements, etc.).

While details of the potential scope for a comprehensive Transit Center master planning effort will need to be developed, staff estimates that the plan could be completed in 12 to 18 months. This effort will require a significant amount of coordination by and between the City, VTA, the County, Caltrain, California High-Speed Rail, and other stakeholders. Development of a plan in that time frame would be particularly timely in terms of upcoming funding programs such as Caltrain and California High-Speed Rail capital improvements, cap and trade funding, and a possible 2016 Santa Clara County sales tax measure for transportation.

Key products of the Master Plan could include a site plan defining the evolution of the Transit Center over time, a description of transit facilities needed to support the expected service and ridership growth, and recommendations regarding Castro Street and/or Central Expressway grade separation options.

**Implementation Program**

**Cost Estimates**

Preliminary “planning” level cost estimates have been developed for the complete package of improvements, as well as initial phases as discussed below. The estimated cost for all proposed Shoreline Corridor improvements is \$38.5 million, summarized below. This cost estimate does not specifically include right-of-way costs, but does include a 40 percent contingency. The cost estimates below assume that an initial phase of the transit lane (estimated at \$4.95 million) would be developed without landscaping buffers. The buffers would be added when the full cycle track project is implemented.

<b>Project Segment</b>	<b>Estimated Cost (2014 Dollars)</b>
Transit Center Short-Term Improvements	\$ 326,000
Central Expressway/Moffett Boulevard/Castro Street Intersection	1,630,000
Stierlin Road Bicycle Lanes and Traffic Calming	1,200,000
Shoreline Cycle Track – Stierlin Road to Middlefield Road	6,120,000
Shoreline Boulevard/Middlefield Road Intersection	1,730,000
Shoreline Cycle Track – Middlefield Road to Caltrans Right-of-Way	6,440,000
Improvements in Caltrans Right-of-Way:	
Bicycle/Pedestrian Bridge	13,530,000
Other Improvements	2,550,000
Median Bus Lane (Initial Phase)	2,280,000
Median Bus Lane (Initial Phase Outside Caltrans Right-of-Way)	2,670,000
Shoreline Boulevard Improvements (Between the Bicycle/Pedestrian Bridge and Plymouth Street/Space Park Way)	2,610,000*
<b>Total</b>	<b>\$41,086,000</b>

\* Cost estimates for these and other improvements located further north along the Corridor are included in the North Bayshore Precise Plan transportation improvement program.



## Phasing Plan

A phased implementation strategy is proposed for the Corridor improvements, recognizing that some elements will require a longer time frame for design, Caltrans coordination, and right-of-way acquisition. Near-term improvements that could be prioritized for early implementation (estimated in the next three years) include:

1. An initial phase of the reversible bus lane.
2. Development of the Middlefield Road and Shoreline Boulevard “protected intersection.”
3. Bicycle lane enhancements (i.e., paint, striping changes) on Shoreline Boulevard (across U.S. Route 101) and Middlefield Road.
4. Stierlin Road bicycle lanes and traffic calming timed with completion of the 100 Moffett Boulevard development.
5. Improvements to the Central Expressway/Castro Street/Moffett Boulevard intersection.
6. Expansion of shuttle loading to Hope and View Streets in the morning peak period and other Transit Center upgrades.

Project development is expected to proceed for other Corridor elements with completion occurring in stages beyond the next three years. Further details regarding the phasing plan are provided in Figure 14 (below).

Segment	Proposed Improvements	Short-Term (0 to 3 Years)	Medium-Term (3 to 6 Years)
<b>Shoreline Boulevard</b>	<b>Shoreline Boulevard Transit Lane (Initial Phase).</b> Includes removal and paving of median between Middlefield Road and Plymouth Street or Space Park Way, transit priority signalization and the closure of State Route 85 from northbound Shoreline Boulevard. Transit stops and landscape buffers would be deferred.	X	
	<b>Shoreline Boulevard Interim Bicycle Lane Enhancements (including U.S. Route 101 Overcrossing).</b> Includes restriping to widen bicycle lanes and pavement markings/signage at key locations.	X	
	<b>Shoreline Boulevard – Complete Protected Bicycle Lanes.</b> Includes landscaped buffers, driveway treatments, pavement markings, and signage (Stierlin Road to Plymouth Street).		X
	<b>Shoreline Boulevard – Complete Transit Lane.</b> Includes landscaped buffers (Middlefield Road to Plymouth Street/Space Park Way) and transit stops at Terra Bella Avenue and Pear Avenue.		X
	<b>Shoreline Boulevard/Middlefield Road Protected Intersection Improvements.</b>	X	
	<b>Shoreline Boulevard/Stierlin Road/Montecito Avenue Protected Intersection Improvements.</b>		X
	<b>Shoreline Boulevard/Terra Bella Avenue Intersection Improvements.</b>		X
<b>Bicycle/Pedestrian Bridge</b>	<b>Bicycle/Pedestrian Bridge.</b> Includes two-way protected bicycle lanes on west side of Shoreline Boulevard.		X

Segment	Proposed Improvements	Short-Term (0 to 3 Years)	Medium-Term (3 to 6 Years)
Middlefield Road	<b>Middlefield Road Bicycle Lane Enhancements.</b> Includes restriping to widen bicycle lanes, and pavement markings/signage at key locations.	X	
Stierlin Road	<b>Stierlin Road Slip Lane.</b> Includes vehicle travel lane, northbound protected bicycle lane, and driveway treatments.	X	
	<b>Stierlin Road.</b> Includes bicycle lanes and traffic calming measures.	X	
Castro Street/Moffett Boulevard/Central Expressway	<b>Castro Street/Moffett Boulevard/Central Expressway Intersection Improvements.</b> Includes reconfiguration of Castro Street approach plus signal timing changes, bike pavement markings, high-visibility crosswalks, and corner bulb-outs.	X	
Transit Center	<b>Transit Center Shuttle Management.</b> Includes enhanced management of bus center and new loading zones on Hope and/or View Streets.	X	
	<b>Transit Center Access Improvements.</b> Includes new pedestrian access points, high-visibility crosswalks, additional bicycle parking and bicycle share pods, Kiss-n-Ride area improvements.	X	
	<b>Transit Center Master Plan.</b> Includes long-term vision to address station capacity, grade separation, additional bicycle and pedestrian access improvements, parking structure, and transit-oriented development.	X	
Transit Service	<b>Public Transit Service Plan (Initial).</b> Includes peak-period service and/or integration with short-term TMA service.	X	
	<b>Public Transit Service Plan (Full).</b> Includes all-day service.		X

**Figure 14 – Summary of Project Phasing**

## Next Steps

Based on the input and direction provided by the City Council regarding the conclusions and recommendations of the Corridor Study, a Final Report will be completed in early 2015.

Additionally, staff will undertake the following actions in the near term (first three to six months of 2015):

1. Present a proposed scope, budget, schedule, and midyear capital improvement project (CIP) funding request for the development of a Master Plan for the Downtown Transit Center/Caltrain Station at a City Council Study Session for consideration.
2. Request CIP funding to prepare the documents required for Caltrans approval of the Corridor improvements (e.g., pedestrian/bicycle bridge across U.S. Route 101) that will be located within Caltrans right-of-way.
3. Request CIP funding to develop the initial phase of the reversible bus lane (in conjunction with Caltrans for the portion on the Shoreline Boulevard overcrossing) for early implementation.

While development of these plans and projects are under way, staff will also:

- Pursue funding and implementation of interim bicycle lane enhancements on Shoreline Boulevard, particularly on the U.S. Route 101 overcrossing in cooperation with North Bayshore companies.
- Continue coordination/discussion with Santa Clara County regarding potential improvements at the Castro Street/Moffett Boulevard/Central Expressway intersection for pedestrians and bicyclists and the impacts the improvements may have on intersection operations. Depending on the results of these discussions, additional funding may be required to conduct traffic studies/modeling before interim, as well as longer-term improvements can be identified and agreed upon.
- Establish new shuttle loading areas on portions of Hope and View Streets to reduce shuttle congestion at the Downtown Transit Center during the peak morning commute periods (in coordination with the VTA, Mountain View TMA, and private shuttle operators). Any required modifications to existing parking restrictions set forth in Section 19 of the City Code will be presented to the Council for review and action.

And as part of the Fiscal Year 2015-16 CIP development and approval process, staff will:

- Request CIP funding to begin designing protected intersection improvements for the Middlefield Road/Shoreline Boulevard intersection, including any need for additional right-of-way
- Request CIP funding to develop improvements to the Corridor segment along Stierlin Road between the Downtown Transit Center and Montecito Avenue, including the installation of bicycle lanes on Stierlin Road and improvements to the Castro Street/Moffett Boulevard/Central Expressway intersection. These improvements would be timed to coincide with the completion of the 100 Moffett Boulevard private development project.

In the longer term (within the next 12 months), staff will also begin work on the following:

- Request CIP funding to begin the design, environmental clearance, and other actions required to implement the full build-out of all recommended Corridor improvements.
- Design bicycle lane enhancements along Middlefield Road between Shoreline Boulevard and Sierra Vista Avenue to provide improved connections to the Permanente Creek Trail. The installation of these enhancements will coincide with the paving work that will be done on Middlefield Road after PG&E completes this portion of its gas main replacement project in 2017.

### **FISCAL IMPACT**

Funding for Project 14-44, Shoreline Boulevard Transportation Corridor Study, was approved by the City Council as part of the City's Fiscal Year 2013-14 Capital Improvement Program. There is no additional cost directly associated with the adoption of the Corridor Study.

The estimated cost of the recommended Corridor improvements is approximately \$41 million. The City's share of the cost of these improvements will depend on the timing and/or phasing of the projects, the ability to leverage funding or the construction of the improvements as properties along the Corridor and/or North Bayshore redevelop, developers' willingness to fund and/or construct some of the improvements as community benefits, availability of development impact fees, cost-



sharing opportunities with other governmental agencies, as well as the availability of grant funding.

## **CONCLUSION**

The Shoreline Corridor Study has developed a conceptual plan for transportation facilities designed to improve the Corridor for bicycle, transit, and pedestrian users and help achieve mode-shift targets for North Bayshore.

The estimated capital cost for the Corridor improvements is approximately \$41 million. Phased implementation actions are proposed to further develop the Corridor improvements.

The Corridor Study also recommended the development of a Master Plan for the Transit Center/Caltrain Station area, with further information about the potential study scope, budget, and funding to be presented at a Council Study Session in early 2015.

## **ALTERNATIVES**

1. Approve a modified conceptual plan for Shoreline Boulevard Transportation Corridor improvements.
2. Take no action on the proposed conceptual plan for Shoreline Boulevard Transportation Corridor improvements.
3. Provide other direction to staff.

## **PUBLIC NOTICING**

In addition to the City's standard agenda posting requirement, notices were sent to more than 100 individuals, including and/or representing: persons/stakeholders requesting notification through the project website; residents; attendees at previous workshops/meetings regarding the Study; City neighborhood associations; transportation agencies; North Bayshore businesses, property owners, and tenants; Bicycle/Pedestrian Advisory Committee; and other interested parties.

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City Manager

JL-LF/7/CAM  
901-11-25-14CR-E

Attachment: 1. Public Comments – Community Workshop #3