



El Camino Real Corridor Study



City of Menlo Park

July 2015

Acknowledgements

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Introduction

El Camino Real is the most prominent north-south arterial on the Peninsula and connects cities throughout San Francisco, San Mateo, and Santa Clara Counties, and provides a key transportation route through downtown Menlo Park. El Camino Real is designated as State Route (SR) 82 and serves many local businesses fronting and adjacent to the street, and is one of few continuous north-south thoroughfares in the City, providing connections for residents to jobs and services in Palo Alto, Mountain View, Los Altos, Atherton, Redwood City, and beyond. A map showing the regional setting is provided in Figure 1.

El Camino Real also divides the City, with the downtown business district on the west side and the Civic Center, recreation facilities and library on the east side, and the Menlo Park City School District schools straddling both sides. This orientation requires frequent crossings by Menlo Park residents on a daily basis, and represents a challenging situation for

pedestrians, bicyclists, and motorists making short trips to local destinations.

El Camino Real is owned by Caltrans within Menlo Park city limits (San Francisquito Creek to approximately Encinal Avenue); however, the City of Menlo Park operates the traffic signals within the City due to the unique signal timing system in place. El Camino Real also serves numerous SamTrans and local shuttle transit services, and is one block west of the Caltrain corridor, with the Menlo Park station located near the intersection with Santa Cruz Avenue.

Today, El Camino in Menlo Park is six lanes wide from the southerly border with the City of Palo Alto, before narrowing to four through lanes north of Live Oak Avenue. The four-lane section continues north to Spruce Avenue in the Town of Atherton, although the Town of Atherton had been considering narrowing options. In the southbound direction, the four lane section begins at Valparaiso Avenue-Glenwood Avenue and continues south to Live Oak Avenue, where it widens to a six-lane cross-section. El Camino Real is six lanes through the adjacent communities of Atherton, Palo Alto, Mountain View and Los Altos and four lanes through portions of Redwood City. There are no existing bike lane facilities on the corridor.

Project Goals and Objectives

The focus of the *El Camino Real Corridor Study* is to review and recommend potential transportation and safety improvements to El Camino Real, making it safer and more efficient to move along and across El Camino for all modes of travel: pedestrians, bicycles, automobiles, and transit. This study identifies potential reconfiguration alternatives, and evaluates the feasibility and potential impacts (adverse and beneficial) to improve multi-modal transportation along the corridor. This study considers possible modifications to allow for the addition of a bicycle

CHAPTER 1 Introduction

Figure 1 | Regional Setting



The study objectives of the El Camino Real Corridor Study are to:

- ▶ Review potential transportation and safety improvements.
- ▶ Consider possible alternatives to allow for the addition of a bicycle lane or an additional through lane.
- ▶ Identify potential reconfiguration alternatives.
- ▶ Evaluate the feasibility and potential impacts of up to three (3) alternatives to improve multi-modal transportation.
- ▶ Address impacts to traffic, active transportation, safety, parking and aesthetics.
- ▶ Assess safety, efficiency and convenience trade-offs between motorists and bicyclists within the limited right-of-way available.

lane or an additional through lane, for a total of three lanes in each direction between Sand Hill Road and Encinal Avenue. Impacts to traffic, active transportation, safety, parking and aesthetics are addressed as part of the evaluation. Within the limited right-of-way available, this study assesses safety, efficiency and convenience trade-offs between motorists and bicyclists on El Camino Real between Sand Hill Road and Encinal Avenue.

Per direction from the City Council, the following guidelines were developed at the outset of the Study to set the parameters of the Corridor Study process:

- El Camino Real between Encinal Avenue and Sand Hill Road will be evaluated.
- Modifications to side-streets will be considered between the western side of the Caltrain tracks and the eastern side of Curtis Street-Hoover Street-Alto Lane.
- All proposed modifications should be consistent with the *Menlo Park El Camino Real/Downtown Specific Plan*.

- Only surface improvements will be considered (i.e., no grade separation or tunneling).
- Impacts (both beneficial and adverse) to all modes of travel will be considered in this study.
- Ultimate design and implementation of modifications to El Camino Real will need to meet Caltrans requirements and standards.

Study Area

The study area consists of the 1.3 mile stretch of El Camino Real within the Menlo Park City limits between Sand Hill Road to the south and Encinal Avenue to the north (shown in Figure 2).

Corridor Segments

Within the city limits of Menlo Park, El Camino Real has a posted speed limit of 35 mph and segments with either two or three through lanes in each direction. A selection of cross sections is shown in Figures 3 through 6.

- **From Sand Hill Road north to Roble Avenue,** there are three through travel lanes in each direction with wide curb lanes. The curb-to-curb width of El Camino Real varies between 88 feet and 120 feet throughout the segment. On-street parking is allowed on the east side of El Camino Real, north of Cambridge Avenue. Parking on the west side of the street is allowed on a short section south of Middle Avenue.
- **Between Roble Avenue and Ravenswood Avenue,** El Camino Real transitions from a six-lane roadway to four through lanes with turn lanes. The curb-to-curb width of El Camino Real varies between 84 feet and 90 feet throughout the segment. In the northbound direction, the curb lane becomes a right-turn lane for the entire block serving right-turn movements onto Ravenswood Avenue. On-street parking is allowed on the west side of the street.
- **Between Menlo Avenue-Ravenswood Avenue and Valparaiso Avenue-Glenwood Avenue,** there are two through lanes in each direction with turn lanes. The curb-to-curb width of El Camino Real is typically 84 feet throughout the segment. There are right-turn lanes of varying



Figure 2 | Study Area



LEGEND
 ● Study Intersection



Figure 3 | Cross Section – Sand Hill Road to Cambridge Avenue

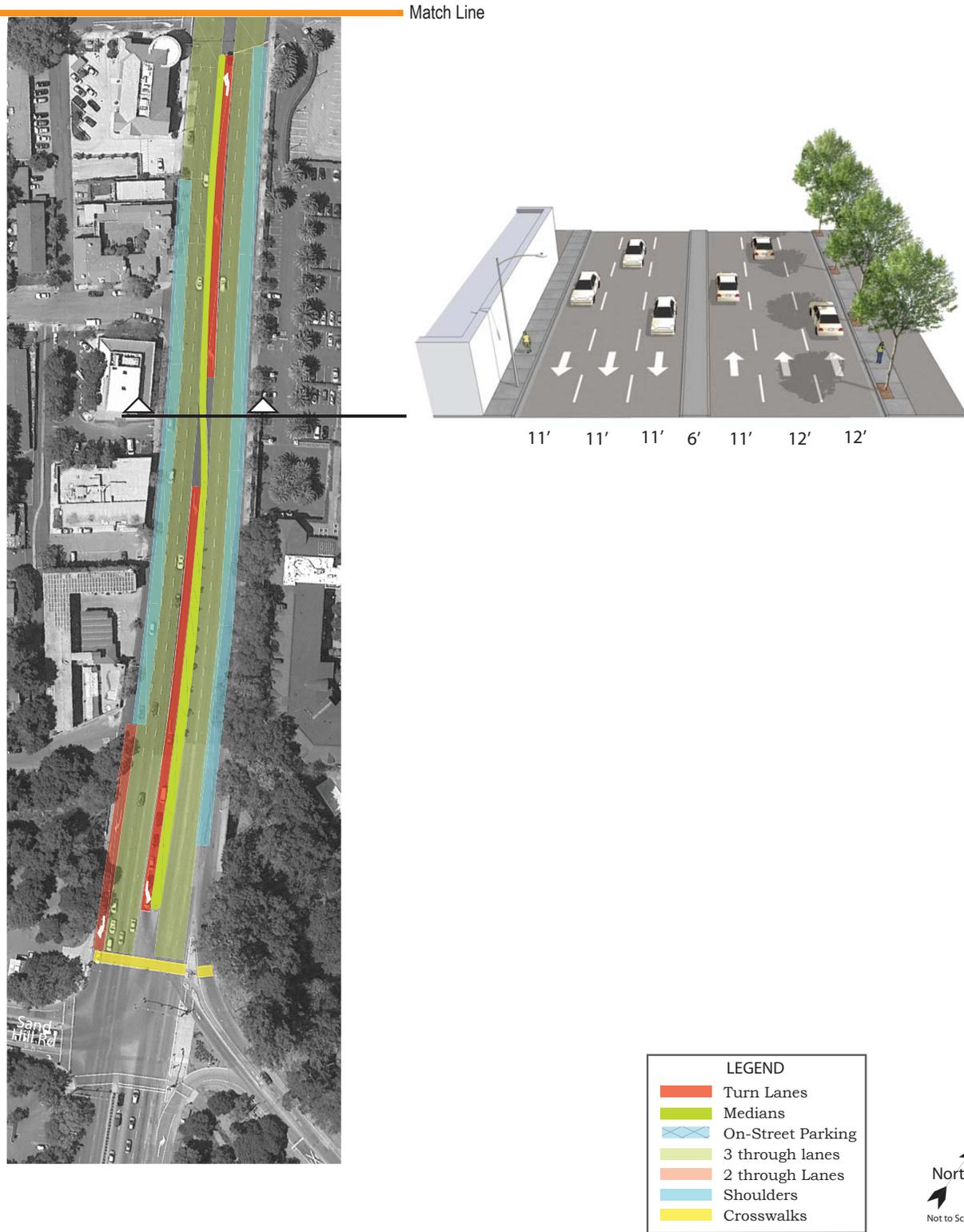


Figure 4 | Cross Section – Cambridge Avenue to Roble Avenue

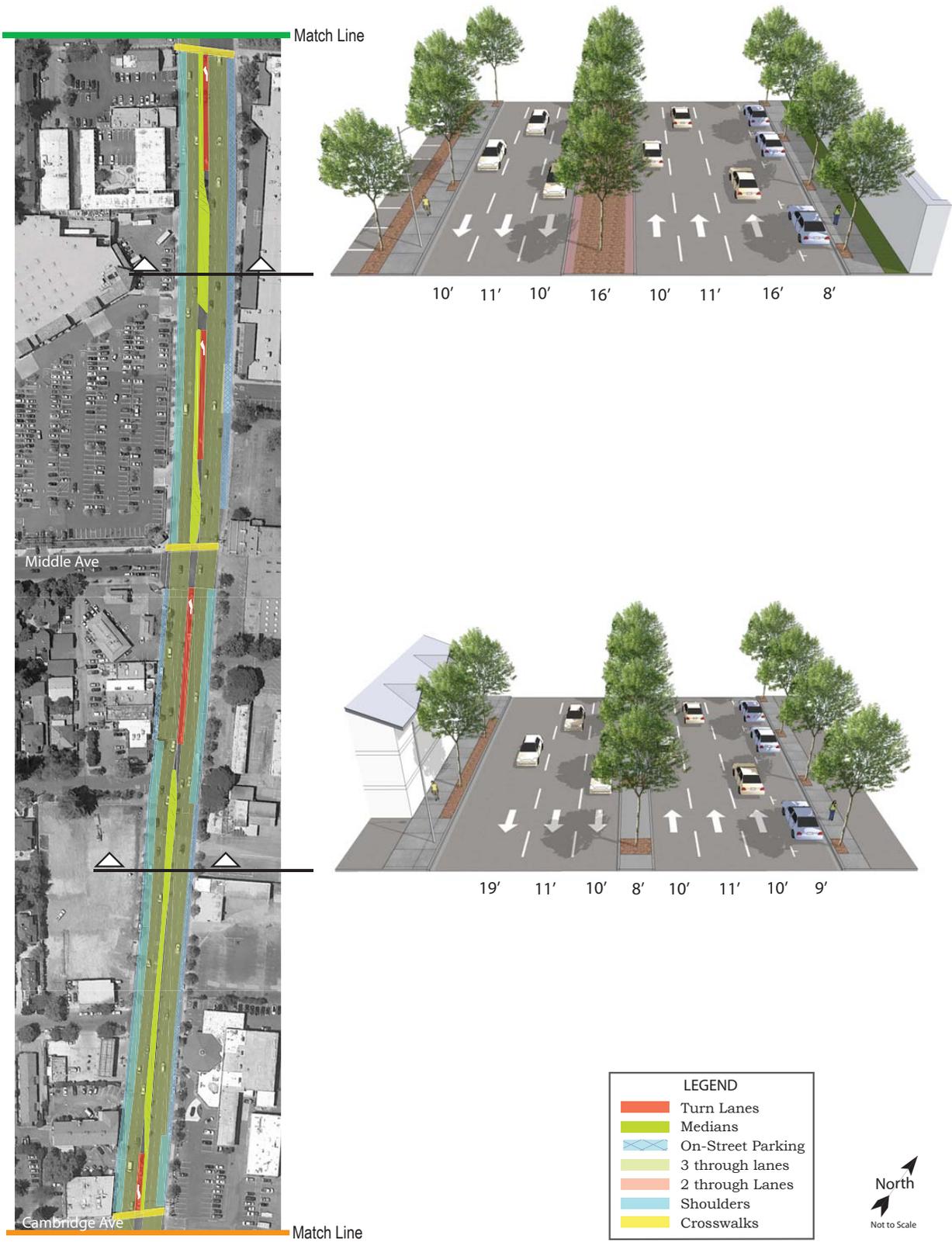


Figure 5 | Cross Section – Roble Avenue to Oak Grove Avenue

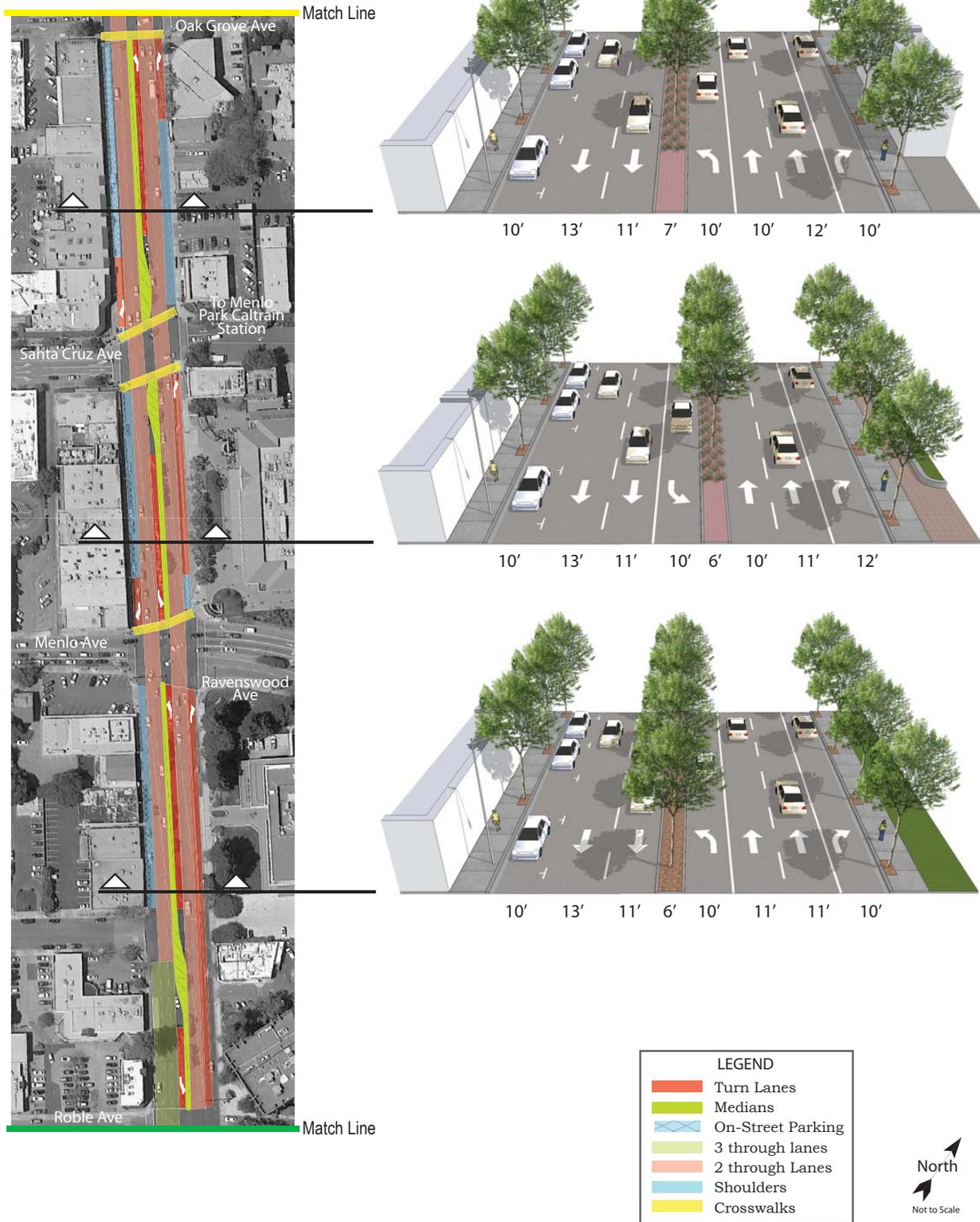
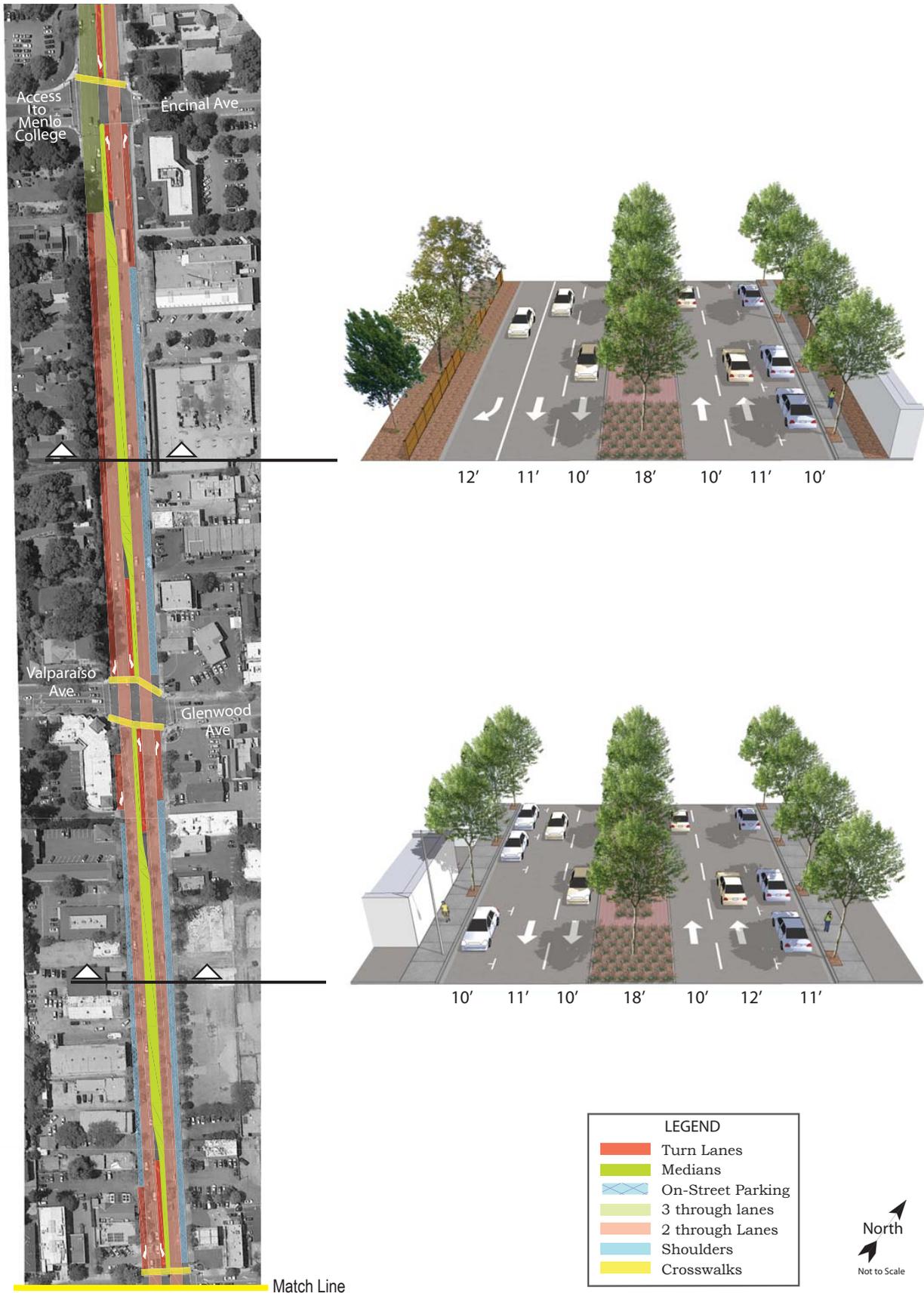


Figure 6 | Cross Section – Roble Avenue to Encinal Avenue



length at each of the intersections. On-street parking is generally allowed between signalized intersections; near the intersections, parking is restricted to provide right-turn pockets.

- **North of Valparaiso Avenue-Glenwood Avenue,** El Camino Real has two northbound through lanes and three southbound travel lanes. The curb-to-curb width of El Camino Real is typically 88 feet throughout the segment. On the east side of El Camino Real, on-street parking is provided, except where restricted to provide a right-turn pocket at Encinal Avenue. In the southbound direction, the third curb lane serves as a long right-turn lane at the Valparaiso-Glenwood intersection.

Study Intersections

The intersections along the El Camino Real corridor within the study area include:

- Sand Hill Road*
- Creek Drive
- Harvard Avenue
- Cambridge Avenue*
- Partridge Avenue
- College Avenue
- Middle Avenue*
- Roble Avenue*
- Live Oak Avenue
- Menlo Avenue-Ravenswood Avenue*
- Santa Cruz Avenue*
- Oak Grove Avenue*
- Valparaiso Avenue-Glenwood Avenue*
- Encinal Avenue*

These locations include both the signalized and side-street stop-controlled intersections on El Camino Real. The streets with side-street stop-controlled intersections all lie to the west of El Camino Real and are limited to right-turn in/right-turn out movements by a raised median on El Camino Real.

It is acknowledged that streets in Menlo Park generally do not follow a true north-south or east-west alignment. For the purpose of this analysis, El Camino Real was considered to have a north-south alignment. Therefore, the alignment designation of all other streets was established based on the street's

relative position to El Camino Real (e.g., all side-streets such as Cambridge Avenue, Live Oak Avenue, and Glenwood Avenue are considered to run east-west).

Pedestrian Facilities

Within Menlo Park, continuous sidewalks are currently provided along both sides of El Camino Real with varying width and physical condition. There are marked crossings of El Camino Real provided at all of the study intersections; however, at some intersections, crossings are prohibited on one leg of the intersection. There are no uncontrolled marked crossings of El Camino Real within the study area.

Bicycle Facilities

Along the El Camino Real, no bicycle facilities are currently provided. Within the study area, bike facilities on intersecting streets include Class II bike lanes on Valparaiso Avenue-Glenwood Avenue, and shared-lane (sharrow) markings along Menlo Avenue west of El Camino Real. Bike parking at the Caltrain station, public parking lots, and bike racks located in bike corrals and sidewalks on streets intersecting El Camino Real are provided.

Transit Facilities

Local and regional transit service is provided by SamTrans and Caltrain respectively. Additionally, local shuttles provided by the City of Menlo Park and nearby Stanford University supplement transit service along El Camino Real. In each direction, one Caltrain station and six bus stops are located along El Camino Real within the City of Menlo Park.

* Traffic signal location





Community Engagement

The *El Camino Real Corridor Study* included an extensive engagement process conducted to facilitate community participation in visioning and review of design concepts via public workshops, project website, community surveys and public hearings. Following is a description of these activities and the input received.

Establish El Camino Real Subcommittees

At the outset of the Study, the Bicycle and Transportation Commissions each established an El Camino Real Subcommittee of two to three Commissioners to provide feedback throughout the Study, beginning with review of the scope of work, participation in the selection of the consultant team, and providing input on draft materials to ensure that they are readable and as easy as possible to interpret the complex concepts in the Study.

Website

Throughout the process, news, notices, documents and the community surveys were posted on the project website, www.menlopark.org/elcaminorealcorridor.

Mailing Lists

All community members who participated in meetings, provided written comments, or called in with questions or comments that were willing to share an email address were added to a mailing list. Project updates throughout the Study were posted to the project website, and emailed to this list. Approximately 150 unique subscribers are currently on the list.

Community Workshops

Three workshops were conducted for the project. All of these events included the presentation of data and findings with the opportunity for attendees to provide feedback and input on issues.

April 30, 2014 – Existing Conditions and Initial Public Input Workshop

Attendees: 35-40

Key Objectives: Presentation of Existing Conditions, Obtain community input on issues and vision for El Camino Real.

Results: Team obtained attendees' vision for El Camino Real, identification of problem areas from a user's perspective and suggested improvements for the corridor.

October 2, 2014 – Alternative Measures and Interactive Streetscape Workshop

Attendees: 60-65

Key Objectives: Presentation and Feedback on Best Practices, Obtaining further

CHAPTER 2 Community Engagement

ideas for sections for El Camino Real, and Interactive exercise for attendees to explore the limitation of the street cross-section.

Results: Team obtained input on attendee's likes/dislikes of Best Practices and additional input on ideas for the corridor. This input was used directly to develop the three proposed alternatives

February 19, 2015 – Alternatives Analysis Presentation and Community Feedback Workshop

Attendees: 50-55

Key Objectives: Presentation of Corridor Alternatives, Obtaining comments from attendees on the alternative features, and community ranking of the alternatives.

Results: Rankings of the Alternatives (discussed later in the report)

Community Group Presentations

In addition to community workshops, staff presented information on the Study to community groups that expressed an interest in the Study. These groups included the Menlo Park Kiwanis and the Menlo Park Police Chief's Advisory Panel.

Public Hearings

Throughout the study, presentations have been made to various commissions in a public hearing setting to receive input and feedback.

November 10, 2014 – Bicycle Commission

Objectives: Informational report on Study Objectives, Existing Conditions, and Potential Alternatives

Results: Feedback on the proposed alternatives.

November 12, 2014 – Transportation Commission

Objectives: Informational report on Study Objectives, Existing Conditions, and Potential Alternatives

Results: Feedback on the proposed alternatives.

March 9, 2015 – Bicycle Commission

Objectives: Presentation of alternatives and results of analysis were presented to

obtain commission's recommendation to the City Council on a preferred alternative.

Results: Commission voted (3-1 with 1 abstention) to recommend Alternative 2 (Buffered Bike Lanes) with two northbound through lane approach to Ravenswood Avenue in order to minimize impacts to trees.

March 11, 2015 – Transportation Commission

Objectives: Presentation of alternatives and results of analysis were presented to obtain commission's recommendation to the City Council on a preferred alternative.

Results: Commission voted unanimously (7-0) to recommend Alternative 3 (Separated Bike Facility).

April 6 and 20, 2015 – Planning Commission

Objectives: Presentation of alternatives and results of analysis were presented to obtain commission's recommendation to the City Council on a preferred alternative.

Results: Commission voted (4-1 with 1 abstention) to recommend Alternative 2 (Buffered Bike Lanes) as the preferred alternative, but with preservation of the heritage trees on the corner of El Camino Real at Ravenswood Avenue.

Web-Based Surveys

Two online community surveys were conducted as part of the Corridor Study. The first survey sought to gain the input of the community related to critical transportation issues on the corridor and the vision for improvements for El Camino Real. The second survey, which is summarized later in this report, asked for feedback on the draft alternatives and asked the respondent to rank the options in order of preference.

Visioning and Issue Identification Survey

At the April 2014 workshop, attendees provided a list of both issues and opportunities for transportation improvements for the corridor. Following the workshop, a web-based online survey was provided to gain further input on the use of the corridor and additional input on the ideas from the first workshop.

Survey questions were focused on learning how and why different members of the community use the



El Camino Real Corridor and on eliciting feedback on potential improvements to the Corridor. Many of the questions were based directly on the ideas gathered at the first community workshop, and were intended to assess which of these ideas had the greatest appeal to the broader community. The survey was active between June 16 and September 12, 2014, during which time 309 community members participated. Initial results were presented at an open house on October 2, 2014, where seven additional responses were collected, for a total of 316 responses.

The survey report, *El Camino Real Corridor Study Community Survey Report*, February 2015, is provided in Appendix A. Key findings are summarized below.

Respondent Profile

Survey participants were asked where they live or work in relation to the El Camino Real Corridor—in Menlo Park, outside of Menlo Park, within a half-mile of the Corridor, or farther than a half-mile from the Corridor. Responses are described in Chart 1 for where participants live, and Chart 2 for where participants work.

The majority of survey respondents live in Menlo Park, with the largest portion of respondents (47 percent) living in Menlo Park within a half-mile of the Corridor. The next-largest portion of respondents (32 percent) lives in Menlo Park, but farther than a half-mile from the Corridor. For participants living outside of Menlo Park, more live within a half-mile of the Corridor (13 percent) than beyond (8 percent).

Conversely, the majority of survey respondents work outside of Menlo Park, with the largest portion (43 percent) working outside of the city and farther than a half-mile from the Corridor. Those working outside of Menlo Park but within a half-mile of the Corridor constitute the second-largest portion, at 32 percent.

Transportation Needs

Most respondents use a variety of methods to travel along El Camino Real—especially a combination of driving, bicycling, and walking. They mostly travel the Corridor to access shopping and local businesses, and half of respondents use it to commute to work. Most respondents use El Camino Real to access the Menlo Park Caltrain station. These Caltrain users tend to favor bicycling or walking to the station.

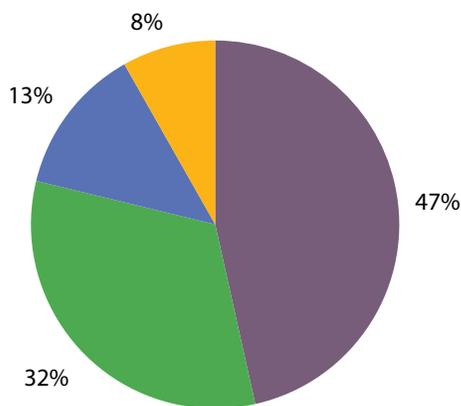


Chart 1 | Survey: Where Respondents Live

- In Menlo Park, within 1/2 mile of the corridor
- In Menlo Park, farther than 1/2 mile of the corridor
- Outside of Menlo Park, within 1/2 mile of the corridor
- Outside of Menlo Park, farther than 1/2 mile of the corridor

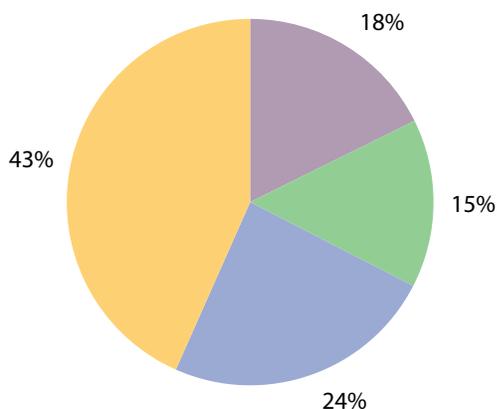


Chart 2 | Survey: Where Respondents Work

- In Menlo Park, within 1/2 mile of the corridor
- In Menlo Park, farther than 1/2 mile of the corridor
- Outside of Menlo Park, within 1/2 mile of the corridor
- Outside of Menlo Park, farther than 1/2 mile of the corridor



Respondents desire multi-modal improvements along the Corridor regardless of which modes they currently use most. The majority agreed that if pedestrian and bicycling improvements were made, they would prefer to take advantage of those transportation options rather than drive.

The sample of transit riders responding to the survey was too small to draw supportable generalizations. There may need to be a closer examination of public transit needs along the corridor. However, survey responses suggest that frequent transit riders—unlike frequent users of other transportation modes—are less willing or less able to drive as an alternative to transit, meaning that this group may have a greater need for non-automotive transportation options. Additionally, there were some open-ended responses from non-transit users that showed interest in improving public transportation along the corridor.

Traffic

Traffic was a prevalent concern throughout responses to the open-ended questions. Respondents connected traffic conditions with a number of the Corridor's safety issues as frustrated drivers participate in risky behavior, such as running red lights, cutting through adjacent neighborhoods, and speeding. In discussing potential improvements to vehicle traffic, most respondents did not feel that vehicle capacity was a problem in the Corridor, and additional vehicle lanes on El Camino Real were not considered a desirable improvement. Respondents' explanations for traffic causes focused on bottlenecks at specific intersections or along specific segments of the Corridor due to signal timing and lane design. Problematic intersections tended to be those adjacent to major destinations (such as Menlo/Ravenswood) or which serve as connections for regional traffic (such as Sand Hill). Signalization changes were a desired improvement. According to the responses to the open-ended questions, important considerations for signal timing include crossing signals for pedestrians and cyclists and ensuring that signals facilitate east-west movement as well as north-south flow.

Safety

Safety in the Corridor was a major concern, particularly for those traveling by bicycle or on foot. Pedestrian safety and crossing improvements, bike lanes, bike

parking, and landscaped buffers for pedestrians and cyclists were among the most desired improvements. Additionally, though travel by vehicle was considered the safest way to travel El Camino Real, vehicle safety improvements were still considered desirable. Open-ended responses indicated that vehicle safety may need to address driving behavior such as speeding, opportunistic use of turn lanes for passing purposes, running red lights, U-turns, and stopping in the intersection during red lights.

Student safety and the safety of children using El Camino Real was a priority for respondents, regardless of whether or not respondents have children who need to cross El Camino Real for school. Nineteen percent of respondents have children who need to make this crossing, though responses to open-ended questions suggested that there were

Opinions Expressed in the Survey

- ▶ 85% agreed that ensuring that children can safely cross ECR to get to and from school should be a priority
- ▶ 60% would walk rather than drive for short trips and errands if conditions for pedestrians were improved
- ▶ 73% would bike rather than drive for some short trips and errands if conditions for bicyclists improved
- ▶ 65% agreed that if bicycle lanes are provided, they should be separated from vehicle traffic
- ▶ 65% agreed that there is enough capacity for automobiles and that improvements should focus on other forms of travel
- ▶ 70% disagreed that lanes should be made wider
- ▶ 40% disagreed that dedicated bus or BRT should be accommodated through Menlo Park; 39% were neutral
- ▶ 57% disagreed that street parking on ECR is essential for the convenience of customers of small businesses



additional respondents who are uncomfortable with letting their children travel El Camino Real alone and use alternate means of getting them to school. Student safety concerns include traveling by foot and by bicycle, particularly at crossings.

Potential Changes on El Camino Real

The survey offered 17 ideas for potential improvements along El Camino Real, and asked participants to rate each on a scale from least desirable (with a score of 1) to most desirable (with a score of 5). Chart 3 describes the responses for each item. Details of the average rating score for each item are included in Appendix A.

The most desirable changes to the corridor included the following:

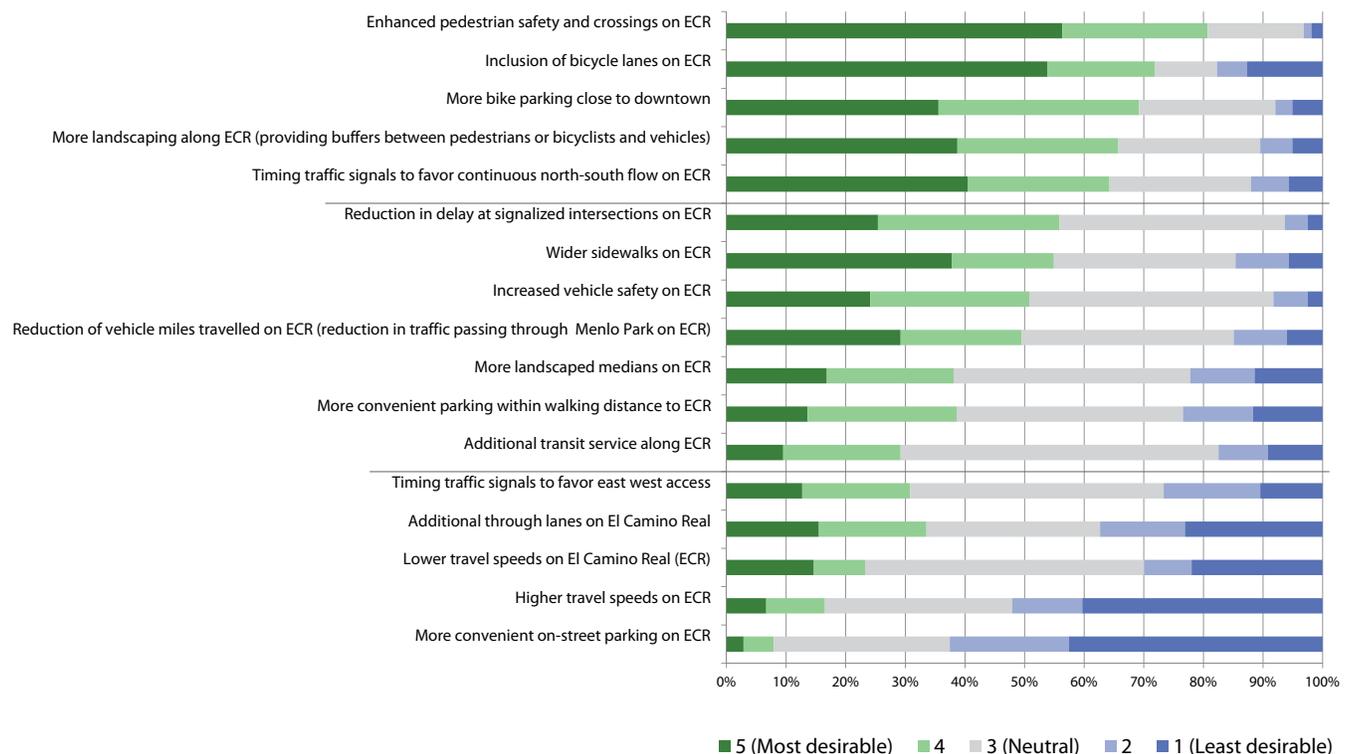
- Enhanced pedestrian safety and crossings on El Camino Real was the most desired improvement. Over 80 percent of respondents considered this option desirable, with 57 percent considering it most desirable (more than a majority, and more than was received by any other item). It also received the least amount of undesirable or least desirable responses.

- Inclusion of bike lanes on El Camino Real, which also received more than a majority of most desirable responses and also the fewest neutral responses
- More bike parking close to downtown
- More landscaping along El Camino Real (providing buffers between pedestrians or bicyclists and vehicles)
- Timing traffic signals to favor continuous north-south flow on El Camino Real
- Reduction in delay at signalized intersections on El Camino Real
- Wider sidewalks on El Camino Real
- Increased vehicle safety on El Camino Real

The least desirable modifications to the corridor included:

- More convenient on-street parking on El Camino Real was the least desirable improvement. Over 60 percent of respondents considered this an undesirable improvement, with over 40 percent considering it least desirable. Only eight percent responded that it would be a desirable improvement.
- Additional through lanes on El Camino Real
- Lower travel speeds on El Camino Real
- Higher travel speeds on El Camino Real
- More convenient on-street parking on El Camino Real

Chart 3 | Survey: Preferences for Potential Changes on El Camino Real





Related Plans

General Plan

The *Menlo Park General Plan* adopted in 1994 provides the framework for transportation planning within the city. The General Plan established goals that are concerned with the safe and efficient movement of people and goods in and around the city, while promoting alternative modes of transportation. Transportation-related goals and policies included in the Circulation and Transportation Element of the *Menlo Park General Plan* that are relevant to this study focus on the following areas:

- Level of Service D on City-controlled signalized intersections (not El Camino Real).
- Achievement of average travel speeds of 14 mph or greater on El Camino Real.
- Promotion of the use of public transit.
- Promotion of alternatives to the single occupant automobile.

- Completion of bike facilities to promote the use of bicycles for commuting and recreation.
- Development of pedestrian facilities such as continuous sidewalks and safe crossings to promote walking for short trips.
- Support of full pedestrian access across all legs of signalized intersections along El Camino Real.
- Provision of adequate parking in the Downtown area, especially for retail customers and Caltrain patrons.

A full listing of relevant goals and policies is included in Appendix B.

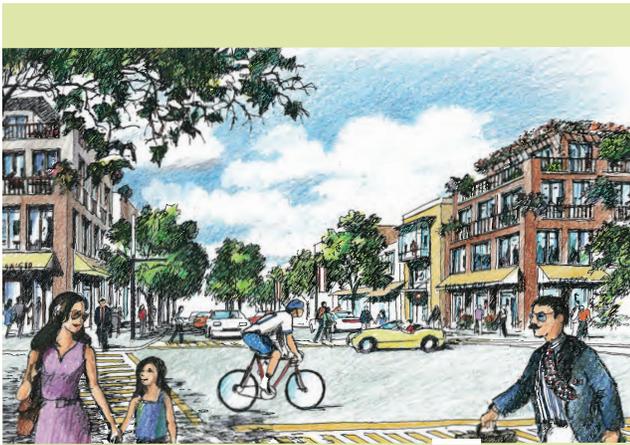
Complete Streets Policy

In January 2013, the Menlo Park City Council passed a resolution establishing the *Complete Streets Policy of City of Menlo Park*. The policy establishes complete streets as being those that serve all users and are developed based on the context of the situation that requires a collaborative effort between many City departments to implement. The policy further requires incorporation of a complete streets approach into all phases of all projects, unless a project is found to meet limited exemption criteria.

Menlo Park El Camino Real/ Downtown Specific Plan

Adopted by the City Council in June 2012, the *Menlo Park El Camino Real/Downtown Specific Plan* establishes the framework for private development and public improvements along the El Camino Real corridor in the City of Menlo Park, as well as downtown Menlo Park and the Menlo Park Caltrain Station area. For circulation, the Specific Plan envisions the following:

CHAPTER 3 Related Plans



**MENLO PARK EL CAMINO REAL/
DOWNTOWN SPECIFIC PLAN**

CITY OF MENLO PARK, CALIFORNIA
July 12, 2012

- A vehicular circulation system that accommodates both local traffic and north/south through traffic on El Camino Real.
- An integrated pedestrian network of expansive sidewalks, promenades and paseos along El Camino Real and within downtown. The network provides opportunities for safe crossing of El Camino Real and the railroad tracks and connects the east and west sides of town, including the City’s civic center with downtown.
- A bicycle network that builds upon existing plans and integrates more fully with downtown and proposed public space improvements in the area.
- An integrated circulation plan that supports transit use.
- A public parking strategy and management plan that efficiently accommodates downtown visitors and supports downtown businesses.
- Modified parking rates for private development based on current industry standards.

Recommended Transportation Enhancements

The Specific Plan included a series of recommended transportation enhancements to the pedestrian and bicycle networks as well as transit access along El Camino Real and within Downtown Menlo Park.

These elements within the El Camino Real corridor study area included:

- Basic Pedestrian Crossing Treatments, which generally includes marked crosswalks and accessible pedestrian signals were recommended along El Camino Real at the intersections with Encinal Avenue, Valparaiso-Glenwood Avenue, Roble Avenue, Middle Avenue and Cambridge Avenue.
- Special Crossing Pedestrian Treatments, which generally includes high visibility crosswalks with enhanced pavement, accessible pedestrian signals, countdown pedestrian signals and median islands/pedestrian refuges, and which may include sidewalk extensions were recommended at the El Camino Real intersections with Oak Grove Avenue, Santa Cruz Avenue, and Menlo-Ravenswood Avenue.
- Extended time for pedestrians to cross El Camino Real, particularly at Santa Cruz Avenue, during off-peak periods.
- Pedestrian and bicycle way-finding signage.
- Track-separated pedestrian/bicycle passageways beneath (or above) the railroad tracks at the train station and in the vicinity of Burgess Park.
- North and south of Downtown, minimum 15-foot-wide sidewalks on the east side of El Camino Real, and a minimum 12-foot sidewalk on the west side of El Camino Real.
- Within the Downtown area on El Camino Real (between Oak Grove and Menlo Avenues), 12-foot wide sidewalks separated from travel lanes by on-street parking and future bicycle lanes.
- Future Class II bike lanes/Minimum Class III bicycle route on westbound Ravenswood Avenue between the railroad tracks and El Camino Real.
- Future Class II bike lanes/Minimum Class III bicycle route on Middle Avenue between University Drive and El Camino Real with additional striping modifications at the El Camino Real and Middle Avenue intersection.



- New bicycle parking facilities in the plan area, including in the proposed parking garages.
- Accommodate potential Bus Rapid Transit service in accordance with the Grand Boulevard Initiative to serve added travelers on El Camino Real.
- More frequent and lengthened hours of shuttle service to serve added travel demand, improve east-west connectivity and reduce demand for parking in the plan area.
- Continue employer-sponsored Transportation Demand Management (TDM) programs that support and increase transit use.

Traffic Mitigation Measures

The Specific Plan EIR identified mitigation measures for impacts to three intersections on El Camino Real at Glenwood Avenue-Valparaiso Avenue, Ravenswood Avenue-Menlo Avenue, and Middle Avenue. None of these modifications are assumed to be in place as part of the Corridor Study, since in certain cases, the suggested improvements conflict with the goals of the Specific Plan.

El Camino Real/Glenwood Avenue-Valparaiso Avenue

- Add a westbound right-turn lane
- Modify the westbound approach to a left-turn lane, a through lane, and a right-turn lane

These geometric modifications which would improve the overall vehicular operations of the intersection. The additional westbound right-turn lane will increase the crosswalk distance and duration of pedestrian and bicycle exposure to motor vehicle traffic.

El Camino Real/Ravenswood Avenue-Menlo Avenue

- Add a second southbound left-turn lane
- Modify the southbound right-turn lane to a shared through/right-turn lane
- Create a southbound receiving lane
- Add a third northbound through lane
- Add an eastbound left-turn lane, right-turn lane to create one left-turn, two through lanes, and one right-turn lane

- Change the signal phasing on the eastbound and westbound approaches from split phasing to protected left-turn phasing

These mitigations would not reduce the operations to acceptable levels of service and would increase the crossing distances and duration of pedestrian and bicycles exposure to motor vehicle traffic and would require right-of-way acquisition and parking removal along Menlo Avenue and on the east side of El Camino Real.

Bicycle Master Plan

City of Menlo Park Comprehensive Bicycle Development Plan

The *2005 Comprehensive Bicycle Development Plan* (Bike Plan) provides a blueprint of strategies and actions to further the integration of bike usage as a commute alternative and for recreation. The goals of this Plan provide the framework for specific policies and actions addressed in the Bike Plan. The goals of the Bike Plan provide a long-range vision, while the policies provide specific action descriptions to implement the Plan. The Bike Plan also provided the baseline bike network, a system of streets identified for various infrastructure modifications to support bicycling. These facilities are designed/constructed as funding is identified as part of the City's Five-Year Capital Improvement Program.

San Mateo County Comprehensive Bicycle and Pedestrian Plan

The City/County Association of Governments of San Mateo County (C/CAG), with support from the San Mateo County Transportation Authority (SMCTA), developed the 2011 *San Mateo County Comprehensive Bicycle and Pedestrian Plan* (CBPP) to address the planning, design, funding, and implementation of bicycle and pedestrian projects of countywide significance. Following is a key related goal of the plan:

- **Policy 4.1:** *Comply with the complete streets policy requirements of Caltrans and the Metropolitan Transportation Commission concerning safe and convenient access for bicyclists and pedestrians, and assist local implementing agencies in meeting their responsibilities under the policy.*



Sidewalk Master Plan

The *Sidewalk Master Plan* prioritizes sidewalk installations by inventorying gaps in the City's existing walkway network and identifying opportunities and constraints to close gaps in the network. The plan, adopted in 2009, does not address intersection or roadway crossing issues or pedestrian improvements other than sidewalk construction.

Grand Boulevard Initiative

The Grand Boulevard Initiative is a regional collaboration of public, private, and nonprofit organizations in San Mateo and Santa Clara counties with the goal of revitalizing the El Camino Real corridor. Both the *Menlo Park El Camino Real/Downtown Specific Plan* as well as this *El Camino Real Corridor Study* are part of Menlo Park's efforts towards implementing the overall goals of the Grand Boulevard Initiative. The Grand Boulevard Initiative's *Street Design Guidelines and Street Design Prototypes* focus on encouraging multimodal access and a boulevard street environment, and are specifically intended to encourage locally-initiated street improvement projects. The *Street Design Guidelines* include the following considerations:

- Lane Narrowing
- Lane Sharing
- Shoulder Conditions
- Intersection Geometry
- Intersection Crossings
- Mid-Block and Median-Obstructed Crossings
- Crossing Refuges
- Corner Curb Bulb-Outs
- General Median Design
- Plant Materials
- Sight Distance
- Median Barriers
- Sidewalk Width
- Sidewalk Zones
- Sidewalk Street Trees
- Pedestrian Oriented Lighting
- Transit Related Facilities
- Bicycle Related Facilities
- Storm water Management
- Physically Separated Bikeway
- Center Running BRT
- Frontage Treatment Concepts
- Boulevard Frontage Access and Parking





Existing Conditions

In order to establish baseline traffic conditions for all travel modes in the El Camino Real corridor, existing traffic data was collected and analyzed. The data and analysis included traffic counts as well as a determination of performance metrics such as safety, corridor travel time and speed, intersection level of service, vehicle queuing, pedestrian crossing facilities and level of activity, bicycle volumes, transit services, and on-street parking activity. These metrics are then compared later in the report for each of the alternatives developed for El Camino Real.

Data Collection

Transportation data along the El Camino Real corridor was collected in early April 2014, on typical weekdays while local schools were in session and without the presence of special events or adverse weather. This included collection of the following data:

- Peak period vehicle, pedestrian and bicycle turning movement counts at all study intersections
- 48-hour roadway segment vehicle counts, including vehicle classification
- Morning, midday and evening peak period travel time studies
- On-street parking inventory and occupancy

Traffic Volumes

Vehicle traffic volume counts on El Camino Real, which are included in Appendix C, were found to be lowest at the north end of the City, generally increasing towards the south where more capacity is provided – there is as much as 35 percent more traffic between Middle Avenue and Sand Hill Road. The average daily traffic volumes are graphed in Chart 4.

Throughout the day, southbound traffic generally peaks during the morning and decreases slightly during the afternoon. Conversely, northbound traveling traffic steadily increases throughout the day, peaking during the evening commute period. The hourly distribution of traffic on El Camino Real at four points on the corridor are included in Appendix C. Chart 5 provides a summary of hourly counts at one of these locations.

Vehicle Classification

Vehicle classification studies to determine the level of heavy vehicle traffic, including buses, on the route were performed at two locations along El Camino Real, at Cambridge Avenue and Middle Avenue. Heavy vehicle volumes were found to be highest during the midday peak period, at approximately two percent of total vehicle traffic. During the evening, heavy vehicles represents less than one percent of total traffic on El Camino Real. The vehicle classification counts are included in Appendix C.

CHAPTER 4

Existing Conditions

Chart 4 | El Camino Real Average Daily Traffic Volume

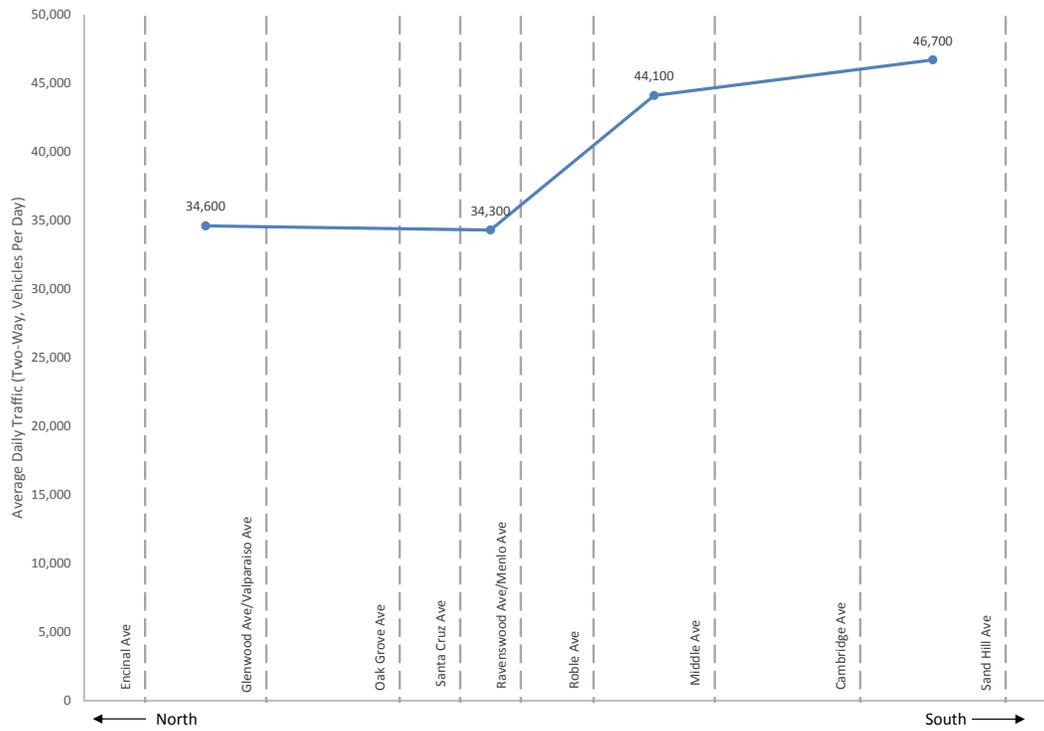
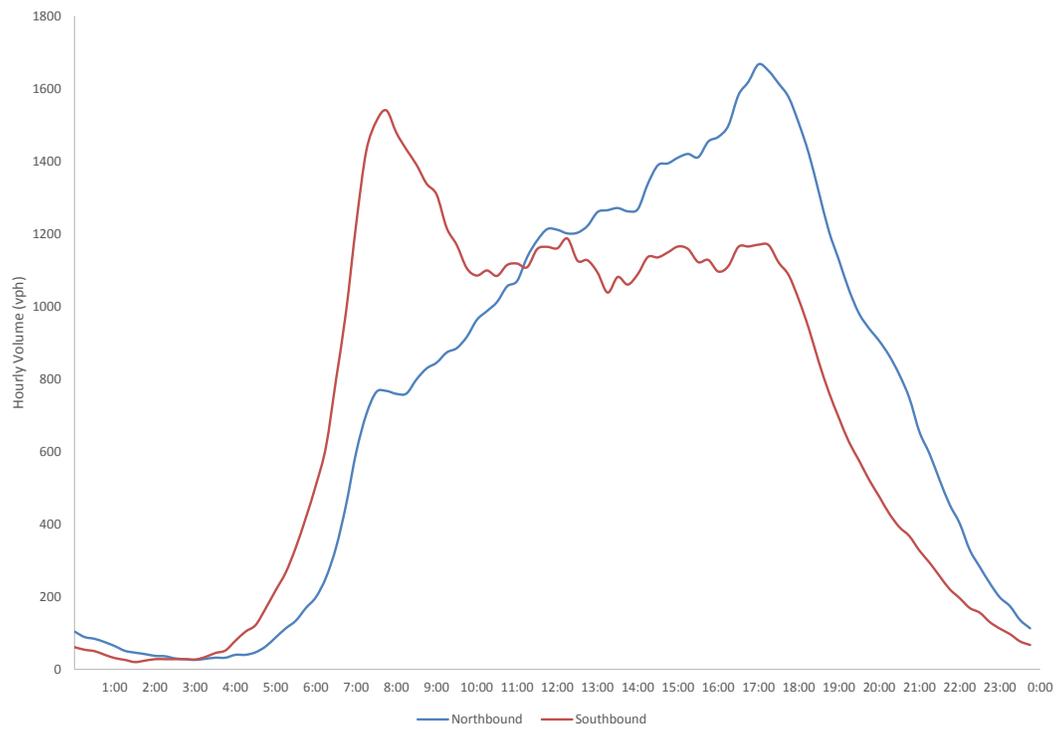


Chart 5 | 24-Hour Counts on El Camino Real at Encinal Ave-Glenwood Ave



Collisions and Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the City’s Police Department for the most current five-year period available (January 2009 through December 2013).

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2010 Collision Data on California State Highways*, California Department of Transportation (Caltrans).

The calculated collision rates are higher than the statewide average collision rate for similar facilities for the study intersections between Roble Avenue and Valparaiso Avenue-Glenwood Avenue. The calculated injury rates were generally similar or slightly higher than statewide averages, with the exception of El Camino Real/Encinal Avenue.

Approximately 85 percent of all intersection-related collisions at the study intersections between Roble Avenue and Valparaiso Avenue-Glenwood Avenue were rear-end and sideswipe collisions, with almost two-thirds of intersection-related collisions classified

as rear-end collisions. These types of collisions are often attributable to congestion on the roadway, in addition to other factors.

Collision involving pedestrian and bicycles were also reviewed. Because these types of collisions are often underreported, the analysis period was extended to 10 years. Over a 10-year period, there were a total of 24 pedestrian collisions of which 22 included injuries. The intersection of El Camino Real/Santa Cruz Avenue experienced the highest number of pedestrian collisions, with four collisions. The majority of these pedestrian related collisions occurred from the intersection with Santa Cruz Avenue to the south on the existing six-lane section of the corridor, where the street is wider and carries more traffic today. During the 10-year analysis period, there were a total of 30 bicycle collisions recorded with the most at the intersection of El Camino Real/Oak Grove Avenue which experienced four collisions. Of the 30 bicycle related collisions, 28 included injuries. The majority of the bike collisions occurred from the intersection with Oak Grove Avenue to the south on the existing six-lane section of the corridor.

The collision data and collision location maps are included in Appendix C.

Table 1 – Collision History

Study Intersection	Number of Collisions (2009-2013)	Calculated Collision Rate (c/mve)	Expected Collision Rate (c/mve)
1. El Camino Real/Sand Hill Rd	8	0.09	0.27
2. El Camino Real/Cambridge Ave	18	0.24	0.27
3. El Camino Real/Middle Ave ¹	16	0.21	0.21
4. El Camino Real/Roble Ave	22	0.32	0.27
5. El Camino Real/Menlo Ave-Ravenswood Ave	34	0.40	0.27
6. El Camino Real/Santa Cruz Ave	23	0.38	0.27
7. El Camino Real/Oak Grove Ave	36	0.52	0.27
8. El Camino Real/Valparaiso Ave-Glenwood Ave	24	0.36	0.27
9. El Camino Real/Encinal Ave	6	0.09	0.27

Notes: **Bold** = Calculated rate is higher than expected rate

c/mve = collisions per million vehicles entering the intersection

¹ Expected collision rate is lower since the intersections has 3 legs compared with 4 for other intersections



Corridor Travel Time

Travel time surveys on El Camino Real were conducted along the study corridor for three time periods: a.m. peak period (7:00 – 9:00 a.m.), midday peak period (11:30 a.m. – 1:30 p.m.) and the p.m. peak period (4:00 – 6:00 p.m.) Details of the surveys are included in Appendix C. Table 2 provides a summary of existing average travel time and average speeds along the corridor between Encinal Avenue and Sand Hill Road during typical morning, midday and evening peak periods.

In the northbound direction, average speeds varied between 14.9 mph (p.m. peak) and 21.5 mph (a.m. peak) while in the southbound direction, average speeds varied between 15.7 mph (a.m. peak) and 21.3 mph (midday peak). Based on a free-flow

travel speed of 35 mph (equivalent to the posted speed limit), the resulting delay due to traffic signals, cross-street traffic, pedestrian crossings, parking maneuvers, etc., it would take a vehicle approximately 2.3 minutes to travel the length of El Camino Real in Menlo Park. Thus, the resulting delay to motorists above free-flow conditions ranges from 1.5 to 3 minutes per direction, depending on the time of day. The average travel time in the Northbound p.m. peak hour is shown in Chart 6. Additional data on the travel time runs are included in Appendix C.

The City of Menlo Park, in *Policy II-A-2* of its *General Plan*, has established a goal of maintaining an average travel speed of 14 mph or better along El Camino Real which is met or exceeded during all existing study periods.

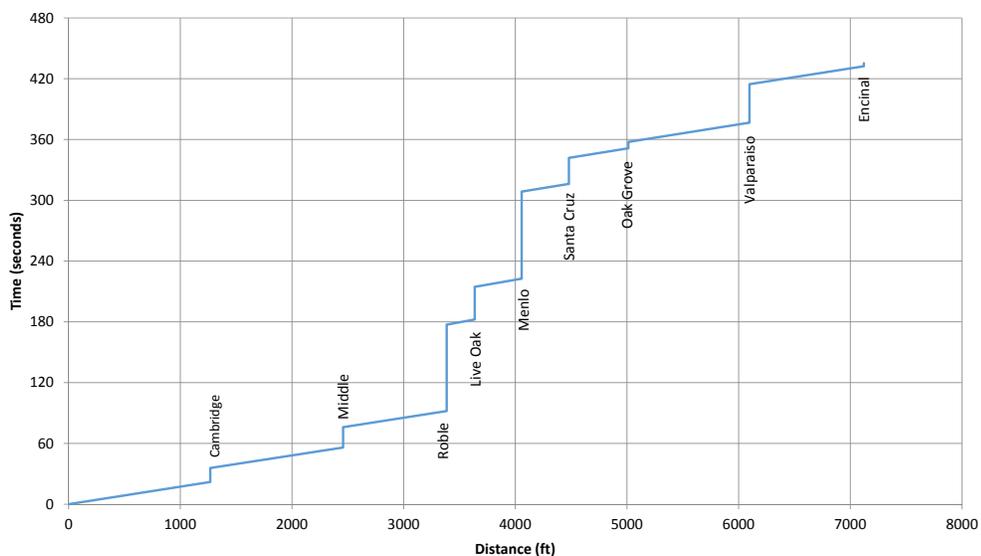
Table 2 – Existing Peak Period Travel Time

Direction of Travel	AM Peak		Midday Peak		PM Peak	
	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed
NB El Camino Real ¹	3:48	21.5	4:35	17.5	5:24	14.9
SB El Camino Real ²	5:06	15.7	3:48	21.3	5:00	16.1

Notes: Travel Time is measured in minutes: seconds; Speed is measured in miles per hour (mph)

¹ from Sand Hill Rd to Encinal Ave; ² from Encinal Ave to Sand Hill Rd

Chart 6 | Average Travel Time Northbound PM Peak Hour



Intersection Level of Service

Level of Service (LOS) is used to evaluate traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation. The study intersections were analyzed using the signalized methodology published in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 2000.

The City of Menlo Park’s standards of significance for signalized intersections within Menlo Park, including those controlled by Caltrans, establish an acceptable threshold of operations at LOS D or better. The City of Palo Alto standard of significance for the intersection with Sand Hill Road is LOS E or better.

An operational model was developed to evaluate traffic conditions at the signalized intersections within the Corridor Study. The model is calibrated to real-life conditions at the time data was collected, including observed travel times and operating characteristics. Using the travel time runs completed for the corridor, the predicted travel time from the model was calibrated within 5 percent of the actual data.

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest volumes on the local transportation network. A summary of the intersection level of service calculations are summarized in Table 3.

Currently, all study intersections along the corridor were found to be operating at or better than their LOS standard.

Intersection turning movement volumes and intersection LOS calculations are included in Appendix C.

Table 3 – Existing Peak Hour Intersection Levels of Service

Study Intersection	Existing Conditions		
	Peak Hour	Delay	LOS
1. El Camino Real/Sand Hill Rd	AM	33.9	C
	PM	65.8	E
2. El Camino Real/Cambridge Ave	AM	4.9	A
	PM	11.6	B
3. El Camino Real/Middle Ave	AM	14.7	B
	PM	15.9	B
4. El Camino Real/Roble Ave	AM	10.2	B
	PM	13.5	B
5. El Camino Real/Menlo Ave-Ravenswood Ave	AM	38.3	D
	PM	53.8	D
6. El Camino Real/Santa Cruz Ave	AM	22.5	C
	PM	18.7	B
7. El Camino Real/Oak Grove Ave	AM	20.7	C
	PM	30.6	C
8. El Camino Real/Valparaiso Ave-Glenwood Ave	AM	38.6	D
	PM	31.4	C
9. El Camino Real/Encinal Ave	AM	13.8	B
	PM	10.2	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service



Queuing

Vehicular queuing along the El Camino Real corridor at the study intersections was analyzed for both the a.m. and p.m. peak hours. For each scenario the projected average and maximum queues on the El Camino Real approaches to the study intersections are shown in a series of images included in Appendix C. In general, these conditions reveal the following:

- The longest average queues were confirmed to occur in the southbound direction during the a.m. peak hour, and in the northbound direction during the p.m. peak hour which are the peak times and direction of vehicle travel, approaching Menlo Avenue-Ravenswood Avenue, with maximum projected through-lane queues intermittently spilling back to adjacent intersections. However, all average queues were within the available storage capacity between signalized intersections on El Camino Real.
- While maximum left-turn queues intermittently exceeded the available storage capacity, all of the average queues within left-turn lanes were within the available storage capacity of those lanes, with the exception of the northbound left-turn lane at Sand Hill Road.
- All of the queues within right-turn lanes were, on average, within the available storage capacity of those lanes.

Queuing during the p.m. peak hour is shown in Figure 7.

Pedestrian Facilities

Within Menlo Park, continuous sidewalks are currently provided along both sides of El Camino Real; however, the width and condition of the sidewalk varies along the corridor. Although sidewalk widening is not proposed as part of this project, as part of the Downtown Specific Plan widening of existing sidewalks was recommended. Within the Downtown area on El Camino Real (between Oak Grove and Menlo Avenues), the Specific Plan proposed 12-foot wide sidewalks separated from travel lanes by on-street parking and possible future bicycle lanes. The sidewalks would consist of an

Figure 7 | PM Peak Hour Queuing



eight-foot wide clear pedestrian zone and a four-foot wide furnishings zone. The gains in sidewalk widths, implemented by private developers, would be achieved over time by moving building frontages back as sites redevelop.

As part of the corridor study, an assessment of all existing crosswalks was conducted. Marked crosswalks, along with pedestrian crossing signal equipment, are provided at all study intersections; however, at the following locations, crossings are not provided on one leg of El Camino Real:

- Cambridge Avenue (south leg)
- Middle Avenue (south leg)
- Roble Avenue (north leg)
- Menlo Avenue/Ravenswood Avenue (south leg)
- Encinal Avenue (south leg)

All crosswalks within the study area have standard crosswalk markings, two transverse white lines perpendicular to the flow of traffic. There are no uncontrolled marked crossings of El Camino Real within the study area corridor. At the five other uncontrolled intersections within the corridor (Live Oak Avenue, College Avenue, Partridge Avenue, Harvard Avenue and Creek Drive), there are raised medians which include intermittent landscaping. Although these medians discourage pedestrian crossings of El Camino Real and channel crossings to signal-controlled locations, there are no signs or markings that prohibit pedestrians from crossing at these locations.

At all marked crosswalk locations, curb ramps are provided on both sides of the street. Curb ramps are also provided at all intersecting street crossings along El Camino Real.

Data collection typically assesses peak commute travel periods, which do not always align with peak travel for pedestrians and bicyclists. In Menlo Park, based on observations, typically peak travel periods for bicycling and walking typically occur during the mid-day and afternoon conditions (i.e., around lunch and school dismissal hours). However, the peak commute hours typically represent the worst-case scenario for traffic congestion. That is why peak commute hours are the focus of this Study.

There are existing raised medians on all sections of El Camino Real in the study corridor. Wider medians also provide tree coverage and landscaping while narrower sections have no landscaping and provide channelization.

As part of the data collection effort, pedestrian crossings were counted during the a.m. and p.m. peak hours. The heaviest pedestrian crossings of El Camino Real were recorded at the intersection with Santa Cruz Avenue with over 120 crossings during the p.m. peak hour.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2012, classifies bikeways into three categories:

- ▶ **Class I Multi-Use Path:** a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- ▶ **Class II Bike Lane:** a striped and signed lane for one-way bike travel on a street or highway.
- ▶ **Class III Bike Route:** signing only for shared use with motor vehicles within the same travel lane on a street or highway.

Note: Caltrans is currently preparing design guidelines for a new class of bike facility. **Class IV Bikeways**, or cycletracks, are separated from motor traffic using a physical barrier, such as curbs, planters, or parked cars.

Currently, there are no designated bicycle facilities on El Camino Real within Menlo Park. Class II bicycle lanes currently exist on Valparaiso Avenue and Glenwood Avenue. Sharrows are marked on Menlo Avenue west of El Camino Real, a Class III Bike Route. Additionally, parallel Class II bicycle lanes are provided along Alma Street and Laurel Street; however, neither parallel route continues for the entire length of El Camino Real.

Planned bicycle facilities along El Camino Real and on nearby side streets are detailed in the Menlo Park Comprehensive Bicycle Development Plan and in the *Menlo Park El Camino Real/Downtown Specific*



Plan. These planned bicycle facilities include Class II bike lanes on Oak Grove Avenue, Future Class II/Minimum Class III bike facilities along El Camino Real and on Menlo Avenue, Ravenswood Avenue west of the Caltrain Tracks, and Middle Avenue, and a Class III bike route on Encinal Avenue.

Bicycle volumes were counted during the a.m. and p.m. peak hour. The data shows that, today, there is limited bicycle use along the El Camino Real corridor. This is likely due to the limited bicycle infrastructure on El Camino Real, coupled with heavy vehicle traffic volumes. Additionally, many bicycle trips are made off-peak when vehicle traffic is lighter, but speeds are faster with less congested conditions.

Crossing El Camino Real, most of the intersections between Valparaiso Avenue-Glenwood Avenue and Menlo Avenue-Ravenswood Avenue experience bicycle volumes of between 5 and 15 riders per hour. Sand Hill Road, with the bicycle-only through lane crossing El Camino Real, has over 30 riders per hour in the peak direction. Generally, during the two-hour peak commute period, the maximum hourly bike volumes along El Camino Real aligns with the peak hourly travel for vehicles.

Transit Access

Local transit services in Menlo Park are provided by the San Mateo County Transit District (SamTrans). Additional regional services are provided by Caltrain and the Santa Clara Valley Transportation Authority (VTA). In addition, shuttles along El Camino Real are provided by the City of Menlo Park's Shuttle Service, as well as Stanford's Marguerite Shuttle.

SamTrans

The San Mateo County Transit District operates SamTrans, a fixed-route bus transit service within San Mateo County. SamTrans primarily serves as a local transit provider within San Mateo County, but also provides connecting regional services to neighboring Santa Clara and San Francisco Counties. All SamTrans buses are equipped with bike racks. Two additional bikes are allowed inside the bus, depending on passenger loads.

SamTrans provides paratransit services through the affiliated Redi-Wheels and RediCoast providers. Paratransit, also known as dial-a-ride or door-to-

door service, is available for those who are unable to independently use the transit system due to a disability.

There are six ECR stops in both directions within the study area. The average weekday ridership, by direction, is summarized in Charts 7 and 8.

Caltrain

Caltrain is the commuter rail line serving the San Francisco Peninsula. It connects Menlo Park with San Francisco to the north and San Jose and Gilroy to the south, and provides a means to connect to VTA Light Rail and BART services. On weekdays, there are 30 trains servicing the Menlo Park Station in the northbound and southbound directions. There are four to six trains during the 7:00-9:00 a.m. and 4:00-6:00 p.m. peak periods in each of the northbound and southbound directions. On weekends, there are fourteen to sixteen trains that stop at the station daily. The Menlo Park Caltrain Station is on the north side of Ravenswood Avenue, east of El Camino Real.

The average weekday ridership is summarized in Chart 9.

Parking

Vehicular parking along the El Camino Real corridor is provided in four forms: on-street parking, off-street public parking plazas, off-street private parking lots and off-street commuter parking. In addition, bicycle parking is provided both in racks along the corridor, at various downtown locations and at the Caltrain station.

On-Street Parking

On-street parallel parking is provided along segments of El Camino Real where the roadway width permits. In Downtown Menlo Park, both along El Camino Real and on adjacent streets, on-street parking is generally limited to two hours. There are a total of 85 parking spaces on the east side of El Camino Real and 71 spaces on the west side within the study area. Additional on-street parking is available on side streets throughout the corridor. The inventory of on-street parking spaces in the corridor is included in Appendix C.



Chart 7 | SamTrans Bus Route ECR Northbound: Average Weekday Ridership

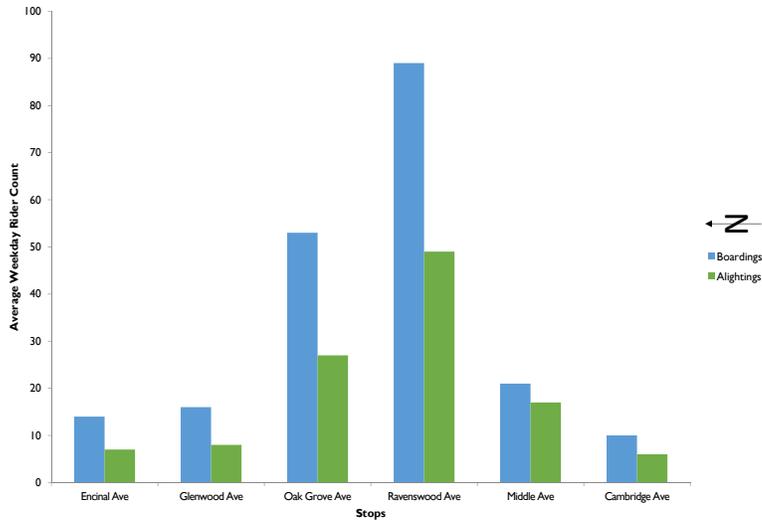


Chart 8 | SamTrans Bus Route ECR Southbound: Average Weekday Ridership

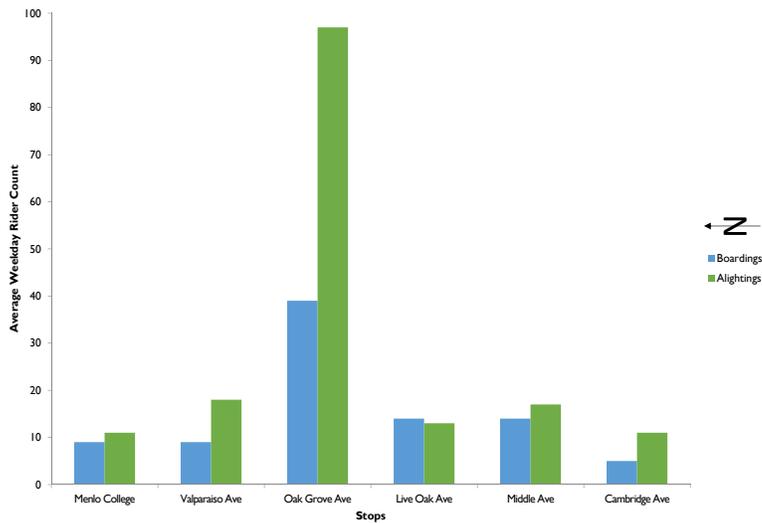
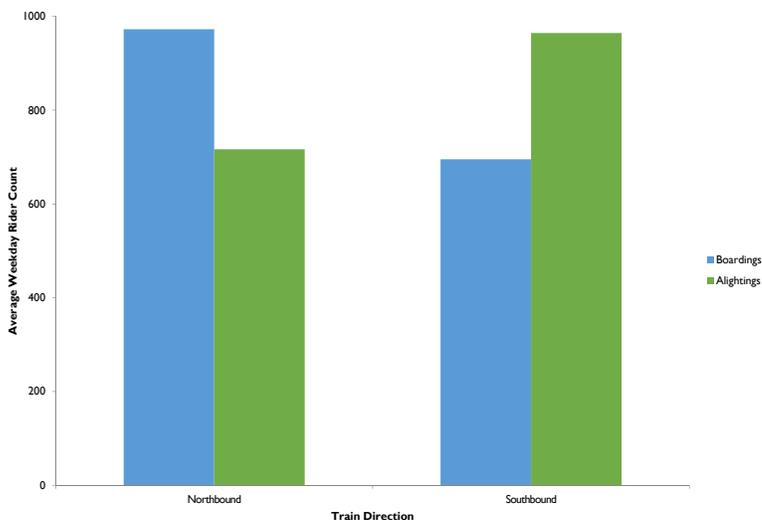


Chart 9 | Caltrain Menlo Park Station: Average Weekday Ridership



Vehicle Parking Occupancy

On-street parking occupancy surveys were conducted in September 2014, while public schools and Stanford University were in session. Parking occupancy surveys were conducted along El Camino Real between Encinal Avenue and Sand Hill Road, as well as on side-streets immediately adjacent to El Camino Real. Table 4 shows the peak occupancy on El Camino Real which occurred during the weekday midday peak period with 53 vehicles parking in the 156 available parking spaces.

Table 4 – Peak Parking Occupancy on El Camino Real

Segment of El Camino Real	West Side			East Side		
	Spaces	Parked Veh.	Occ. %	Spaces	Parked Veh.	Occ. %
Encinal Ave to Valparaiso Ave-Glenwood Ave	-	-	-	14	6	43%
Valparaiso Ave-Glenwood Ave to Oak Grove Ave	15	8	53%	16	9	56%
Oak Grove Ave to Santa Cruz Ave	5	5	100%	-	-	-
Santa Cruz Ave to Ravenswood Ave-Menlo Ave	8	7	88%	-	-	-
Ravenswood Ave-Menlo Ave to Live Oak Ave	10	2	20%	-	-	-
Roble Ave to Middle Ave	-	-	-	20	0	0%
Middle Ave to College Ave	8	3	38%	-	-	-
College Ave to Partridge Ave	6	5	83%	12	4	33%
Partridge Ave to Cambridge Ave	-	-	-	11	4	36%
Cambridge Ave to Harvard Ave	-	-	-	11	0	0%
Harvard Ave to Creek Dr	19	0	0%	1	0	0%
Totals	71	30	42%	85	23	27%





Best Practices and Potential Improvement Measures

The *Menlo Park El Camino Real/Downtown Specific Plan* outlines specific pedestrian, bicycle, and transit policies which support each mode's individual goals while fulfilling the overall goals of the Specific Plan. Based on these goals, a summary of best practices, or "toolbox" of potential improvement measures for the El Camino Real corridor, was developed and was presented at Workshop #2 on October 2, 2014 in order to gather feedback from the public on these potential modifications in advance of defining the alternatives. The toolbox, which is included in Appendix D, included the following elements:

Toolbox Elements include...

- ▶ Pedestrian Improvements
- ▶ Bicycle Improvements
- ▶ Transit Enhancements
- ▶ Parking Improvements
- ▶ Streetscape Improvements

Pedestrian Improvements

1. **High Visibility Crosswalks** – Clearly delineated pedestrian crossing areas to enhance visibility and the pedestrian environment.



2. **Curb Extensions** – Increase the visibility of pedestrians while reducing intersection crossing distance by aligning pedestrians with the edge of the parking lane.



CHAPTER 5 Best Practices

- 3. **Pedestrian Refuge Median** – Reduce the exposure time experienced by pedestrians in the intersection and provide the ability to cross in two separate legs. In Menlo Park, there would be a desire to ensure that the existing median trees are not impacted by these refuge areas.



- 4. **Enhanced Pedestrian Signal Functions** – Leading Pedestrian Intervals provide pedestrians a head start when entering the intersection in order to increase the visibility of pedestrians in the intersection. Countdown signal heads will inform pedestrians of the available time to cross.



- 5. **Enhanced Crossing Signage** – Intended to increase pedestrian visibility, but should not replace geometric design strategies. Provides motorists more warning of approaching pedestrian crossing.



- 6. **Turn Limitations** – Prohibiting and/or limiting motorists turning movements to reduce conflicts with pedestrians.



- 7. **Enhanced Pedestrian Railroad Crossings** – Provide pedestrians a direct crossing of the tracks in order to increase safety and reduce exposure time.



Bicycle Improvements

1. **Conventional Bike Lanes** – Designate an exclusive space for bicyclists through pavement markings and signage. Located adjacent to travel lanes and flows in the same direction as traffic.



2. **Buffered Bike Lanes** – Conventional bike lanes paired with a designated buffer space to separate the bicycle lane from the adjacent travel lane or parking lane.



3. **Separated Bike Lanes** – Exclusive bicycle facilities physically separated and sometimes elevated from vehicle traffic and distinct from the sidewalk. These can be configured as either one-way or two-way depending on the available width. Sometimes referred to as cycle tracks.



4. **Shared Lane Markings** – Also known as Sharrows, these are road markings used to indicate a shared lane environment for bicycles and vehicles which recommend proper bicycle positioning and offer directional guidance. These markings are generally used on both local and arterial streets where there is not adequate width for full bike lanes.
5. **Bicycle Boulevard** – Streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority.
6. **Colored Bike Facilities** – Increases the visibility of the bicycle facility, identifies potential conflict areas, and reinforces bicycle priority in conflict areas.



- 7. **Bicycle Through Lanes at Intersections** – Enable bicyclists to correctly position themselves to travel through the intersection, minimizing conflict and creating predictability.
- 8. **Intersection/Bicycle Crossing Markings** – Increase bicycle visibility and reduce exposure in the intersection.
- 9. **Bike Boxes** – A designated area ahead of the travel lane that provides bicyclists with a safe and visible way to get ahead of queuing traffic.



- 10. **Two-Stage Turn Queue Boxes** – Orient bicyclists properly for turning movements, provide a better way to make left turns at multi-lane signalized intersections.



- 11. **Bicycle Turn Signal Heads** – Provide for specific bicycle turn movement at signalized intersections.
- 12. **Full Bicycle Signal** – Standard three lens signal specifically for bicycles provide priority to bicycle movements at intersections and accommodates bicycle-only movements.



- 13. **Increased Bicycle Parking and Storage** – Safe and convenient bicycle parking racks and storage would encourage bicycle trips to the Downtown and Caltrain.



Transit Enhancements

1. **Bus Bulbs** – Curb extensions that align the bus stop with the parking lane, allowing busses to stop and board passengers without ever leaving the travel lane.



2. **Far-Side Bus Stops** – Located at the far side of an intersection, these allow for passengers to cross behind the bus improving visibility of crossing pedestrians for drivers waiting at the intersection.
3. **Midblock Bus Stops** – Recommended for important destinations or locations where multiple buses may queue.
4. **Transit Signal Priority** – Modifications to normal signal operation process to better accommodate transit vehicles through preferential treatment.
5. **Bus Stop Facilities** – All bus stops should have improved shelters, bike racks, and expanded sidewalks to separate the waiting area from the walking area of the sidewalk.

Parking Improvements

1. **Short On-Street Parking Time Limits** – Used to encourage turnover in areas where high turnover is expected or warranted.
2. **Long Off-Street Parking Time Limits** – Encourage employees and multi-purpose trips to park off-street to free up available spaces to improve convenience.
3. **Parking Pricing Strategies** – Price convenient/desirable spaces at a higher rate. Set parking prices so that 85 percent of curbside spaces are occupied during peak periods.

4. **Vegetated Parking Lanes** – Utilize street trees or planters to separate parking spaces.
5. **Parking Lanes as Buffers** – Place the parking lane between the bicycle lane and the travel lane to increase bicycle protection.

Streetscape Improvements

1. **Street Trees** – Provide tree cover to create substantial shaded pathways to encourage walking and completing tree canopy or shade where possible. Mitigate heat island effects.



2. **Median Enhancements** – Additional trees and landscaping to complete tree canopy or shade where possible.
3. **Parklet** – Public seating platforms that convert curbside parking spaces into community spaces along narrow or congested sidewalk to increase public space and seating.



- 4. **Temporary Street Closures** – Allow cities to take better advantage of roadways and call attention to neighborhood businesses and increase foot traffic on designated corridors.



- 5. **Interim Public Plazas** – Transforms underutilized areas of roadway into public spaces for surrounding residents and businesses.



- 6. **Vegetated Swales** – Shallow landscaped areas designed to capture, convey, and potentially infiltrate storm water runoff as it moves downstream.



- 7. **Pervious Pavement** – Allows rainwater to either pass through the paving system itself or through joint openings between the pavers.

- 8. **Infiltration/Flow-Through Planters** – Contained landscaping areas designed to capture and retain storm water runoff.



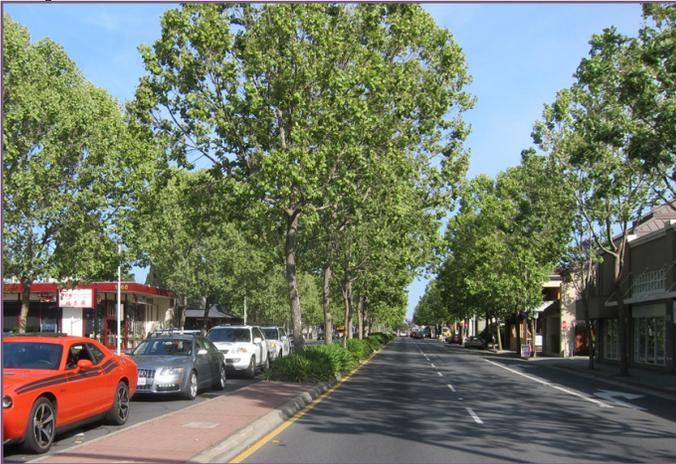
- 9. **Rain Gardens** – Shallow landscaped areas that can collect, slow, filter, and absorb large volumes of water delaying discharge into the watershed system.



- 10. **Stormwater Curb Extensions** – Landscaped areas within the parking zone of a street that capture storm water and allow it to interact with plants and soil.

- 11. **Pavement Reallocation** – The available pavement should be reallocated to serve all needs and users and could consist of lane narrowing for speed reduction, the removal of underutilized turn lanes or parking to create room for bike lanes or wider sidewalks, and/or installation of landscaping in areas of unused pavement.





Alternatives

The objective of this effort was to develop three alternatives intended to improve multi-modal transportation. Per direction from the City Council, consideration for the possible addition of a bicycle lane or an additional through lane on the northern section where there are currently four through lanes instead of six was

to be evaluated. The alternatives were to be defined to not impact the existing center tree-lined medians and the sidewalks which limited any modifications to the curb to curb pavement areas between the center median and sidewalks.

The development of the alternatives evolved from the following:

- Direction from the City Council on minimum considerations
- Goals of the Downtown Specific Plan
- Toolbox of Best Practices
- Input received at the Corridor Study Workshops

The resulting alternatives for the study included the following which are summarized in Table 5:

- **No Project**
- **Alternative 1** – Continuous Three Lanes
- **Alternative 2** – Buffered Bike Lanes
- **Alternative 3** – Separated Bike Facility

All of the alternatives maintain the existing northbound right-turn lane on El Camino Real approaching Ravenswood Avenue due to heavy existing traffic volumes of 385 vehicles during the

Table 5 – Summary of Corridor Alternatives

	No Project	Alt 1	Alt 2	Alt 3
Existing 2 Through Lanes North of Live Oak Ave	X		X	X
Continuous 3 Through Lanes on Corridor		X		
Add On-Street Bike Facilities			X	X
Removal of On-Street Parking		X	X	X
Removal of Right Turn Pockets at Santa Cruz Ave, Oak Grove Ave, and Valparaiso-Glenwood Ave		X		X
Add Third Northbound Through Lane at Ravenswood Ave		X	X	

CHAPTER 6 Alternatives

a.m. peak hour and over 600 during the p.m. peak hour at this location. As a result of the identified mitigations from the *Menlo Park El Camino Real/ Downtown Specific Plan*, two of the three alternatives also include the addition of a third northbound travel lane approaching Ravenswood Avenue. This improvement is assumed to be included in Alternative 1 – Continuous Three Lanes and Alternative 2 – Buffered Bike Lanes. Further discussion about the specific modifications proposed under each alternative is provided on pages 36-45.

No Project



No Project – looking southbound towards El Camino Real/ Santa Cruz Avenue intersection



No Project – looking southbound at El Camino Real/ Santa Cruz Avenue intersection

Under this alternative, the existing lanes, traffic controls, pedestrian crossing and lack of bicycle facilities on El Camino Real within Menlo Park would remain with no changes. This alternative is evaluated to provide a baseline to compare analyses of each alternative.

Alternative 1 – Continuous Three Lanes



Alternative 1 – looking southbound towards El Camino Real/Santa Cruz Avenue intersection



Alternative 1 – looking southbound at El Camino Real/ Santa Cruz Avenue intersection

This alternative includes the addition of a third travel lane in each direction between Encinal Avenue and Roble Avenue, where there are currently two through lanes in each direction. The additional through lane would be created by removing all on-street parking north of Roble Avenue and conversion of the existing right-turn lanes into shared through/right-turn lanes. In keeping with the direction of the study objectives, a northbound right-turn lane approaching Ravenswood Avenue would remain as part of the corridor concept plan, which is provided in Figure 8.

- On-Street parking would be prohibited north of Roble Avenue.
- Existing right-turn pockets at Santa Cruz, Oak Grove, etc. would become shared through/right-turn lanes.
- The existing northbound right-turn lane approaching Ravenswood Avenue would become the third travel lane and the road would be widened by approximately 12 feet to create a new northbound right-turn lane.



Figure 8 | Concept Plan – Alternative 1



ALTERNATIVE 1
CONTINUOUS 6 LANES

PLLOT DATE: 6/29/15



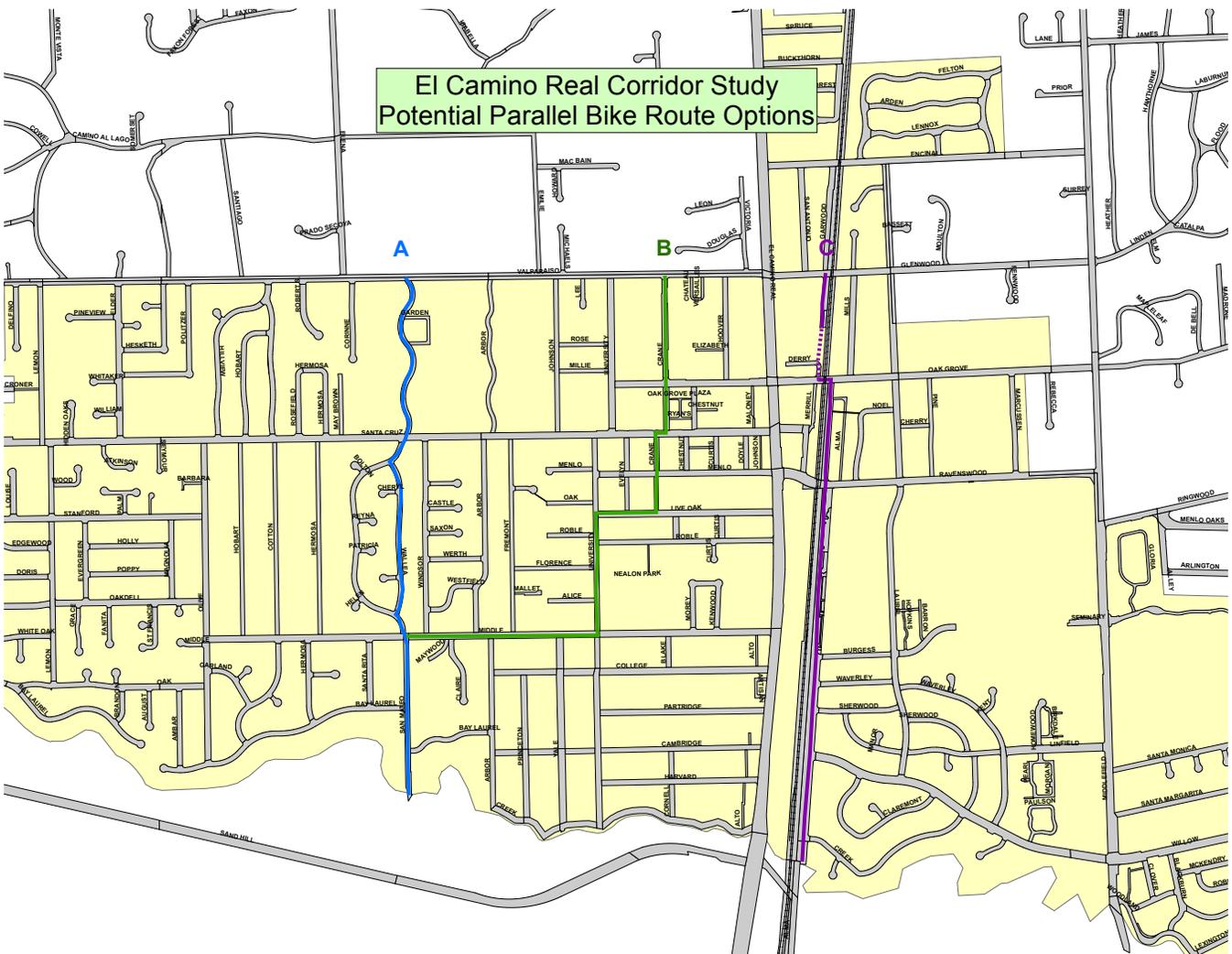
- Due to the widening on the east side of El Camino Real to create both a third travel lane and a northbound right-turn lane approaching Ravenswood Avenue, this alternative may result in removal of approximately 11 heritage trees and seven street trees on the southeast corner of El Camino Real/Ravenswood Avenue.
- No pedestrian bulbouts could be added under this alternative, north of Roble Avenue due to geometric constraints. There would still be opportunities to provide corner bulbouts at intersections, south of Roble Avenue.
- No bicycle facilities would be added to El Camino Real under this alternative.
- A parallel bicycle route would be included. Three options for this route are the following corridors (see Figure 9):

A. West of El Camino Real

San Mateo Drive – Wallea Drive

This route would connect Valparaiso Avenue near Sacred Heart with the Stanford Medical Center area via a route through neighborhood streets. Bike lanes could not be striped because of the width limitations unless on-street parking is removed. Other modifications would likely include wayfinding, signs and shared-lane markings, crossing improvements at Middle Avenue, Santa Cruz Avenue, and Valparaiso Avenue, and stop-sign orientation to favor bike movements. Between these three options, this route would provide comfort for cyclists due to the lower speeds and lower traffic volumes, but would not provide a direct connection to downtown nor beyond the confines of the immediate route.

Figure 9 | Map of Potential Parallel Bike Route Options



B. West of El Camino Real, Downtown Alternative
San Mateo Drive – Middle Avenue – University Drive – Live Oak Avenue – Crane Street

This route would connect Valparaiso Avenue near Menlo School with the Stanford Medical Center area via a route through a collection of neighborhood and collector streets. Similar to Route A, bike lanes could not be striped unless on-street parking is removed. Other modifications would likely include wayfinding, signs and shared-lane markings, traffic calming, crossing improvements at Middle Avenue, Menlo Avenue, Santa Cruz Avenue, Oak Grove Avenue and Valparaiso Avenue, and stop-sign orientation to favor bike movements. Between these three options, this route would provide a moderate level of comfort for cyclists with some exposure to streets with moderate traffic volumes, and it would provide a direct connection to downtown, but no connections beyond the confines of the immediate route.

C. East of El Camino Real
Alma Street – Oak Grove Avenue – Garwood Way (including possible future extension)

This route would connect Glenwood Avenue, east of El Camino Real with the City of Palo Alto via a route primarily on Alma Street with a jog across the railroad tracks at Oak Grove Avenue. Existing bike lanes are provided on Alma Street south of Ravenswood Avenue. North of Ravenswood Avenue, parking modifications would be needed to accommodate bike lanes. Other modifications would likely include wayfinding, signs and markings, traffic calming, and crossing improvements at Alma Street, Oak Grove Avenue, and Glendwood Avenue-Valparaiso Avenue. Between these three options, this route would provide the least level of level of comfort for cyclists due to the exposure of traffic and speeds on Alma Street. It would provide a direct connection to Caltrain and Burgess Park, but would require crossing major streets and El Camino Real to access Downtown.

Alternative 1A – Time of Day Shared Vehicle Lane/Parking

Consideration was given to implementing the additional third travel lane in each direction, north of Roble Avenue as a time of day restricted vehicle travel lane that converts to parking in off-peak hours. For example, during the a.m. peak hours of 6:30 to 9:30 a.m., signage would allow for a third travel lane in the southbound direction, north of Roble Avenue. During the other hours of the day, the curb lane would convert to on-street parking. During the p.m. peak hours of 3:00 to 6:00 p.m., a third travel lane would be provided, north of Roble Avenue in the northbound direction. Due to the need to provide a separate northbound right-turn lane approaching Ravenswood Avenue, the third northbound lane would be permanent south of Ravenswood Avenue while the curb lane would convert to on-street parking during non-p.m. peak hours, north of Ravenswood Avenue. This alternative would provide added through-vehicle capacity at the intersections north of Roble Avenue. However, based on the traffic forecasting results discussed in the next section, the increase in capacity would likely attract more through traffic which would in turn degrade the potential operational benefits. There would also be a need for daily enforcement and towing of vehicles that block traffic in the peak periods.



Alternative 2 – Buffered Bike Lanes



Alternative 2 – looking southbound towards El Camino Real/Santa Cruz Avenue intersection



Alternative 2 – looking southbound at El Camino Real/Santa Cruz Avenue intersection

Bike lanes would be added on El Camino Real in both directions under this alternative between Sand Hill Road and Encinal Avenue. Because of the higher traffic volumes, higher travel speeds and exposure to truck traffic on El Camino Real, guidelines from the North American City Transportation Officials suggest buffered bike lanes over conventional bicycle lanes in this type of situation (see insert to the right). The bike lanes would be a minimum of five-feet standard with additional buffering from the vehicle travelway by an approximate three-foot wide painted section on most sections of the corridor. The additional bike lanes and buffering would be achieved by eliminating on-street parking along the majority of the corridor. The existing six through lane section, south of Live Oak Avenue would remain under this alternative. A concept plan is provided in Figure 10.

At Ravenswood Avenue, this alternative accommodates potential widening of the northbound approach to add a third northbound through lane. This additional lane would extend



Buffered Bike Lanes – Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

Benefits

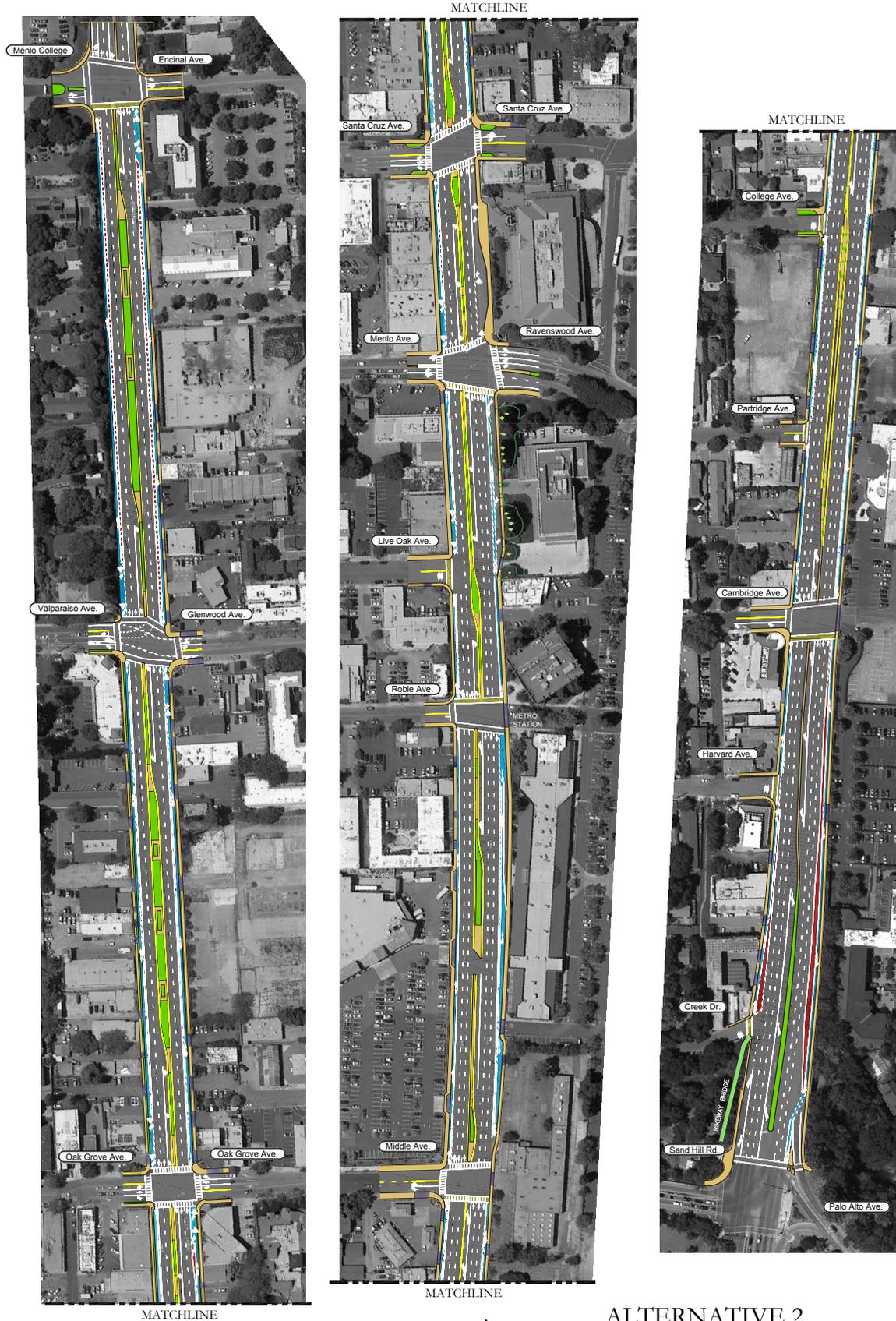
- ▶ Provides greater shy distance between motor vehicles and bicyclists.
- ▶ Provides space for bicyclists to pass another bicyclist without encroaching into the adjacent motor vehicle travel lane.
- ▶ Encourages bicyclists to ride outside of the door zone when buffer is between parked cars and bike lane.
- ▶ Provides a greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane or a parking lane.
- ▶ Appeals to a wider cross-section of bicycle users.
- ▶ Encourages bicycling by contributing to the perception of safety among users of the bicycle network.

Typical Applications

- ▶ Anywhere a standard bike lane is being considered.
- ▶ On streets with high travel speeds, high travel volumes, and/or high amounts of truck traffic.
- ▶ On streets with extra lanes or extra lane width.
- ▶ Special consideration should be given at transit stops to manage bicycle and pedestrian interactions.



Figure 10 | Concept Plan – Alternative 2



**ALTERNATIVE 2
BUFFERED BIKE LANES**

PLAT DATE: 6/29/15



from Roble Avenue to Santa Cruz Avenue in this alternative. At Santa Cruz Avenue, vehicles in this lane must turn right; through traffic must merge to the adjacent through lane.

- On-street parking would be prohibited along the majority of the study corridor.
- Existing right-turn lanes north of Ravenswood Avenue would be converted to a combined right-turn lane/bike lane in order to accommodate bicyclists.
- Narrow pedestrian bulbouts could be accommodated at some downtown intersections where there are no right-turn lanes by replacing the buffer area with the pedestrian bulbouts.
- There would additional opportunities to provide corner bulbouts at intersections south of Roble Avenue.
- In the northbound direction approaching Ravenswood, the roadway would be widened by approximately 17 feet which includes one 12-foot right-turn lane and the five-foot bike lane. The bike lane buffering was assumed to drop approaching Ravenswood Avenue to minimize potential tree impacts.
- The new third northbound through travel lane would convert to a “trap” right-turn lane at Santa Cruz Avenue. Because of the bus turnout and alternative variation to carry the third through lane to Santa Cruz Avenue, sharrow markings for bikes would be provided on the block between Ravenswood Avenue and Santa Cruz Avenue.
- Due to the widening on the east side of El Camino Real to create the third travel lane, northbound right-turn lane approaching Ravenswood Avenue, and the bike lane, this alternative may result in removal of approximately 11 heritage trees and seven street trees on the southeast corner of El Camino Real/Ravenswood Avenue.

Alternative 3 – Separated Bicycle Facility



Alternative 3 – looking southbound towards El Camino Real/Santa Cruz Avenue intersection



Alternative 3 – looking southbound at El Camino Real/Santa Cruz Avenue intersection

The alternative would provide a physically separated bicycle facility on El Camino Real in both directions between Sand Hill Road and Encinal Avenue. Each of the five to six-foot wide one-way bike lanes would be from vehicle traffic with three-foot wide raised curbs or planters on most sections of the corridor¹. The facility would be created by eliminating on-street parking and modifying existing right-turn lanes through the majority of the corridor. This alternative also includes “protected intersection design” at several intersections. The existing six through lane section, south of Live Oak Avenue would remain under this alternative. In keeping with the direction of the study objectives, a northbound right-turn lane approaching Ravenswood Avenue would remain as part of the corridor concept plan. A concept plan is provided in Figure 11.

¹ Bike lanes would be six feet wide north of Ravenswood Avenue and primarily five feet wide south of Ravenswood Avenue



Figure 11 | Concept Plan – Alternative 3



**ALTERNATIVE 3
SEPARATED BIKE FACILITY**



- On-Street parking would be prohibited along the majority of the study corridor.
- Existing right-turn lanes north of Roble Avenue would be eliminated.
- Some intersections would be designed with a “Protected Intersection” bicycle design approach (see insert on page 45). The protected bike lane would enter mixing zones with pedestrians at the intersections, and bicycle crossings would be provided adjacent to crosswalks.
 - Valparaiso/Glenwood
 - Oak Grove
 - Santa Cruz
 - Middle

- The existing northbound right turn lane approaching Ravenswood Avenue would be maintained as well as the two existing northbound through lanes. Widening of approximately 8-feet on this section will be required to achieve the protected bike lane.
- Due to the widening on the east side of El Camino Real to create the bike facility, this alternative may result in removal of approximately one heritage tree and seven street trees on the southeast corner of El Camino Real and Ravenswood Avenue.
- Intersections would be designed with bicycle crossings provided adjacent to crosswalks.

Separated Bike Facilities – Caltrans design standards refer to this treatment as a Class IV: Separated Bicycle Facility. It is a newly adopted type of bicycle facility that several cities around the US and California have begun to implement. This type of facility is generally preferred in urban and suburban communities where a Shared-Use Bicycle and Pedestrian Path (or trail; a Class I bicycle facility) is not recommended due to intersections and driveway crossings. Instead, a Class IV bicycle facility can provide physical separation between bikes and vehicles while providing better predictability and visibility for cyclists and preserving sidewalks for pedestrians.

Benefits

- ▶ Dedicates space for bicyclists in order to improve perceived comfort and safety.
- ▶ Eliminates risk and fear of collisions with over-taking vehicles.
- ▶ Reduces risk of ‘dooring’ compared to a bike lane and eliminates the risk of a doored bicyclist being run over by a motor vehicle.
- ▶ Prevents double-parking, unlike a bike lane.
- ▶ More attractive for bicyclists of all levels and ages.

Typical Applications

- ▶ Streets on which bike lanes would cause many bicyclists to feel stress because of

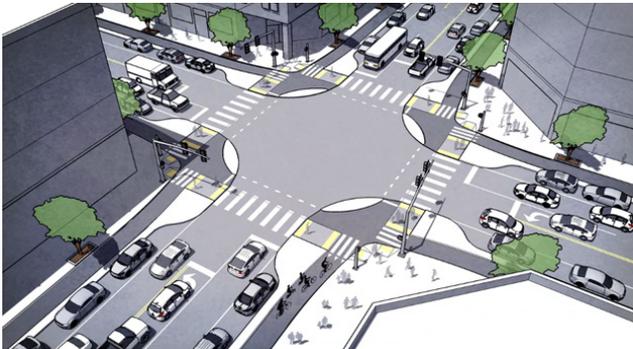


factors such as multiple lanes, high traffic volumes, high speed traffic, high demand for double parking, and high parking turnover. Current planning and design guidance for separated bike lanes is published by the Federal Highway Administration, *Separated Bike Lane Planning and Design Guide*, May 2015.

- ▶ Streets for which conflicts at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments.
- ▶ Along streets with high bicycle volumes.
- ▶ Along streets with high motor vehicle volumes and/or speeds.
- ▶ Streets with parking lanes.
- ▶ Special consideration should be given at transit stops to manage bicycle & pedestrian interactions.



- While traditional pedestrian bulbouts are not included under this alternative, pedestrian crossing distances would be shortened with provision of the separated bicycle facility and the protected intersection design.



Source: www.protectedintersection.com

Protected Intersections – Protected intersection designs are in progress in Austin, Texas; Salt Lake City, Utah; Lincoln, Nebraska; Portland, Oregon; and Davis, California. Key Elements to Protected Intersections include:

- ▶ **Corner Refuge Islands** – Separates turning vehicles from bicyclists.
- ▶ **Bike Signals** – Designates a phase for bicyclists that allows them to get mostly or completely through the intersection before giving a green light to vehicles.
- ▶ **Forward Stop Bar** – Provides space ahead of vehicles as a refuge for bicyclists while they wait for the green light, making them more visible to motorists.
- ▶ **Set-back Bicycle Crossing** – Pedestrian and bicycle crossing is set back with enough room for one car to turn, wait, and stop while bicyclists and pedestrians clear the crossing.

Pedestrian Crossing Improvements

In addition to the pedestrian bulbouts discussed under Alternative 2 and the shortened pedestrian crossings due to the protected intersection design in Alternative 3, all three alternatives include additional pedestrian crosswalks on the corridor where there currently are none:

- South Leg of ECR at Encinal Avenue-Menlo College
- South Leg of ECR at Ravenswood Avenue-Menlo Avenue
- North Leg of ECR at Roble Avenue
- South Leg of ECR at Middle Avenue
- South Leg of ECR at Cambridge Avenue

It is recommended that crosswalk striping, pedestrian crossing signal equipment such as countdown signals and pedestrian activated push buttons be added.

San Francisquito Bridge Crossing

All three alternatives would also include improved pedestrian and bicycle connections across the San Francisquito Creek, just north of Sand Hill Road. In the southbound direction, the existing bridge width cannot accommodate wider sidewalks or a bike lane. A separate pedestrian/bicycle bridge crossing over San Francisquito Bridge would be needed, located on the west side of El Camino Real. Bridge specifics including design, location and cost estimates need to be determined in collaboration with the City of Palo Alto. In the northbound direction, there is enough pavement width on the shoulder to create a bike lane merge across the right turn lane movement from Palo Alto Avenue with high visibility bike lane markings.





Alternatives Analysis

Analysis was completed on the different alternatives to demonstrate how the corridor would operate under Existing (2014) and Future (2035) travel demand projections.

Analysis of the alternatives included assessment of:

- Traffic Volume Forecasts
- Corridor Vehicular Travel Time and Speed
- Vehicular Intersection Delay and Level of Service
- Vehicular Intersection Queuing
- Bicyclist Safety and Comfort
- Pedestrian Safety and Comfort
- Aesthetics
- Parking
- Tree Impacts

Traffic Volume Forecasts

Travel demand was analyzed under each of the various alternatives and in the future 2035 scenario to determine how each alternative would

influence local and regional travel patterns. Demand modeling was evaluated using the joint bi-county Santa Clara and San Mateo County model maintained by the City/County Association of Governments (C/CAG) of San Mateo County and the Santa Clara Valley Transportation Authority (VTA). This model is the most sophisticated tool currently available for assessing changes in travel demand within the bi-county region. It is sensitive to changes in the roadway and transit networks, land use changes, demographics, and travel time and cost in order to predict travel demand, choice of travel mode (i.e., driving alone, transit, carpooling, bicycling, etc.), and traffic volumes during various times of day. The model is calibrated regularly to existing conditions by C/CAG and VTA to confirm that the resulting forecasts are within industry-standard ranges of confidence.

The C/CAG-VTA model was reviewed to ensure that the travel network and land use assumptions were valid for application within Menlo Park. As part of this review, the land use assumptions were verified to include the full build-out of the adopted *Menlo Park El Camino Real/Downtown Specific Plan*, as well as all other approved projects within Santa Clara and San Mateo Counties as of June 2014, when the *El Camino Real Corridor Study* was initiated. Thus, the travel demand and traffic volume forecasts account for a reasonable, worst-case scenario for future growth and development under all scenarios. Each alternative was analyzed in the model by modifying the capacity provided on El Camino Real (e.g., for Alternative 1 – 3 Vehicle Lanes, capacity was added on the appropriate segments to reflect the changes proposed with this alternative).

Additional details of the forecasting process are included in Appendix E.

Traffic volume projections were extracted from the traffic model for each of the alternatives including the No Project condition. Table 6 includes the projected traffic volumes during the a.m. and p.m. peak hours on El Camino Real under the different alternatives.

CHAPTER 7

Alternatives Analysis

Alternative 1 results in approximately 64 (a.m. peak) to 47 percent (p.m. peak) more traffic demand in the El Camino corridor north of Ravenswood Avenue with the expansion of capacity. The increase in capacity with the continuous six lanes in Alternative 1 attracted through traffic from other parallel routes such as Middlefield Road, Highway 101 and neighborhood streets (see further explanation on page 48). A more moderate increase in traffic would be served south of Ravenswood Avenue (16 to 14 percent), as minimal capacity improvements are proposed as part of this Study.

Minimal change in vehicle demand is observed in Alternatives 2 or 3. Traffic volume projections for Alternative 2 and Alternative 3 did not attract additional traffic volumes compared with the No Project since the through traffic lanes were the same under these options.

Table 7 includes the projected traffic volumes during the a.m. and p.m. peak hours on Middlefield Road under the different alternatives.

Middlefield Road does not experience much change in traffic volumes under any alternative,

north of Ravenswood Avenue. However, south of Ravenswood Avenue, Alternative 1 would create an increase of approximately 20 percent due to the added capacity on El Camino Real to the north.

Other north-south parallel routes, east of El Camino Real in closer proximity, such as Laurel Street and Alma Street would experience a more significant drop in traffic. The traffic forecasting model includes the basic street network (including arterial and collector streets), but does not include every neighborhood street. Based on the available data, the following approximate changes would be expected, west of El Camino Real:

- South of Middle Avenue, University Drive would not experience any change in peak hour traffic.
- Between Middle Avenue and Santa Cruz Avenue, University Drive would experience a 33 percent reduction in peak hour traffic as more traffic moves to El Camino Real.
- North of Santa Cruz Avenue, north-south streets would experience only a 5 percent reduction in peak hour traffic.

Table 6 – El Camino Real Traffic Volumes

Segment	Peak Hour	Existing 2014			Future 2035						
		Existing	E + Alt 1		No Project	Alt 1		Alt 2		Alt 3	
		Vol	Vol	% Inc	Vol	Vol	% Inc	Vol	% Inc	Vol	% Inc
North of Ravenswood	AM	2,150	3,230	+50%	2,430	3,990	64%	2,430	0%	2,340	-4%
	PM	2,830	3,830	+35%	3,070	4,500	47%	3,070	0%	3,010	-2%
South of Ravenswood	AM	2,880	3,030	+5%	3,660	4,230	16%	3,660	0%	3,570	-4%
	PM	3,730	3,940	+6%	4,330	4,920	14%	4,330	0%	4,270	-1%

Notes: E = Existing; Vol = Volume; Inc = Increase; Under Existing Conditions, Alternatives 2 and 3 produce virtually no change in traffic volumes similar to Future 2035

Table 7 – Middlefield Road Traffic Volumes

Segment	Peak Hour	Existing 2014			Future 2035						
		Existing	E + Alt 1		No Project	Alt 1		Alt 2		Alt 3	
		Vol	Vol	% Inc	Vol	Vol	% Inc	Vol	% Inc	Vol	% Inc
North of Ravenswood	AM	850	685	-19%	1,580	1,070	-38%	1,490	-6%	1,510	-4%
	PM	1,490	644	-57%	1,740	1,610	-7%	1,730	-1%	1,790	3%
South of Ravenswood	AM	1,750	1,250	-29%	2,140	2,130	0%	1,910	-11%	2,090	-2%
	PM	2,100	1,367	-35%	2,390	2,860	20%	2,460	3%	2,430	2%

Notes: E = Existing; Vol = Volume; Inc = Increase



- East-west streets, west of El Camino Real would experience a mix of results such as Valparaiso Avenue with a 5 percent increase, Oak Grove Avenue with a 5 percent reduction, Roble Avenue with a 35 percent reduction and Middle Avenue with a 5 percent increase in peak hour traffic.

In short, more traffic appears to shift away from University Drive and connect to El Camino Real at Middle Avenue and Valparaiso Avenue with the modifications to El Camino Real.

Key Findings Related to Traffic Volumes

- ▶ Traffic demand grows compared to Existing Conditions
- ▶ Adding through lanes (Alternative 1) draws more traffic onto El Camino Real
- ▶ Adding northbound modifications at Ravenswood Avenue without full Alternative 1 concept results in negligible increase in volume served in the corridor
- ▶ Adding bicycle lanes has little impact to the capacity and number of vehicles that the corridor can serve.

Corridor Travel Time and Speed

Table 8 shows the travel time for the entire corridor with the associated average under Future 2035 traffic volumes. With the added capacity in Alternative 1 along with the increase in traffic volumes discussed above, travel time increases over the No Project condition during both the a.m. and p.m. peak. Alternatives 2 and 3 would experience a slight increase in travel time compared to the No Project scenario.

Table 8 – El Camino Real Travel Time and Speed

Direction	Peak Hour	2035 – No Project		2035 – Alt 1		2035 – Alt 2		2035 – Alt 3	
		Travel Time (min)	Avg Speed (mph)						
Northbound Sand Hill to Encinal	AM	4.8	16.6	6.9	11.5	4.5	17.4	4.7	16.7
	PM	5.2	15.3	6.7	11.8	5.5	14.3	5.8	13.7
Southbound Encinal to Sand Hill	AM	5.8	13.6	7.5	10.5	6.0	13.3	6.9	11.5
	PM	5.0	15.7	5.7	13.8	4.8	16.4	5.1	15.6

Key Findings Related to Travel Time

- ▶ The range of alternative travel times to traverse the corridor during the a.m. peak hour varies by about 1 ½ (southbound direction) to 2 minutes (northbound direction).
- ▶ The range of alternative travel times during the p.m. peak hour is about 1 ½ minutes (northbound direction) and less than 1 minute (southbound direction).
- ▶ Alternative 1 with 3 continuous lanes would result in the longest travel times for the corridor.
- ▶ Alternative 2 with the buffered bike lanes and the No Project condition result in the shortest travel time results for the corridor.

Intersection Delay

A summary of the intersection delay and Level of Service conditions for the nine signalized intersections on the corridor are shown in Table 9 with calculations included in Appendix F. For the more critical p.m. peak hour, each of the alternatives would result in several intersections operating at levels below local standards during future traffic conditions:

- **No Project**
2 intersections operating below local standards
 - Ravenswood Avenue-Menlo Avenue
 - Valparaiso Avenue-Glenwood Avenue
- **Alternative 1 (6 Vehicle Lanes)**
3 intersections operating below local standards
 - Sand Hill Road
 - Ravenswood Avenue-Menlo Avenue
 - Valparaiso Avenue-Glenwood Avenue



- **Alternative 2 (Buffered Bike Lanes)**
1 intersection operating below local standards
 - Valparaiso Avenue-Glenwood Avenue

- **Alternative 3 (Protected Bike Lanes)**
2 intersections operating below local standards
 - Ravenswood Avenue-Menlo Avenue
 - Valparaiso Avenue-Glenwood Avenue

Table 9 – Peak Hour Intersection Levels of Service

Intersection	Peak Hour	Existing 2015				Future 2035							
		Existing		E + Alt 1		No Project		Alt 1		Alt 2		Alt 3	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. ECR/Sand Hill Rd	AM	33.9	C	33.4	C	41.7	D	37.2	D	40.7	D	42.4	D
	PM	65.8	E	69.1	E	75.5	E	86.0	F	75.5	E	73.1	E
2. ECR/Cambridge Ave	AM	4.9	A	6.0	A	8.5	A	7.9	A	8.8	A	7.5	A
	PM	11.6	B	8.9	A	11.5	B	11.7	B	11.5	B	11.4	B
3. ECR/Middle Ave	AM	14.7	B	15.7	B	23.7	C	26.2	C	23.6	C	23.0	C
	PM	15.9	B	19.1	B	27.6	C	34.1	C	28.1	C	28.2	C
4. ECR/Roble Ave	AM	10.2	B	7.3	A	7.1	A	6.7	A	7.4	A	8.0	A
	PM	13.5	B	13.8	B	13.1	B	10.7	B	12.8	B	12.9	B
5. ECR/Ravenswood Ave-Menlo Ave	AM	38.3	D	28.2	C	40.6	D	81.9	F	40.4	D	43.7	D
	PM	53.8	D	67.3	E	62.5	E	51.5	D	53.2	D	64.2	E
6. ECR/Santa Cruz Ave	AM	22.5	C	21.8	C	15.6	B	18.7	B	17.1	B	15.7	B
	PM	18.7	B	22.0	C	17.7	B	23.3	C	21.3	C	26.1	C
7. ECR/Oak Grove Ave	AM	20.7	C	26.0	C	24.2	C	22.4	C	24.2	C	25.7	C
	PM	30.6	C	29.6	C	40.5	D	32.2	C	40.7	D	41.3	D
8. ECR/Glenwood Ave-Valparaiso Ave	AM	38.6	D	94.1	F	69.6	E	111.5	F	74.1	E	135.2	F
	PM	31.4	C	28.3	C	61.4	E	110.9	F	62.4	E	82.6	F
9. ECR/Encinal Ave	AM	13.8	B	17.0	B	18.1	B	15.3	B	18.3	B	19.2	B
	PM	10.2	B	10.2	B	18.1	B	14.2	B	19.1	B	24.0	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; E = Existing; ECR = El Camino Real; **Bold** text = deficient operation; Alternatives 2 and 3 produce virtually no change in intersection LOS compared with Existing Conditions shown in Table 3

Key Findings Related to Intersection Delay

- ▶ Sand Hill Road intersection would operate at LOS E or F, which would impact the operations of the corridor by metering traffic into or out of Menlo Park under all alternatives.
- ▶ The added northbound through lane at Ravenswood Avenue would improve the existing constraint at this location; but, in doing so, degrades operations at Santa Cruz, Oak Grove, and Valparaiso-Glenwood by facilitating more northbound traffic – especially in the evening peak period.
- ▶ Removal of dedicated right-turn lanes in Alternative 3 results in higher delay conditions compared with Alternative 2, but similar delay conditions to Alternative 1.
- ▶ Alternative 2 with the buffered bike lanes and the No Project condition result in the lowest level of delay results for the corridor.



Intersection Queuing

An assessment of the through lane queue lengths for the nine signalized intersections on the corridor under 2035 Future Conditions for the No Project and the three alternatives is included in Appendix F. Queuing of vehicles stacked at the traffic signals under red signal phasing was determined to be a critical operational factor in the corridor since excessive queuing may lead to potential vehicle safety issues and access constraints for emergency vehicles. For the more congested p.m. peak hour, each of the alternatives would experience several approaches which would spill back to upstream intersections:

- **No Project**
5 locations would experience spillback
 - NB approaching Sand Hill Road
 - NB approaching Ravenswood Avenue
 - NB approaching Glenwood-Valparaiso Avenue
 - SB approaching Encinal Avenue
 - SB approaching Ravenswood Avenue
- **With Alternative 1 (6 Vehicle Lanes)**
4 locations would experience spillback
 - NB approaching Sand Hill Road
 - NB approaching Ravenswood Avenue
 - NB approaching Oak Grove Avenue
 - NB approaching Glenwood-Valparaiso Avenue
- **Alternative 2 (Buffered Bike Lanes)**
4 locations would experience spillback
 - NB approaching Sand Hill Road
 - NB Glenwood-Valparaiso Avenue
 - SB approaching Glenwood-Valparaiso Avenue
 - SB approaching Ravenswood Avenue
- **Alternative 3 (Protected Bike Lanes)**
6 locations would produce spillback
 - NB approaching Sand Hill Road
 - NB approaching Ravenswood Avenue
 - NB approaching Oak Grove Avenue
 - NB approaching Glenwood-Valparaiso Avenue
 - SB approaching Encinal Avenue
 - SB approaching Glenwood-Valparaiso Avenue

Key Findings Related to Intersection Queuing

- ▶ All scenarios would have a similar number of approaches experiencing queues which would spill back to the next upstream intersection under Year 2035 Conditions.
- ▶ Northbound traffic at Ravenswood Avenue in Alternative 2 does not experience additional spill back due to the additional through lane capacity without the full effects of induced demand generated by the continuous 3-lanes in Alternative 1.

Bicyclist Comfort and Safety

- **No Project** – El Camino Real through Menlo Park is not currently a desirable route for bicyclists because of the absence of bike facilities resulting in cyclists adjacent to parked vehicles, high traffic volumes, higher travel speeds, and truck traffic.
- **Alternative 1** – Conditions would be expected to worsen for cyclists on El Camino Real with Alternative 1 since an additional through travel lane would now be closer to the cyclists riding adjacent to the curb. People biking to or from destinations such as to local businesses or for shopping and errands on El Camino Real would not have continuous facilities under this option. However, enhanced facilities on parallel routes would improve cycling conditions overall for north-south through traffic within the City for origins and destinations away from El Camino Real.
- **Alternative 2** – The addition of buffered bike lanes in Alternative 2 would significantly improve safety conditions for the cyclists due to the following:
 - Separation between the cyclists and vehicles
 - Removal of on-street parking would eliminate bicycle conflicts with “door zone”
 - Removal of parking would increase visibility for cyclists of potential conflicts
 - Motorists may be more aware of cyclists with dedicated space
 - Bike lane could be painted green in interaction zones such as intersections and driveways



Bicycle Safety and Route Infrastructure

The American Journal of Public Health examined injury risk of 14 transportation route types using a case-crossover design in which injured participants served as their own controls. The design compared route characteristics at the location where the injury event occurred to those at a randomly selected point on the same trip route where no injury occurred.

Routes with both a high preference rating for public use and a higher safety rating consisted of the following types:

- ▶ Bike Path Only
- ▶ Cycle Tracks (Separated Bike Facility)
- ▶ Local Street with a designated bike route
- ▶ Major Street with no parked cars and a bike lane
- ▶ Local Streets

Source: *Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study*, American Journal of Public Health, December 2012

- **Alternative 3** – With separated bike facilities, Alternative 3 would provide the most optimum safety conditions for bicycling because of the following:
 - Physical separation between the cyclists and vehicles
 - Removal of on-street parking would eliminate bicycle conflicts with “door zone”
 - Removal of parking would increase visibility for cyclists of potential conflicts
 - Motorists would be even more aware of cyclists with the dedicated space
 - Bike lane could be painted green in conflict zones where crossing driveways
 - Protected intersection design would provide the most physical protection vs. vehicle interaction points.

Intersection Interaction Points – Alternatives 2 and 3 include different design treatments at intersections. Alternative 2 would be a more standard approach with the right-turn traffic merging into the bike lane in advance of the intersection to turn. The protected intersection design in Alternative 3 would provide a potentially higher level of safety for the cyclist. However, all users would need to learn the proper right-of-way reaction to this new design treatment.

Safety and Economic Benefits of Complete Streets

Safer Streets, Stronger Economies analyzed before and after transportation safety and economic data from 37 projects across the US which included Complete Street improvements such as dedicated or protected bike lanes, lane reductions, arterial traffic calming and speed reduction measures, improved crosswalks, streetscape improvements and landscaping.

- ▶ **Safety** – In the majority of cases, collision rates declined after Complete Streets projects were built, and there were fewer injuries as well. The conditions created by Complete Streets projects avoided a total of \$18.1 million in collision and injury costs in one year.
- ▶ **Multi-modal Travel** – Trips by foot, bicycle, and transit almost always increased after the implementation of the Complete Streets projects. In about half the projects, automobile volume increased or remained unchanged after the redesigns.
- ▶ **Economic Goals** – Employment levels rose after Complete Streets projects—in some cases, significantly. Communities reported increased net new businesses after Complete Streets improvements, suggesting that Complete Streets projects made the street more desirable for businesses.

Source: *Safer Streets, Stronger Economies*, Smart Growth America/National Complete Streets Coalition, May 2015

Driveway Interaction Points – Under both Alternatives 2 and 3, the bike lane could be painted green in the zone where vehicles must cross the bicycle lane to access driveways. These markings would make both motorists and cyclists more aware of the interaction area.

Bicycle Volumes – The traffic forecasting model used for the study also projected bicycle travel volumes on the El Camino Real corridor and other City streets under the various alternatives evaluated. A summary of the bicycle volumes on both El Camino Real and Middlefield Road are shown in Table 10.



Table 10 – Daily Bike Volumes

Road Segment	Existing 2014	Future 2035			
		No Project	Alt 1	Alt2	Alt 3
El Camino Real					
North of Ravenswood	120	130	130	475	855
South of Ravenswood	175	205	205	320	370
Middlefield Road					
North of Ravenswood	870	1025	1025	715	595
South of Ravenswood	855	1115	1115	855	745

Notes: 2014 volumes are existing counts factored to estimate daily volume compared to daily forecasted numbers in the future years from the model with improved facilities

Key Findings Related to Bicycle Comfort and Safety

- ▶ Alternative 1 would not provide any facilities for bicyclists on El Camino Real.
- ▶ Alternatives 2 and 3 would both provide bike lanes with some separation from the travel lane.
- ▶ Alternative 2 is estimated to increase bicycle travel approximately 4 times that of existing levels.
- ▶ Alternative 3 is estimated to increase bicycle travel approximately 7 to 8 times that of existing levels due to the increased level of comfort along the corridor and intersections.

Pedestrian Comfort and Safety

Pedestrian comfort and safety, which were evaluated for each alternative, are generally influenced by:

- Width of crossings and time exposed to traffic in crosswalk.
- Provision of adequate crossing time for all users including seniors, school children.
- Experience walking on sidewalk including width, clear zones, aesthetics, visual interest, presence of trees for shade, and protection from adjacent traffic provided from parking, trees, street furniture, and bike lanes.

Under Alternative 1, pedestrian comfort would decrease compared to No Project since elimination of parking would remove the physical separation between vehicle traffic and the sidewalk. Under Alternatives 2 and 3, the bike lanes provide a level of separation between vehicle traffic and the sidewalk. Alternative 3 would provide the most potential improvement to pedestrian conditions on the sidewalk, since the physical separation between the bike lane and vehicle traffic lane could provide a landscaped area adding to the aesthetic potential of this alternative.



Alternatives 1, 2 and 3 all provide an opportunity to add crosswalks at intersections where they are missing today (e.g., Ravenswood Avenue, Roble Avenue, etc.). Alternatives 2 and 3 provide the most potential improvement to pedestrian crossing conditions, since the number of lanes pedestrians would need to cross at intersections is minimized. Alternative 2 also provides the opportunity to construct narrow pedestrian bulbouts to further shorten pedestrian crossing distances.

While no sidewalk widening is proposed with any of the potential alternatives, sidewalk widening would be accommodated by increasing building setbacks with future redevelopment opportunities along the corridor, as outlined in the *Menlo Park El Camino Real/ Downtown Specific Plan*.

Key Findings Related to Pedestrian Comfort and Safety

- ▶ All alternatives will include added crosswalks at signalized intersections with missing locations.
- ▶ Alternative 1 would decrease pedestrian comfort due to loss of physical separation between the vehicle travel lane and the sidewalk.
- ▶ Alternatives 2 and 3 would both decrease pedestrian exposure to traffic in crosswalks by decreasing crossing distance.
- ▶ Alternative 3 would provide for the most aesthetic improvement potential with added landscape areas.

Parking

As shown in Table 11, Alternatives 2 and 3 would remove El Camino Real on-street parking for the entire length of the study corridor. Under this condition, a maximum demand of approximately 53 parked vehicles was observed under existing conditions, and would be displaced to private lots serving individual properties, side-streets and off-street public plazas in the downtown. On-street parking would be removed only north of Roble Avenue under Alternative 1. Under existing conditions, a parking demand of approximately 37 vehicles was observed, which would be displaced to other locations.

Businesses on one block of El Camino Real, the west side between Ravenswood Avenue-Menlo Avenue and Live Oak Avenue, do not consistently have access to private parking areas off-street. There are 10 on-street spaces on this block; of which, approximately 5 are designated 3-minute spaces for drop-off and pick-up in front of the Guild Theater. The peak demand on this block was observed to be 2 spaces. It is anticipated that this demand can be accommodated on Live Oak Avenue, approximately a 300' or 1 ½ minute walk away.

Table 11 – Parking Removal Summary

Alternative	Parking	
	North of Roble Ave	South of Roble Ave
No Project	No changes	No changes
Alt 1 – 6 Lanes	88 spaces removed	No changes
Alt 2 – Buffered Bike Lanes	88 spaces removed	68 spaces removed
Alt 3 – Separated Bike Lanes	88 spaces removed	68 spaces removed



Impact to Trees

The guidelines of this study required that any modifications to the corridor limit impacts to existing medians, sidewalks, and street trees. However, in order to complete the desired vehicle capacity or bike facility treatments in each of the alternatives, widening of El Camino Real, south of Ravenswood Avenue is needed. Thus, the only potential for impacts to trees in the corridor is along the east side of El Camino Real, south of Ravenswood Avenue. In this location, there are 11 heritage trees and 7 street trees.

Each of the alternatives would result in various widening amounts on this section of El Camino Real with new curbs and sidewalks. The City conducted a preliminary assessment of the trees, their root system and determined the potential impact of widening on the trees root system area. Although the alternatives are not expected to directly impact the trees, the grade differential between the existing and future street elevation and future sidewalk area poses challenges to preserving the trees when widening. Additionally, the trees root system is constrained by the underground parking structure for the 1000 El Camino Real building, which further constrains trees. Possible construction impacts of widening the street and sidewalk area are expected to damage the root system of the trees which would reduce the likelihood of survivability and potentially require the City to remove the trees in the interest of public safety.

- Alternatives 1 and 2 which would widen El Camino Real by 12 feet or more would result in the removal of up to 11 heritage and 7 street trees on the southwest corner at Ravenswood Avenue.
- Widening for Alternative 2 could be lessened by maintaining the existing two northbound through lanes, resulting in a similar footprint to Alternative 3.
- Alternative 3 would widen the road by only 8 feet which would result in the potential loss of up to 1 heritage tree.

The City has simultaneously engaged a consulting arborist to review the proposed alternatives and provide detailed a assessment of potential tree impacts, which includes recommendations to minimize impacts during construction. Tree locations in relation to the proposed improvements are shown in Figures 12 through 15.

Figure 12 | Impact to Trees – Existing Conditions



Figure 13 | Impact to Trees – Alternative 1



Figure 14 | Impact to Trees – Alternative 2

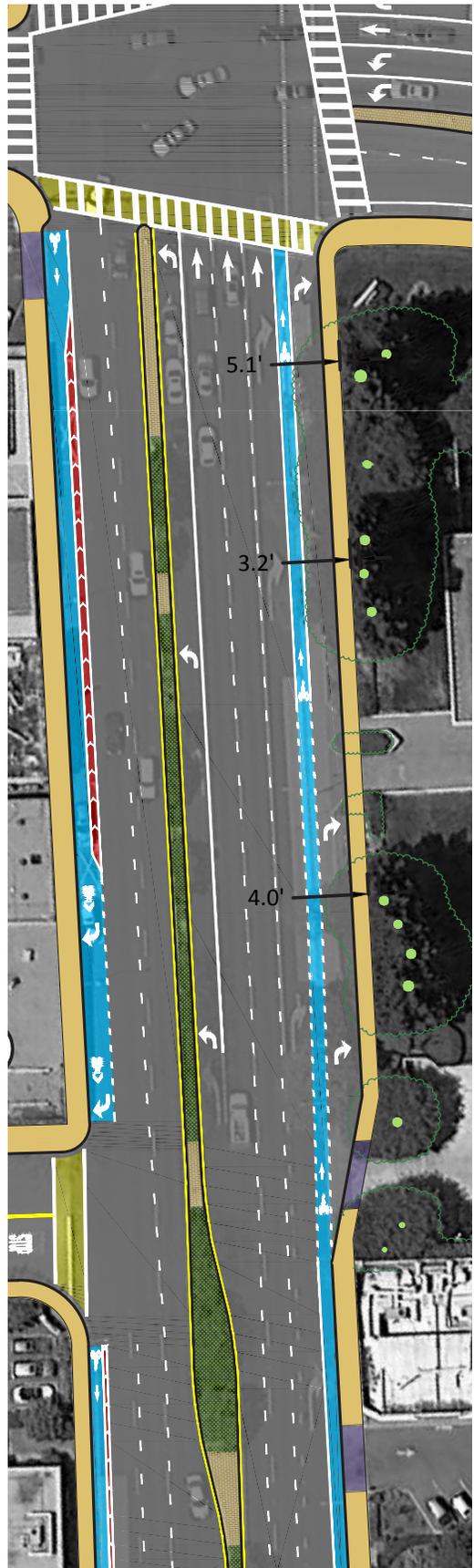


Figure 15 | Impact to Trees – Alternative 3



Community Survey Results

At the third community workshop on February 19, 2015 and through the project’s website, attendees were asked to rank each of the four alternatives. Ranking of these alternatives continued on the project’s website, available from February 19, 2015 through March 13, 2015. In total, 452 rankings were collected from the workshop (46 votes) and online survey (404 online, plus 2 write-in votes). Tables 12 and 13 below show the results from the workshop and on-line survey. The on-line surveys shown in Table 13 includes both all responses as well as those specifically registered in the City of Menlo Park. The survey results were scored with a weighted average with a composite overall score determined. The composite score was determined by assigning points to each alternative according to its rank (4 points for first choice, 3 points for second choice, 2 points for third choice, 1 point for fourth choice).

- The highest score received was Alternative 3 (Separated Bike Lanes) closely followed by Alternative 2 (Buffered Bike Lanes).
- Alternative 3 (Separated Bike Lanes) received the highest number of 1st choice rankings.
- Alternative 2 (Buffered Bike Lanes) received the highest number of combined 1st and 2nd choice rankings.
- Do Nothing and Alternative 1 (3 Continuous Lanes) received a similar overall score.
- Alternative 1 (3 Continuous Lanes) received the second highest total of 1st choice rankings.
- Alternative 1 (3 Continuous Lanes) received the highest number of 4th choice rankings.

Other input received from the public at the workshop is included in Appendix F.



Table 12 – Final Community Survey Results: February 2015 Workshop

Alternative	All Responses					
	Composite Score	Choice				Total
		1 st	2 nd	3 rd	4 th	
Existing/Do Nothing	84	5	7	15	13	40
1. 3 Continuous Lanes	96	12	4	10	16	42
2. Buffered Bike Lanes	114	12	18	4	4	38
3. Separated Bike Lanes	108	17	8	3	10	38
Total		46	37	32	43	

Notes: Total responses do not add to a consistent number since some votes did not rank all four alternatives, but only top choice, last choice, etc.

Table 13 – Final Community Survey Results: Online Surveys

Alternative	All Responses						Registered inside Menlo Park					
	Composite Score	Choice				Total	Composite Score	Choice				Total
		1 st	2 nd	3 rd	4 th			1 st	2 nd	3 rd	4 th	
Existing/Do Nothing	908	52	88	170	96	406	459	25	40	93	53	211
1. 3 Continuous Lanes	917	112	50	75	169	406	452	50	26	39	96	211
2. Buffered Bike Lanes	1098	56	206	112	32	406	578	28	113	57	13	211
3. Separated Bike Lanes	1137	186	62	49	109	406	621	108	32	22	49	211
Total		406	406	406	406			211	211	211	211	

Key Findings

- ▶ The community members who participated in the ranking of the alternatives favored one of the two bike facility alternatives (Buffered Bike Lanes or Separated Bike Lanes) with more than twice the score for bike facilities compared to the 3 Continuous Lanes option and more than 5 times higher than leaving the exiting corridor with no modifications.
- ▶ Between the two bike facility options, community members who participated favored the Separated Bike Lane alternative over the Buffered Bike Lanes.





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