El Camino Real Corridor Study

March 2015 Executive Summary

Prepared for the

City of Menlo Park

Submitted by

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Balancing Functionality and Livability
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Introduction

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. The purpose of this study is to identify potential reconfiguration alternatives, and evaluate 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 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. This Executive Summary report presents the work completed to date.

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.

Per direction from the City Council, the following guidelines were developed 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 El Camino Real/Downtown Specific Plan.
- Only surface improvements will be considered (i.e., no grade separation or tunneling).
- No impacts to existing medians and sidewalks.
- 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.

Existing Conditions

This Existing Conditions Report includes a summary of data collected along the corridor, an analysis of existing corridor operations, and documentation of existing facilities that serve all modes of travel. A full copy of the Report is included as Appendix A. (The full version of the report including appendices is on the City's project website.)

- *Study Area* – El Camino Real is the main north-south arterial in Menlo Park and connects the Downtown to other parts of the peninsula. The corridor within the City limits is typically a four- to six-lane divided arterial with traffic signals, sidewalks, pedestrian crosswalk and curb ramps, as well as assorted transit service including SamTrans buses, shuttles, and Caltrain. Table 1 shows typical daily traffic on El Camino Real.

Table 1
El Camino Real Daily Traffic Volumes

Location along El Camino Real	Southbound	Northbound	Total
Between Encinal Ave and Glenwood Ave	16,700	17,900	34,600
Between Ravenswood Ave-Menlo Ave and Santa Cruz Ave	17,900	16,400	34,300
North of Middle Ave	21,500	22,600	44,100
North of Sand Hill Rd	22,600	24,100	46,700

- *Vehicular Traffic Operations* – The 1.35-mile corridor includes nine signalized intersections, each of which was analyzed in greater detail. Southbound traffic is highest during the a.m. peak period, while northbound traffic is highest during the p.m. peak period. Travel times through the corridor range between three and five minutes during peak periods. Results of the Level of Service (LOS) calculations indicate that all study intersections are operating at LOS D or better, with the exception of El Camino Real/Sand Hill Road during the p.m. peak period which operates at LOS E. Table 2 shows existing travel time and average speed during peak periods on El Camino Real.

Table 2
Existing Peak Period Travel Time

Direction of Travel	AM Peak [1]		Midday Peak [2]		PM Peak [3]	
	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed
NB El Camino Real [4]	3:48	21.5	4:35	17.5	5:24	14.9
SB El Camino Real [5]	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] a.m. peak period = 7:00 – 9:00 a.m.; [2] midday peak period = 11:30 a.m. – 1:30 p.m.; [3] p.m. peak period = 4:00 – 6:00 p.m.; [4] from Sand Hill Rd to Encinal Ave; [5] from Encinal Ave to Sand Hill Rd

- *Queuing* – Vehicular queuing along El Camino Real is generally concentrated near approaches to Menlo Avenue-Ravenswood Avenue. Vehicle queuing in turn lanes are adequately accommodated within existing queue storage, with the exception of the northbound left-turn lane at Sand Hill Road. While vehicular queuing on El Camino Real through lanes approaching Menlo Avenue-Ravenswood Avenue may sometimes exceed storage capacity and spill over onto adjacent intersections, all average queue

lengths during the morning and afternoon peak hours can be accommodated with existing queue storage and spillover queues are temporary.

- *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. Marked pedestrian crosswalks, along with pedestrian crossing signal equipment, are provided at all 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 corridor.

- *Bicycle Facilities* – Existing bicycle facilities within the study area include bike lanes and bike routes on streets intersecting El Camino Real, nearby parallel routes (e.g., Laurel Street, Alma Street, and portions of University Drive), and bike parking near the Downtown and Caltrain Station areas. Table 3 shows pedestrian and bicycle volumes on El Camino Real at key intersection during the morning and evening peak periods.

Table 3
Pedestrian and Bicycle Volumes

Intersection	Pedestrian	Bicycle
ECR/Oak Grove Road	53-88	20-7
ECR/Santa Cruz Ave	96-144	19-13
ECR/Ravenswood-Menlo Ave	35-46	26-25
ECR/Middle Ave	13-28	9-17
ECR/Sand Hill Rd	113-41	201-55

Note: (##-##) represents (morning-afternoon) volumes

- *Public Transit* – Transit service in the study area is provided by several agencies, including SamTrans for local bus service; the City of Menlo Park and Stanford University for local shuttle service; and Caltrain for regional rail service. Bus service runs at frequencies of 15-minutes and rail service runs at frequencies of approximately 60-minutes during typical weekdays.

- *Collisions and Safety* – A review of the City's records for collisions along El Camino Real showed that the calculated intersection collision rates were higher than the statewide average for similar facilities at intersections near the Downtown and Caltrain areas. Two-thirds of reported intersection-related collisions between Valparaiso Avenue-Glenwood Avenue and Roble Avenue were rear-end collisions. Table 4 shows collision rates at the study intersections.

Table 4
Collision Rates at the Study Intersections Compared to Statewide Average

Study Intersection	Number of Collisions (2009-2013)*	Collision Rate (c/mve)	Injury Rate	Fatality Rate
1. El Camino Real/Sand Hill Rd	8	0.09 (0.27)	37.5% (41.9%)	0% (0.4%)
2. El Camino Real/Cambridge Ave	18	0.24 (0.27)	**44.4%** (41.9%)	0% (0.3%)
3. El Camino Real/Middle Ave	16	0.21 (0.21)	**43.8%** (42.4%)	0% (0.4%)
4. El Camino Real/Roble Ave	22	**0.32** (0.27)	40.9% (41.9%)	0% (0.4%)
5. El Camino Real/Menlo Ave-Ravenswood Ave	34	**0.40** (0.27)	**44.1%** (41.9%)	0% (0.4%)
6. El Camino Real/Santa Cruz Ave	23	**0.38** (0.27)	**47.8%** (41.9%)	0% (0.4%)
7. El Camino Real/Oak Grove Ave	36	**0.52** (0.27)	**44.4%** (41.9%)	0% (0.4%)
8. El Camino Real/Valparaiso Ave-Glenwood Ave	24	**0.36** (0.27)	37.5% (41.9%)	0% (0.4%)
9. El Camino Real/Encinal Ave	6	0.09 (0.27)	**83.3%**(41.9%)	0% (0.4%)

Note: c/mve = collisions per million vehicles entering; * = collision records for El Camino Real/Sand Hill Rd are dated October 2007 through September 2012; Statewide average rates are indicated in parentheses; **Bold** = actual rate greater than the Statewide average rate

- *Parking* – Parking along the El Camino Real corridor consists of on-street parking, off-street public parking lots, private parking lots, and Caltrain commuter lots. The available on-street parking supply along El Camino Real is 156 spaces. More spaces are available nearby in public off-street plazas, on-street parking on intersecting streets, commuter parking lots at Caltrain, and private off-street parking lots. Parking occupancy surveys completed in September 2014 along El Camino Real show that street parking spaces are typically underutilized along El Camino Real with the exception of the portion of El Camino Real between Oak Grove Avenue and Ravenswood Avenue-Menlo Avenue. It is worth noting that this portion of El Camino Real is adjacent to Downtown Menlo Park, where several off-street parking lots are available. Additionally, increased parking utilization was observed between College Avenue and Partridge Avenue on the west side of El Camino Real.

Community Feedback & Survey

In April 2014, the first workshop was held on the project to gain the input of the community related to critical transportation issues on the corridor. At that first 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 is provided in Appendix B. (The full version of the report including appendices is on the City's project website.)

- TOP 5 DESIRABLE CHANGES
  1. Enhanced pedestrian safety and crossings
  2. Inclusion of bike lanes on El Camino Real
  3. More bike parking close to downtown
  4. More landscaping along El Camino Real (providing buffers between pedestrians or bicyclists and vehicles)
  5. Timing traffic signals to favor continuous north-south flow on El Camino Real
- MOST UNDESIRABLE CHANGES
  1. More convenient on-street parking on El Camino Real
  2. Higher travel speeds on El Camino Real
  3. Lower travel speeds on El Camino Real

Transportation Needs

Most respondents use multiple forms of transportation along El Camino Real—mainly 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.

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.

There may need to be a closer examination of public transit needs along the corridor. The sample of transit riders responding to the survey was too small to draw supportable generalizations. 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 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.

Alternatives

The *Menlo Park El Camino Real Downtown Specific Plan*, adopted in June 2012, emphasizes the character and extent of enhanced public spaces, the character and intensity of private infill development, and circulation and connectivity improvements to preserve and enhance community life. The plan focuses on improvements along the El Camino Read corridor in the City of Menlo Park, as well as downtown Menlo Park and the Menlo Park Caltrain Station area. For transportation circulation, the Specific Plan envisions the following:

- *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.*

Through the completion of these visions, the Specific Plan accommodates all travel modes, with an emphasis on pedestrians, bicyclists, transit users and parking for downtown. The Specific Plan focuses development in areas well served by transit with a mix of uses in close proximity in order to reduce the reliance on private motor vehicles. The 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 from the Downtown Specific Plan, a "toolbox" of best practices and potential improvement measures for the El Camino Real corridor was developed, and is included in Appendix C. The improvements in the toolbox were presented during Community Workshop #2 in October 2014 for feedback on the applicability of these treatments to El Camino Real in Menlo Park. Following that workshop and feedback, alternative concept designs were developed for the corridor, as described below:

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

No Project

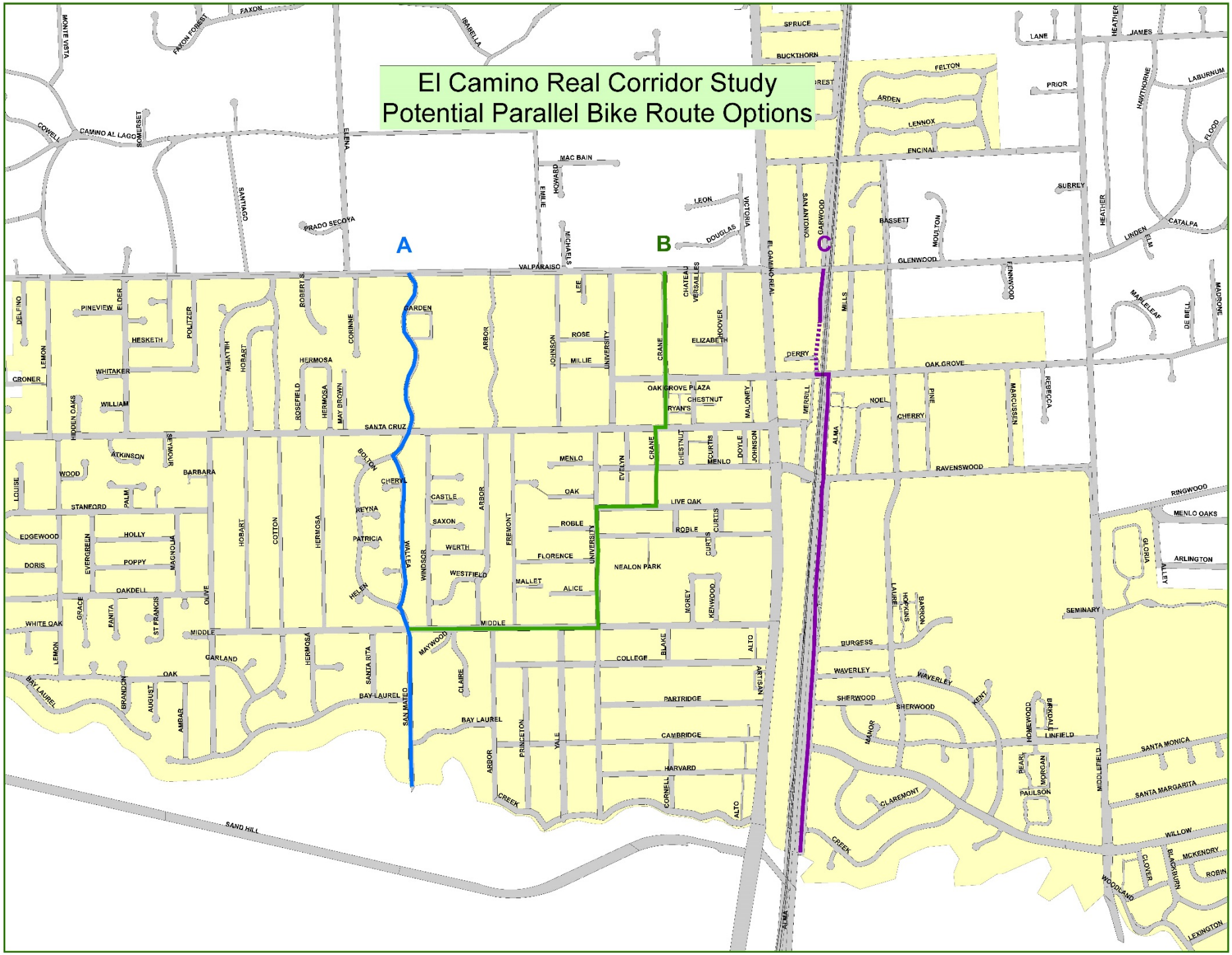
Under this alternative, the existing lanes, crossings, and traffic controls on El Camino Real within Menlo Park would remain with no changes.

Alternative 1 – Continuous Three Lanes

This alternative includes the addition of a third travel lane in each direction between Encinal Avenue and Roble Avenue, where there are currently two lanes in each direction. The additional through lane would be created by removing on-street parking and right-turn lanes, which would become shared through/right-turn lanes.

- 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 3rd travel lane and the road would be widened by approximately 12 feet to create a new NB right turn lane.
- No pedestrian bulbouts could be added under this alternative north of Roble Avenue due to geometric constraints. There still may be opportunities to provide some bulbouts 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 map below):
    - A, West of El Camino Real: San Mateo Drive – Wallea Drive
    - B, West of El Camino Real, Downtown Alternative: San Mateo Drive – Middle Avenue – University Drive – Live Oak Avenue – Crane Street
    - C, East of El Camino Real: Alma Street – Oak Grove Avenue – Garwood Way (including possible future extension)
- This alternative may result in removal of approximately 11 heritage trees and seven street trees on the southeast corner of El Camino Real and Ravenswood Avenue to accommodate the third travel lane.

ALTERNATIVE 1


El Camino Real Corridor Study
Potential Parallel Bike Route Options
A
B
C
EL CAMINO REAL
VALPARAISO
SANTA CRUZ
OAK GROVE
MIDDLE
BAY LAUREL
SAND HILL
ALMA
CREEK

Alternative 2 – Buffered Bike Lanes

Bike lanes would be added on El Camino Real in both directions under this alternative by narrowing the existing vehicle lanes by one to three feet, and eliminating on-street parking along the majority of the corridor. The bike lanes would be further buffered from traffic by an approximately 3-foot wide painted section.

- On-Street parking would be prohibited north of Roble Avenue.
- Existing right-turn lanes north of Roble Avenue would be modified to accommodate bike lanes.
- Bikes would need to cross right-turning traffic.
- Narrow pedestrian bulbouts could be accommodated at some intersections where there are no right-turn lanes.
- In the northbound direction approaching Ravenswood, the roadway would be widened by approximately 21 feet to accommodate the third travel lane, northbound right-turn lane and the bike lane. (Third travel lane would take the place of the existing right-turn lane.)
- New third northbound through travel lane would become a trap right-turn lane at Santa Cruz Avenue.
- This alternative may result in removal of approximately 11 heritage trees and seven street trees on the southeast corner of El Camino Real and Ravenswood Avenue to accommodate widening at Ravenswood Avenue.

Alternative 3 – Separated Bicycle Facility

The alternative would provide a physically separated bicycle facility on El Camino Real. Each of the one-way bike lanes would be protected from vehicle traffic with raised curbs or planters, which could also include landscaping. The facility would be created by eliminating on-street parking and right-turn lanes through the majority of the corridor.

- On-Street parking would be prohibited north of Roble Avenue.
- Existing right-turn lanes north of Roble Avenue would be eliminated.
- Some intersections would be designed with a "Protected Intersection" bicycle design approach. Cycle tracks would enter mixing zones with pedestrians at the intersections, and cross-bikes would be provided adjacent to crosswalks.
- The existing northbound right turn lane approaching Ravenswood Avenue would be maintained, but widening of approximately 8-feet on this section will be required to achieve the one-way cycle track. There would be no widening on this section to achieve a 3rd travel lane.
- Intersections would be designed with bicycle crossings provided adjacent to crosswalks.
- No traditional pedestrian bulbouts could be accommodated under this alternative, but pedestrian crossing distances would be shortened with provision of the separated bicycle facility.
- This alternative would result in removal of approximately one heritage tree and seven street trees on the southeast corner of El Camino Real and Ravenswood Avenue to accommodate the separated bicycle facility.

ALTERNATIVE 3

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.

Model Forecasting

Travel Demand Model Forecasting was completed with:

- C/CAG-VTA Bi-County Travel Demand Model
- 2010 Base and 2035 Future Traffic Projections
- Primarily ABAG Land Use Outside the Study Area
- Menlo Park Downtown Specific Plan Land Use
- Adjustments to lane capacity for Alternative 1 (6-Lanes)
- Bike volume projections for Alternatives 2 and 3 based on the bike facility improvements

The C/CAG-VTA Bi-County Travel Demand Model with 2010 and 2035 ABAG Draft SCS (Sustainable Communities Strategy) socio-demographic assumptions was used. This version of the model represented the most current model as of June 2014. The most recent modeling files from CCAG were obtained and the input assumptions were reviewed, including networks and land uses for all Traffic Analysis Zones (TAZ) within Menlo Park.

Network

The Countywide Model has a coarse network representation within the study area, so not all the cross streets in the study area were represented. The network was modified to add missing cross streets to better represent all legs of the identified study intersections.

Land Use

The Countywide model land uses primarily reflect ABAG assumptions at the census tract level, and are not necessarily accurate at the individual TAZ level, especially with representing future projects for 2035 conditions (CCAG and VTA are in the process of updating the model to Plan Bay Area Projections and requesting input from San Mateo County jurisdictions on future general plans to better allocate the land uses to individual TAZs. This version of the model will be released in mid-2015). City staff reviewed assumptions for 2010 and 2035 socio-demographic input data and made appropriate adjustments to the growth and location of key future projects in the corridor, primarily to reflect potential future build out of land uses under the El Camino Real/Downtown Specific Plan.

Lane Geometrics

Under Alternative 1 with the continuous 6 lanes on El Camino Real, the lane capacity was adjusted to reflect the continuous 3 lanes in each direction in the study area.

With Alternatives 2 and 3, the corridor capacity was based on the existing through lanes on El Camino Real. Adjustments were made based on the provision of the right-turn lane mixing zones in Alternative 2 and the absence of right-turn lanes in Alternative 3.

Bike Volume Estimates

With Alternatives 2 and 3, the determination of bike volumes on El Camino Real was based on the extent of bike facility improvements to the non-motorized mode forecasting.

Analysis of Corridor Metrics

Analysis of the alternatives included assessment of:

- Traffic Volume Projections
- Induced Demand &Change in Travel Patterns
- Corridor Travel Time and Speed
- Intersection Delay
- Intersection Queuing
- Bicyclist Comfort and Safety
- Pedestrian Comfort and Safety

Traffic Volume Projections

Traffic volume projections were extracted from the traffic model for each of the alternatives including the No Project condition. Table 5 includes the projected traffic volumes during the p.m. peak hour on El Camino Real and Middlefield Road under the different alternatives. Traffic demand on Middlefield Road is presented to understand how travel patterns on parallel routes may change as a result of changes to El Camino Real.

As shown, Alternative 1 results in approximately 45 percent more traffic demand in the El Camino corridor north of Ravenswood Avenue with the expansion of capacity. However, only 9 percent more traffic is served south of Ravenswood Avenue, as minimal capacity improvements can be included without widening the street. Minimal change in vehicle demand is observed in Alternatives 2 or 3.

Table 5
Vehicles Per Hour (PM Peak)

Segment	**2014 Existing Conditions**	**Future 2035**							
		No Project	**Alt 1**		**Alt 2**		**Alt 3**	
		Volume	Volume	% Inc	Volume	% Inc	Volume	% Inc
El Camino Real								
North of Ravenswood	2,800	3,140	4,550	45%	3,130	-0.5%	3,070	-2%
South of Ravenswood	3,620	4,230	4,620	9%	4,230	0%	4,170	-1.5%
Middlefield Road								
North of Ravenswood	1,290	1,650	1,540	-7%	1,680	2%	1,730	5%
South of Ravenswood	2,100	2,390	2,860	20%	2,460	3%	2,430	2%

Induced Demand & Change in Travel Patterns

As demonstrated by the date in Table 5, Alternative 1 shows the greatest increase in traffic volumes compared with the other three alternatives. The increase in capacity with the continuous 6 lanes in

Alternative 1 attracted through traffic from other parallel routes such as Middlefield Road and Highway 101. 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. 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.

The increased capacity under Alternative 1 also resulted in diverted trips and additional turning movements to/from El Camino Real which reflected the change in trips from other routes.

Corridor Travel Time and Speed

Table 6 shows the travel time for the entire corridor with the associated average speed in Table 7 under Future 2035 traffic volumes. With the added capacity in Alternative 1 along with the increase in traffic volumes discussed above, traffic time generally increases over the No Project condition during both the a.m. and p.m. peak except for the southbound direction in the morning which decreases. Alternatives 2 and 3 also would experience an increase in travel time compared to the No Project scenario as well as a similar decrease in travel time in the southbound direction during the a.m. peak hour.

Table 6
Travel Time with Future Volumes (minutes)

Study Segments	Future 2035						
	No Project	Alt 1		Alt 2		Alt 3	
	Travel Time	Travel Time	% Inc	Travel Time	% Inc	Travel Time	% Inc
AM							
NB Sand Hill to Encinal*	4.1	4.8	17%	4.6	12%	4.3	5%
SB Encinal to Sand Hill*	5.9	5.2	-12%	5.1	-14%	5.8	-2%
PM							
NB Sand Hill to Encinal*	5.3	5.8	9%	5.9	11%	6.0	13%
SB Encinal to Sand Hill*	4.8	5.0	4%	4.9	2%	5.3	10%

Note: Travel Time in minutes
* Segment length is 6,950 feet

Table 7
Average Speed (mph)

Study Segments	Future 2035						
	No Project	Alt 1		Alt 2		Alt 3	
	Avg Speed	Avg Speed	% Inc	Avg Speed	% Inc	Avg Speed	% Inc
AM							
NB Sand Hill to Encinal*	19.2	16.6	-14%	17.3	-10%	18.3	-5%
SB Encinal to Sand Hill*	13.8	15.3	11%	15.6	13%	13.6	-1%
PM							
NB Sand Hill to Encinal*	14.8	13.6	-8%	13.3	-10%	13.2	-11%
SB Encinal to Sand Hill*	16.3	15.7	-4%	16.2	-1%	14.8	-9%

Note: Speed is measured in miles per hour
* Segment length is 6,950 feet

Intersection Delay

A summary of the intersection delay and Level of Service conditions for the nine signalized intersections on the corridor are included in Appendix D. These conditions are shown for Existing and Future 2035. Future conditions include the No Project and the three Alternatives for the corridor. During the more critical p.m. peak hour, three intersections under the No Project condition are projected to operate at a LOS E including Sand Hill Road, Ravenswood Avenue-Menlo Avenue and Valparaiso Avenue-Glenwood Avenue. With the addition of the continuous 3 lanes in Alternative 1 and the associated increase in traffic volumes, two of these intersections (Sand Hill Road and Valparaiso Avenue-Glenwood Avenue) would deteriorate to LOS F. The intersection of Ravenswood Avenue-Menlo Avenue would improve to LOS D. Alternatives 2 and 3 would have very similar conditions to the No Project scenario, except the intersection with Ravenswood Avenue-Menlo Avenue under Alternative 2 would improve to LOS D as a result of the added through lane and relocation of the right turn lane in the northbound direction.

Intersection Queuing

Appendix E shows the through lane queue lengths for the nine signalized intersections on the corridor. These conditions are shown for Existing and Future 2035. Future conditions include the No Project and the three Alternatives for the corridor. During the p.m. peak hour, the No Project condition shows that traffic from five intersections will spill back to upstream intersections at the following locations:

- Northbound approaching Sand Hill
- Northbound approaching Ravenswood
- Northbound approaching Glenwood-Valparaiso
- Southbound approaching Encinal
- Southbound approaching Ravenswood

With Alternative 1, five locations would experience spillback:

- Northbound approaching Sand Hill
- Northbound approaching Ravenswood

- Northbound approaching Oak Grove
- Northbound approaching Glenwood-Valparaiso

Alternative 2 would have four locations with spillback:

- Northbound approaching Sand Hill
- Northbound Glenwood-Valparaiso
- Southbound approaching Glenwood-Valparaiso
- Southbound approaching Ravenswood

Alternative 3 would produce critical spillback at 6 locations:

- Northbound approaching Sand Hill
- Northbound approaching Ravenswood
- Northbound approaching Oak Grove
- Northbound approaching Glenwood-Valparaiso
- Southbound approaching Encinal
- Southbound approaching Glenwood-Valparaiso

Bicyclist Comfort and Safety

El Camino Real through Menlo Park is not currently a desirable route for bicyclists because of the high traffic volumes, speed, and the lack of bicycle facilities. Conditions would be expected to worsen for the 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. However, enhanced facilities on parallel routes would improve cycling conditions overall for north-south through traffic within the City. People biking to or from destinations on El Camino Real would not have continuous facilities under this option. Alternative 2 significantly improves conditions for the cyclists with the addition of the buffered bicycle lanes. Alternative 3 would be the optimum conditions for bicycling with the separated facility. Under both Alternatives 2 and 3, bicyclists would need to navigate interactions with vehicles at driveways and right-turning traffic at intersections unless separate bicycle signal phases would be provided.

Pedestrian Comfort and Safety

Pedestrian comfort and crossings were also evaluated for each alternative. Under Alternative 1, pedestrian comfort would decrease compared to No Project since elimination of parking would remove the buffer between vehicle traffic and the sidewalk. Under Alternatives 2 and 3, the bike lanes provide a level of buffering 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 buffer area.

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.

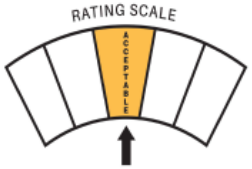
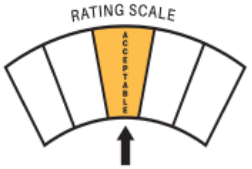
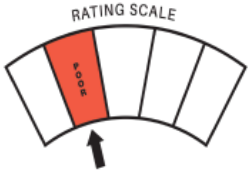
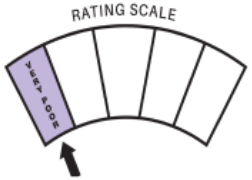
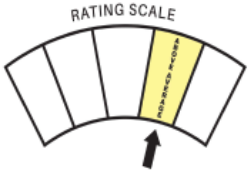
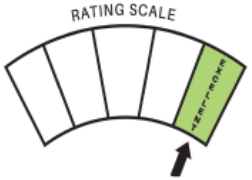
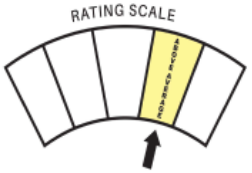
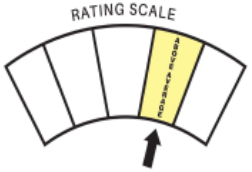
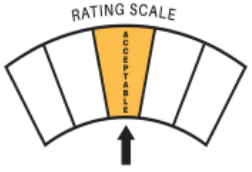
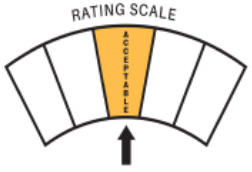
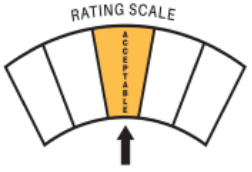
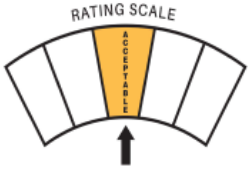
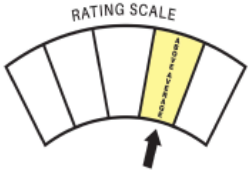
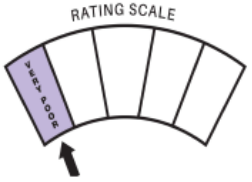
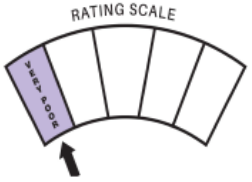
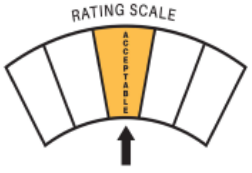
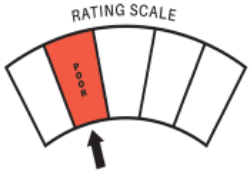
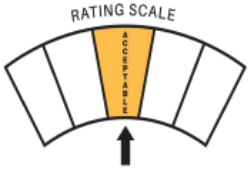
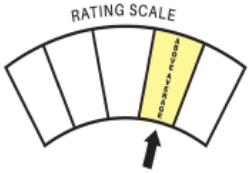
While no sidewalk widening is proposed with any of the potential alternatives, sidewalk widening would be accommodated by increasing building setbacks with future redevelopment opportunities along the corridor, according to requirements in the El Camino Real/Downtown Specific Plan.

Summary of Results

Based on the analysis of the traffic metrics discussed above, an overall rating was developed for each mode under each alternative. Following is a summary of the ratings for each of these assessments, as presented during Community Workshop #3.

El Camino Real Corridor Study

Transportation Rating

	No Project	Alt 1 – 6 Lanes	Alt 2 – Buffered Bike Lanes	Alt 3 – Separated Bike Facilities
Vehicle Travel on ECR				
Bicycle Travel on ECR				
Pedestrian Comfort and Crossings				
Transit Users				
On-Street Parking				
Aesthetic Opportunities				

Appendix A

Existing Conditions Report

El Camino Real Corridor Study

Existing Conditions Report

Prepared for the

City of Menlo Park

Submitted by

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December 19, 2014

Balancing Functionality and Livability
Traffic Engineering • Transportation Planning

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Appendices

Introduction and Summary

Document Context

The goal of the El Camino Real Corridor Study is to evaluate potential transportation and safety improvements to El Camino Real in the City of Menlo Park. This study will consider alternatives to modify the existing cross-section to allow for the addition of a bicycle lane and/or an additional through lane for a total of three lanes in each direction. Ultimately the project will be consistent with the goals for balanced capacity, bicyclist and pedestrian connectivity, transit access, parking, and safety outlined in the *El Camino Real/Downtown Specific Plan* as well as the City's Complete Streets Policy.

This Existing Conditions Report is the first in a series of documents that will be produced as part of this effort. Major upcoming tasks and documentation will include the following elements (Estimated completion dates are shown in parentheses):

- *Summary of Best Practices* – This document will highlight road modification strategies gathered from the El Camino Real/Downtown Specific Plan and the experience of other Bay Area communities that have incorporated such practices along similar roadways. (Early August 2014)

- *Performance Metrics* – Performance metrics will be developed for all users - vehicles, bicycle, pedestrians, transit, parking, etc. that will be used to evaluate alternatives. The metrics will consider industry operational standards as well as conditions specific to the El Camino Real corridor. (September 2014)

- *Travel Demand Forecasts* – Travel demand forecasts will be developed for 2014 and future year 2040, conditions with and without potential modifications, using the San Mateo County/C/CAG Travel Demand Model. (October 2014)

- *Alternatives Analysis* – Preliminary modifications, improvements, and other concepts to meet the goals of the community and the El Camino Real Specific Plan will be presented in this report. Following review of the concepts, the improvements will be mixed, matched, and combined, as appropriate into three alternatives. These alternatives will be evaluated and refined based on input from the public. (November 2014)

Existing Conditions Summary

This Existing Conditions Report includes a summary of data collected along the corridor, an analysis of existing corridor operations, and documentation of existing facilities that serve all modes of travel. Following is a summary of the issues that are detailed in this report.

- *Study Area* – El Camino Real is the main north-south arterial in Menlo Park and connects the Downtown to other parts of the peninsula. The corridor within the City limits is typically a four- to six-lane divided arterial with traffic signals, sidewalks, pedestrian crosswalk and curb ramps, as well as assorted transit service including SamTrans buses, shuttles, and Caltrain.

- *Vehicular Traffic Operations* – The 1.35-mile corridor includes nine signalized intersections, each of which was analyzed in greater detail. Southbound traffic is highest during the a.m. peak period, while northbound traffic is highest during the p.m. peak period. Travel times through the corridor range between three and five minutes during peak periods. Results of the Level of Service (LOS) calculations indicate that all study intersections are operating at LOS D or better, with the exception of El Camino Real/Sand Hill Road during the p.m. peak period.

- *Queuing* – Vehicular queuing along El Camino Real is generally concentrated near approaches to Menlo Avenue-Ravenswood Avenue. Vehicle queuing in turn lanes are adequately accommodated within existing queue storage, with the exception of the northbound left-turn lane at Sand Hill Road. While vehicular queuing on El Camino Real through lanes approaching Menlo Avenue-Ravenswood Avenue may sometimes exceed storage capacity and spill over onto adjacent intersections, all average queue lengths during the morning and afternoon peak hours can be accommodated with existing queue storage and spillover queues are temporary.

- *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. Marked pedestrian crosswalks, along with pedestrian crossing signal equipment, are provided at all 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 corridor.

- *Bicycle Mode of Travel* – Existing bicycle facilities within the study area include bike lanes and bike routes on streets intersecting El Camino Real, nearby parallel routes (e.g., Laurel Street, Alma Street, and portions of University Drive), and bike parking near the Downtown and Caltrain Station areas.

- *Public Transit* – Transit service in the study area is provided by several agencies, including SamTrans for local bus service; the City of Menlo Park and Stanford University for local shuttle service; and Caltrain for regional rail service. Bus service runs at frequencies of 15-minutes and rail service runs at frequencies of approximately 60-minutes during typical weekdays.

- *Collisions and Safety* – A review of the City's records for collisions along El Camino Real showed that the calculated intersection collision rates were higher than the statewide average for similar facilities at intersections near the Downtown and Caltrain areas. Two-thirds of reported intersection-related collisions between Valparaiso Avenue-Glenwood Avenue and Roble Avenue were rear-end collisions.

- *Parking* – Parking along the El Camino Real corridor consists of on-street parking, off-street public parking lots, private parking lots, and Caltrain commuter lots. The available on-street parking supply along El Camino Real is 156 spaces. More spaces are available nearby in public off-street plazas, on-street parking on intersecting streets, commuter parking lots at Caltrain, and private off-street parking lots. Parking occupancy surveys along El Camino Real are scheduled to be completed in September 2014.

Corridor Characteristics

The study area consists of El Camino Real within the City of Menlo Park City limits between Sand Hill Road to the south and Encinal Avenue to the north (shown in Figure 1). El Camino Real, also designated as State Route (SR) 82, is a primary arterial roadway and commercial corridor on the San Francisco Peninsula. As a regional route, El Camino Real begins in Santa Clara County in the south, and continues through Daly City to the north, where it continues as Mission Street into San Francisco. In much of Santa Clara County and all of San Mateo County, El Camino Real is under the jurisdiction of the California Department of Transportation (Caltrans).

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 as shown in Figure 2.

- 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 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

All of the intersections within the corridor that are controlled by traffic signals were evaluated in more detail. These intersections, which are shown on Figure 1, include:

1. El Camino Real/Sand Hill Road
2. El Camino Real/Cambridge Avenue
3. El Camino Real/Middle Avenue
4. El Camino Real/Roble Avenue
5. El Camino Real/Menlo Avenue-Ravenswood Avenue
6. El Camino Real/Santa Cruz Avenue
7. El Camino Real/Oak Grove Avenue
8. El Camino Real/Valparaiso Avenue-Glenwood Avenue
9. El Camino Real/Encinal Avenue

LEGEND
● Study Intersection

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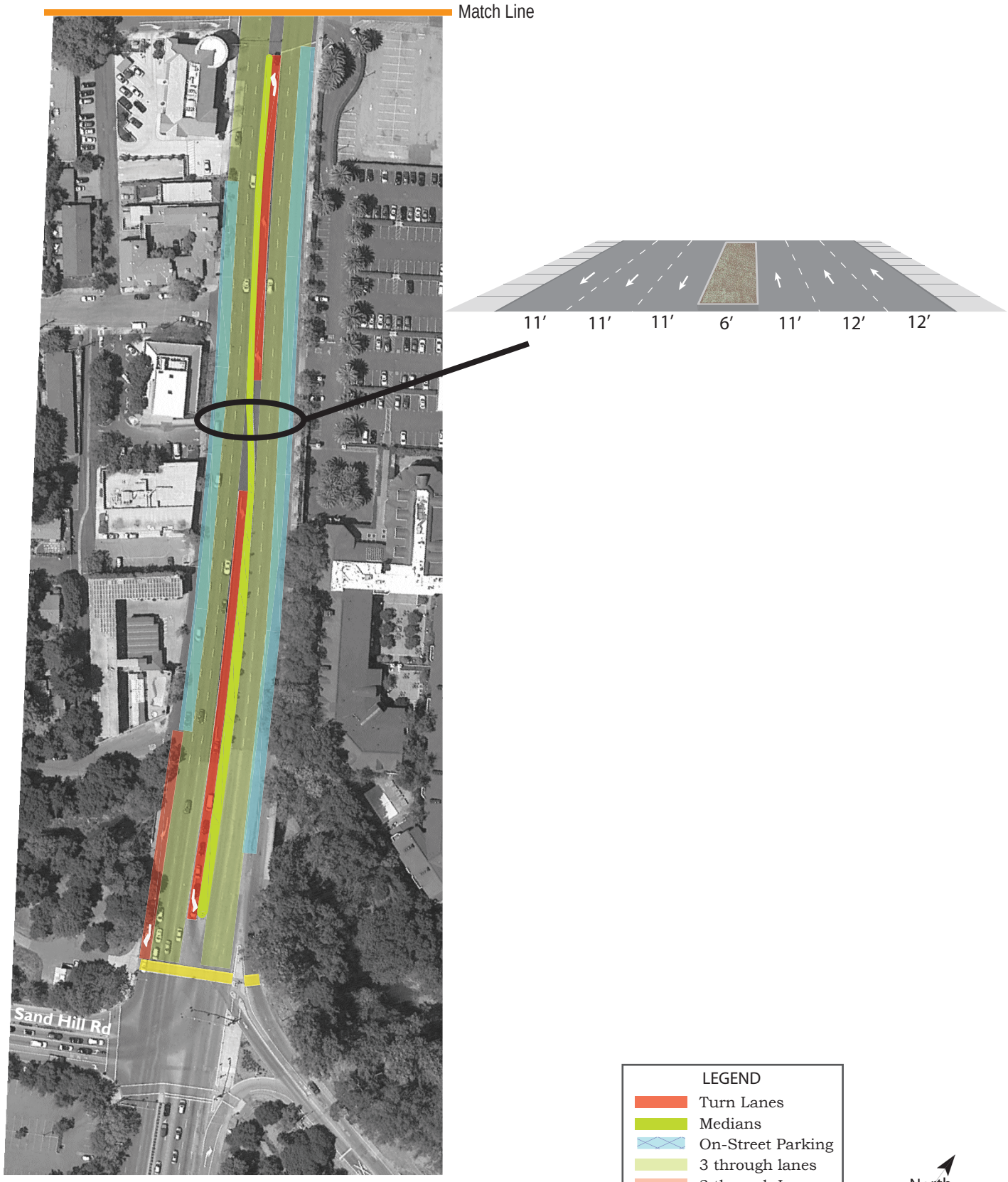
El Camino Real Corridor Study – Existing Conditions Report

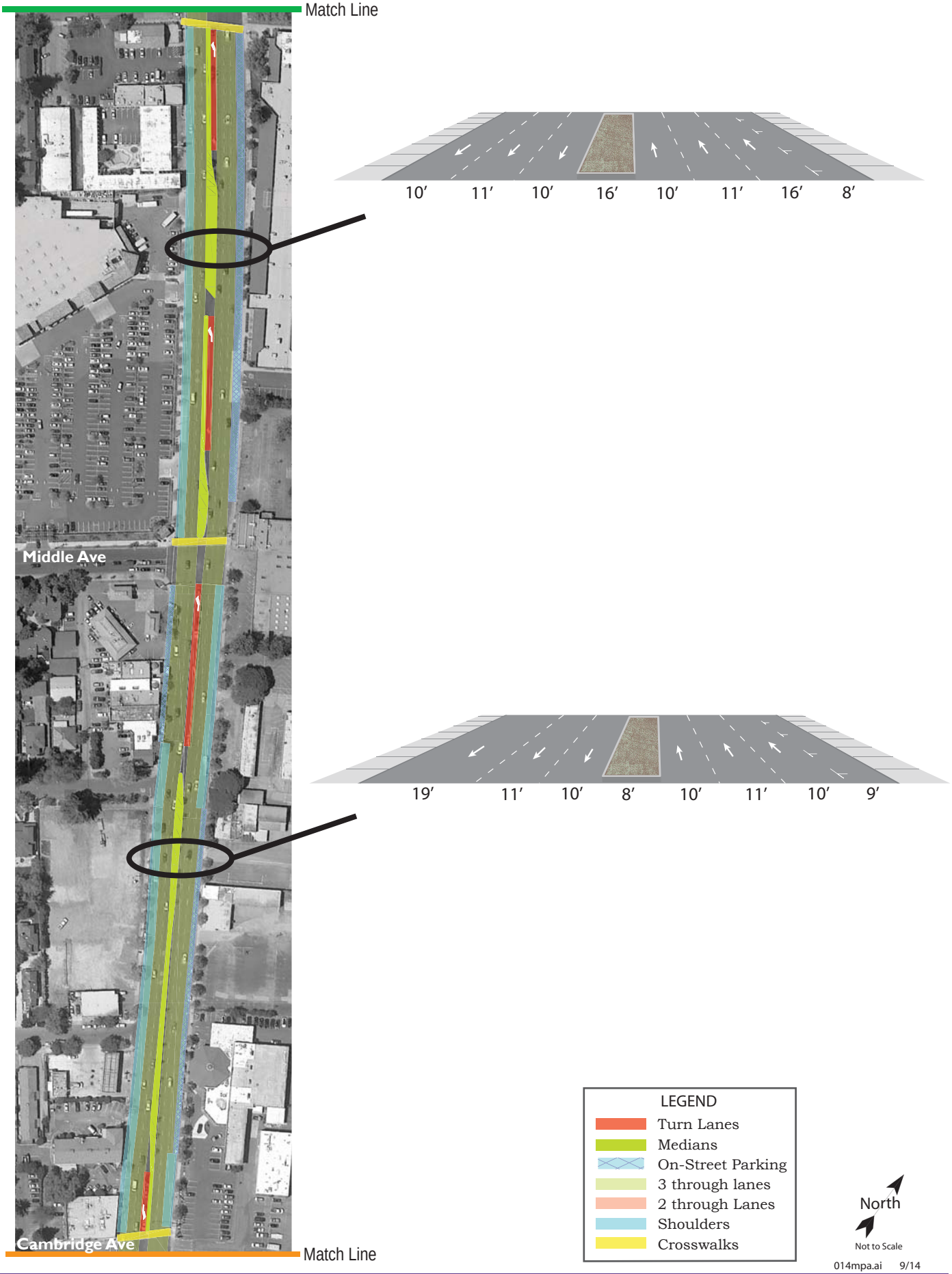
Figure 1 – Study Area

w-trans



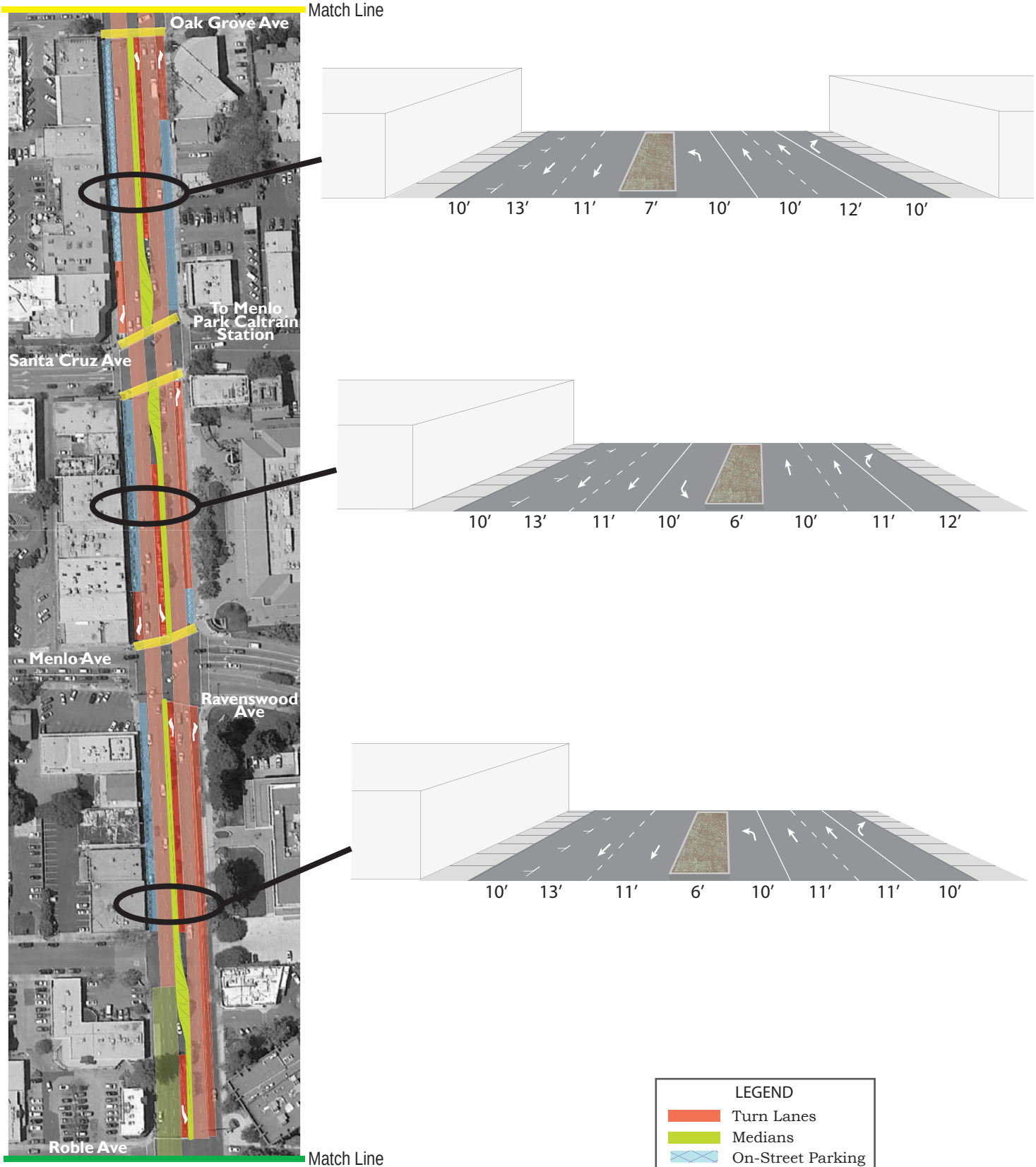
El Camino Real Corridor Study – Existing Conditions Report

Figure 2A – Cross Section



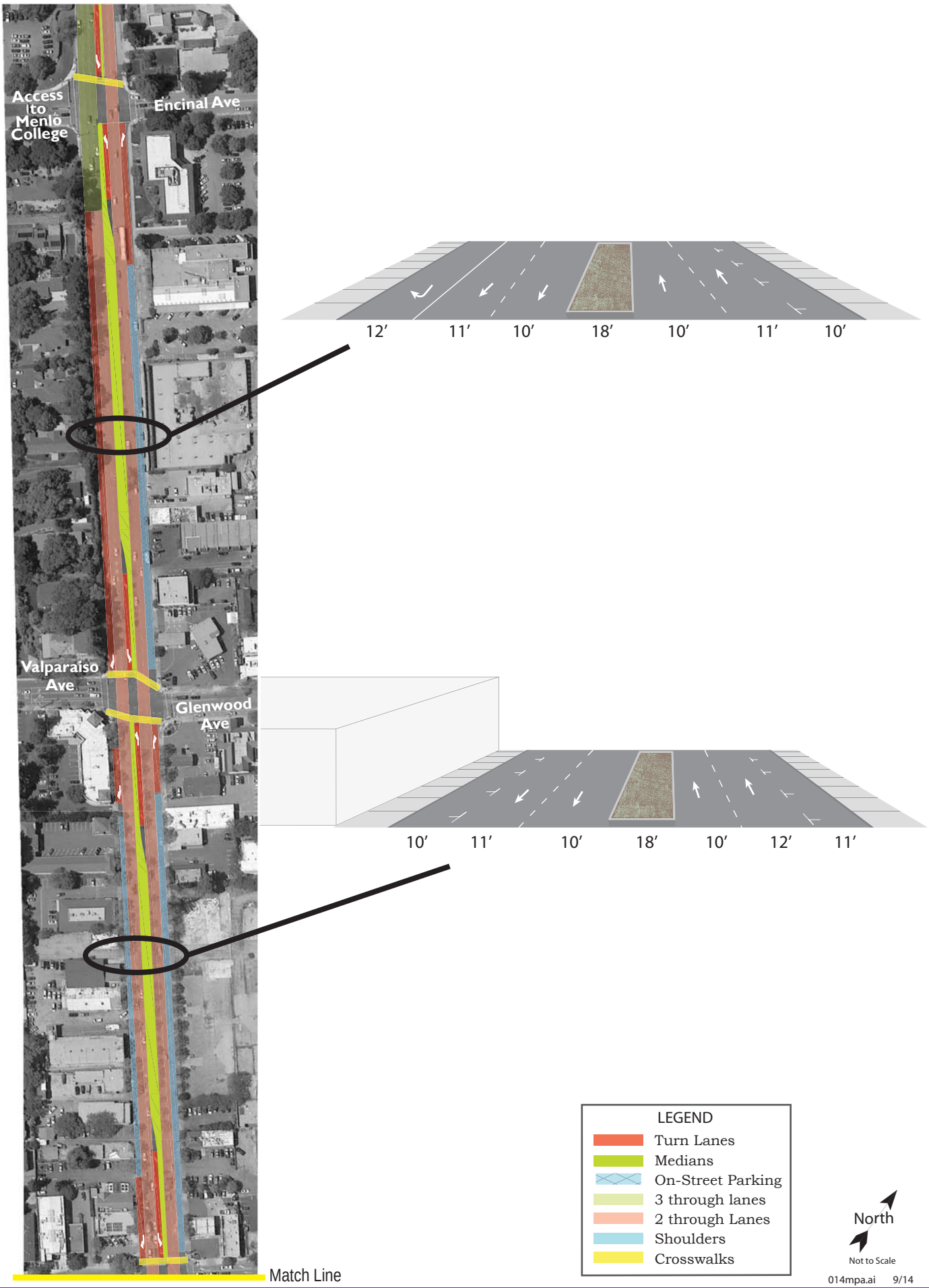
El Camino Real Corridor Study – Existing Conditions Report

Figure 2B – Cross Sections



El Camino Real Corridor Study – Existing Conditions Report

Figure 2C – Cross Sections



El Camino Real Corridor Study – Existing Conditions Report

Figure 2D – Cross Sections

These locations represent all the signalized intersections on El Camino Real within the City of Menlo Park. The following intersections are stop-controlled on their approach to El Camino Real:

- Live Oak Avenue
- College Avenue
- Partridge Avenue
- Harvard Avenue
- Creek Drive

These streets 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.

Cross Streets

Following are descriptions of the cross streets at the study intersections:

Sand Hill Road – is a primary arterial street that parallels the border between the cities of Menlo Park and Palo Alto. This arterial connects the two cities with I-280 to the west. East of El Camino Real the route continues as Alma Street; however, the intersection alignment prohibits east-west through traffic movements across El Camino Real between Sand Hill Road and Palo Alto Avenue, except for bicyclists. The intersection is within the City of Palo Alto.

Cambridge Avenue – is a local, two-lane street that connects El Camino Real to the Allied Arts neighborhood to the west of El Camino Real. The west leg of the intersection is a driveway serving the Stanford Park Hotel and is a potential access location for the proposed development at 500 El Camino Real on the east side of El Camino Real.

Middle Avenue – is a collector street that provides access to residential neighborhoods, a shopping center, schools and parks to the west of El Camino Real. The intersection is a potential access location for the proposed development at 500 El Camino Real on the east side of El Camino Real, and would connect to a pedestrian and bicycle undercrossing of Caltrain which was proposed in the *Menlo Park El Camino Real and Downtown Specific Plan*

Roble Avenue – is a two-lane local street that provides access to residential neighborhoods, shopping, schools and parks to the west of El Camino Real. The signalized intersection also provides access to a shopping center and office building on the east side of El Camino Real.

Ravenswood Avenue – is a minor arterial street to the east of El Camino Real (aligning with Menlo Avenue to the west) that provides connectivity to Middlefield Road, Menlo-Atherton High School, Menlo Park Caltrain Station, residential neighborhoods east of Caltrain, Menlo Park City Hall and employment centers, including the SRI International campus. Ravenswood Avenue is the southernmost crossing of the Caltrain line that connects to eastern Menlo Park.

Menlo Avenue – is a collector street to the west of El Camino Real (aligning with Ravenswood Avenue to the east). The corridor borders Downtown Menlo Park on its southern side and provides access to local businesses and Downtown parking plazas.

Santa Cruz Avenue – is a minor arterial street that provides access to Alameda de las Pulgas and ultimately Sand Hill Road to the west. To the east of El Camino Real, Santa Cruz Avenue is a local street that terminates into the Menlo Park Caltrain Station. Santa Cruz Avenue is the primary commercial street in Downtown Menlo Park. However, since northbound and southbound left-turn movements are not permitted from El Camino Real onto Santa Cruz Avenue, access to Downtown is dispersed among Santa Cruz Avenue as well as Menlo Avenue and Oak Grove Avenue, to the south and north, respectively.

Oak Grove Avenue – is a collector street that forms the northern boundary of Downtown Menlo Park and provides access to local businesses and Downtown parking plazas.

Valparaiso Avenue – is a minor arterial street to the west of El Camino Real (aligning with Glenwood Avenue to the east) that provides access to several schools and residential neighborhoods, ultimately connecting to Alameda de las Pulgas (a regional, north-south route) to the west.

Glenwood Avenue – is a collector street to the east of El Camino Real (aligning with Valparaiso Avenue to the west) that provides access to residential neighborhoods and ultimately connects to Middlefield Road.

Encinal Avenue – is a collector street that connects to Middlefield Road to the east. West of El Camino Real, Encinal Avenue terminates into Menlo College.

Pedestrian Facilities

Within Menlo Park, continuous sidewalks are currently provided along both sides of El Camino Real with varying width and physical condition. As shown in Figure 2, 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, 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 to 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.

Vehicular Traffic Characteristics

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 turning movement counts at all study intersections
- Peak period pedestrian and bicycle turning movement counts at all study intersections
- 48-hour roadway segment vehicle counts, including vehicle classification, at the following locations:
    - El Camino Real between Encinal Avenue and Glenwood Avenue
    - El Camino Real between Ravenswood Avenue and Santa Cruz Avenue
    - El Camino Real north of Middle Avenue
    - El Camino Real north of Sand Hill Road
- Morning, midday and evening peak period travel time studies

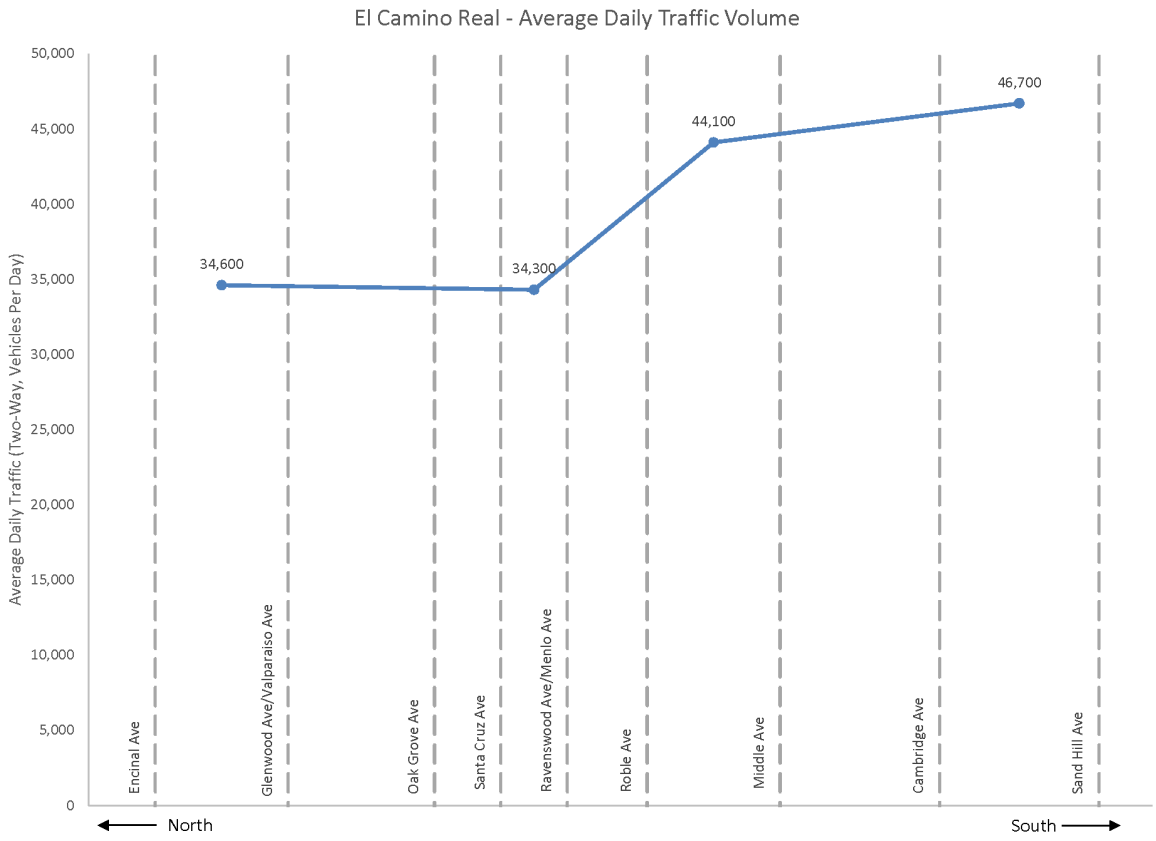
Segment Traffic Volumes

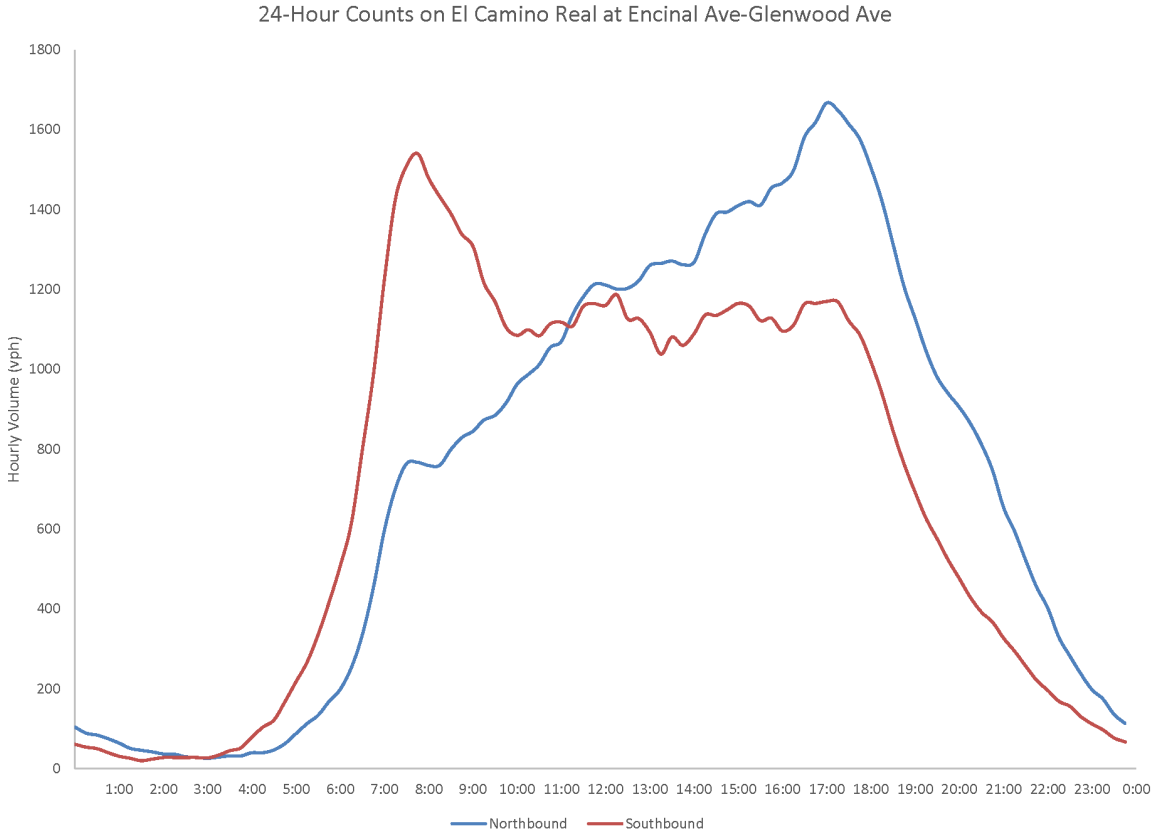
Vehicle traffic volume counts on El Camino Real, which are included in Appendix A, were found to be lowest at the north end of the City, generally increasing towards the south where there is as much as 35 percent more traffic. These counts are summarized in Table 1.

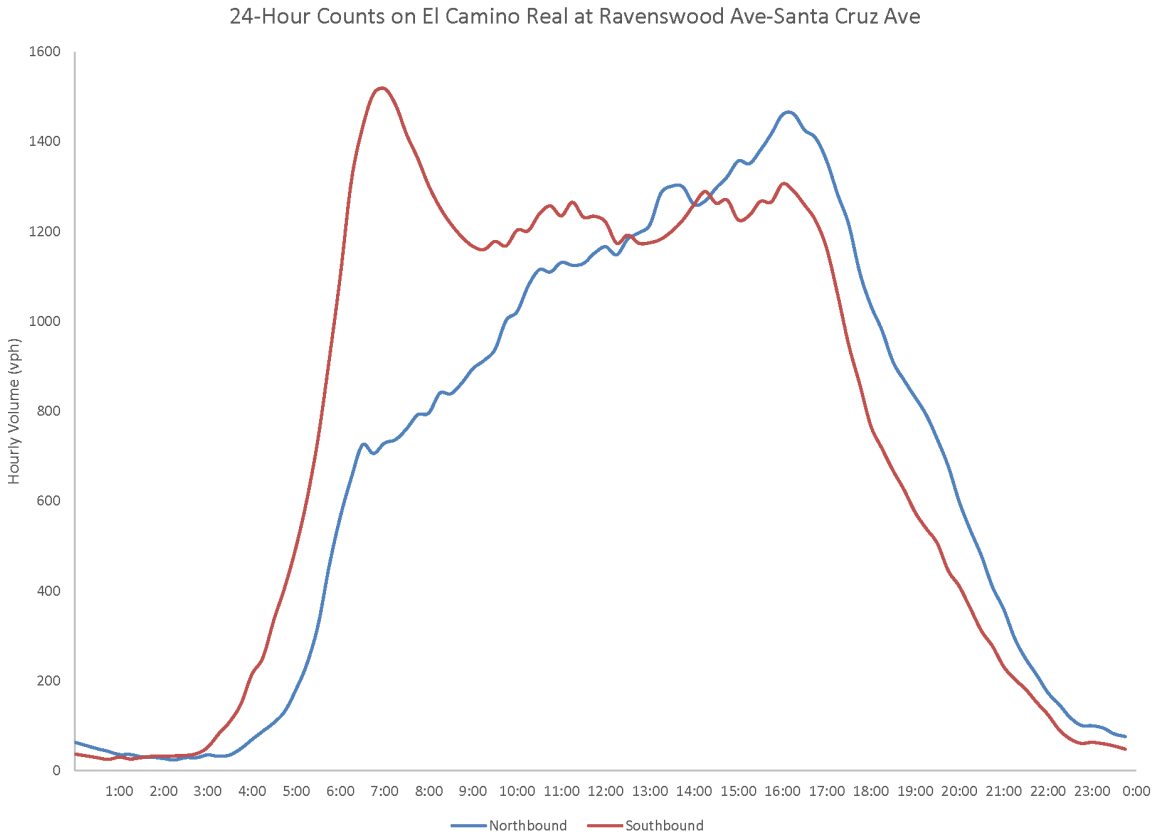
Table 1
El Camino Real Daily Traffic Volumes

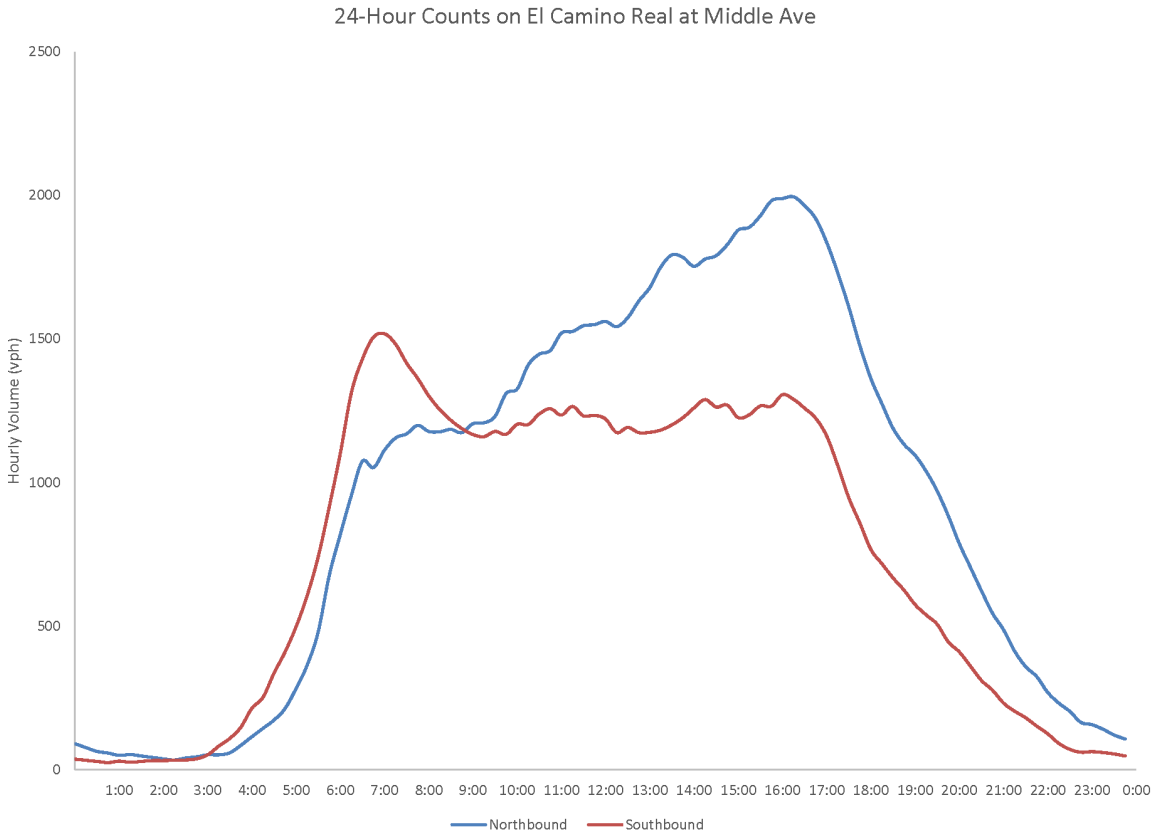
Location along El Camino Real	Southbound	Northbound	Total
Between Encinal Ave and Glenwood Ave	16,700	17,900	34,600
Between Ravenswood Ave-Menlo Ave and Santa Cruz Ave	17,900	16,400	34,300
North of Middle Ave	21,500	22,600	44,100
North of Sand Hill Rd	22,600	24,100	46,700

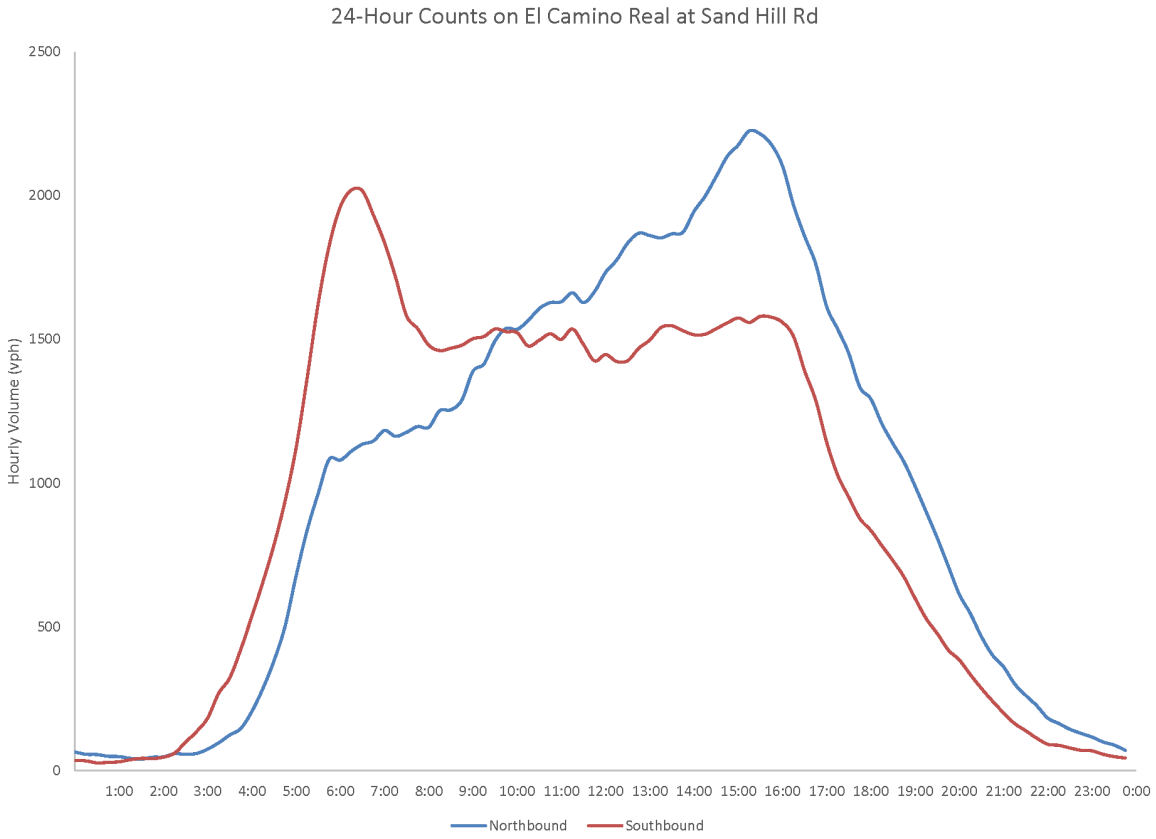
The charts below display the hourly distribution of traffic on El Camino Real at the four points of data collection. Throughout the day, southbound traffic generally peaks during the morning and decreases slightly during the afternoon. Conversely, northbound traveling traffic steadily increases throughout the day, peaking during the evening commute period.


El Camino Real - Average Daily Traffic Volume
Average Daily Traffic (Two-Way, Vehicles Per Day)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
34,600
34,300
44,100
46,700
Encinal Ave
Glenwood Ave/Valparaiso Ave
Oak Grove Ave
Santa Cruz Ave
Ravenswood Ave/Menlo Ave
Roble Ave
Middle Ave
Cambridge Ave
Sand Hill Ave
North
South


24-Hour Counts on El Camino Real at Encinal Ave-Glenwood Ave
Hourly Volume (vph)
1800
1600
1400
1200
1000
800
600
400
200
0
1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Northbound
Southbound


24-Hour Counts on El Camino Real at Ravenswood Ave-Santa Cruz Ave
Hourly Volume (vph)
1600
1400
1200
1000
800
600
400
200
0
1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Northbound
Southbound


24-Hour Counts on El Camino Real at Middle Ave
Hourly Volume (vph)
2500
2000
1500
1000
500
0
1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Northbound
Southbound



Vehicle Classification

Vehicle classification studies were performed at two locations along El Camino Real, at Cambridge Avenue and Middle Avenue, to determine the level of heavy vehicle traffic, including buses, on the route. 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 B.

Travel Times

Travel time surveys were conducted along the study corridor for three time periods: a.m. peak period of 7:00 – 9:00 a.m., midday peak period of 11:30 a.m. – 1:30 p.m., and the p.m. peak period of 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.

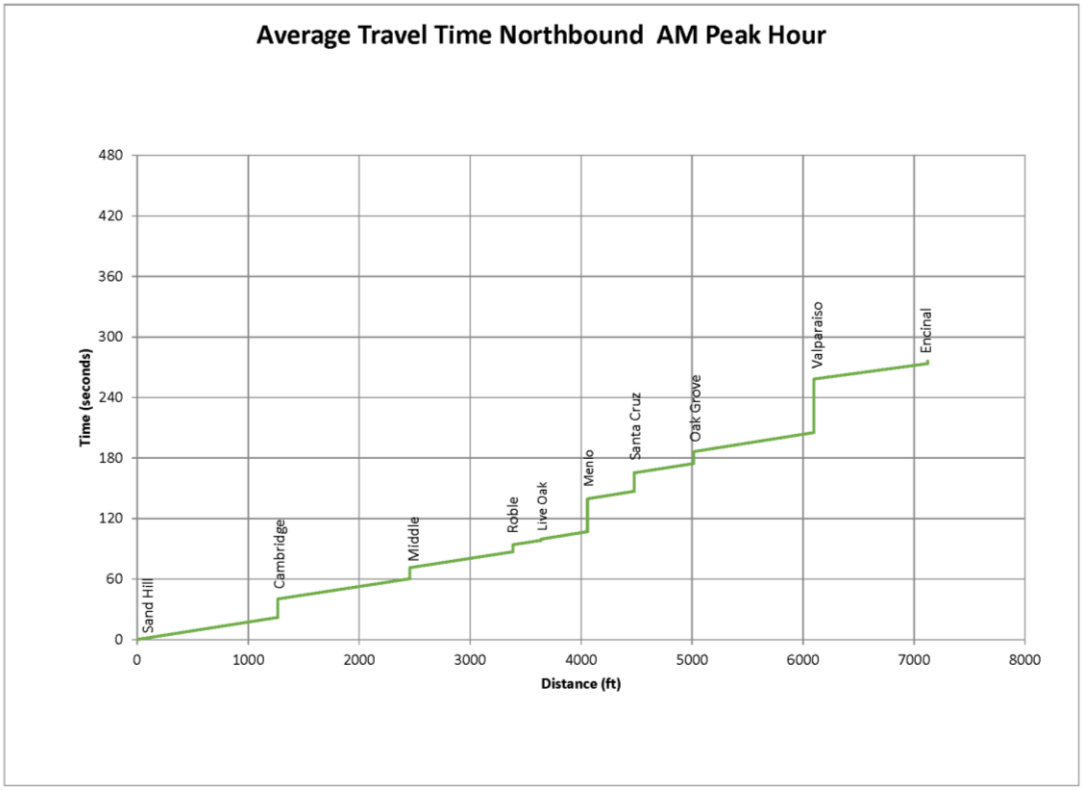
Table 2
Existing Peak Period Travel Time

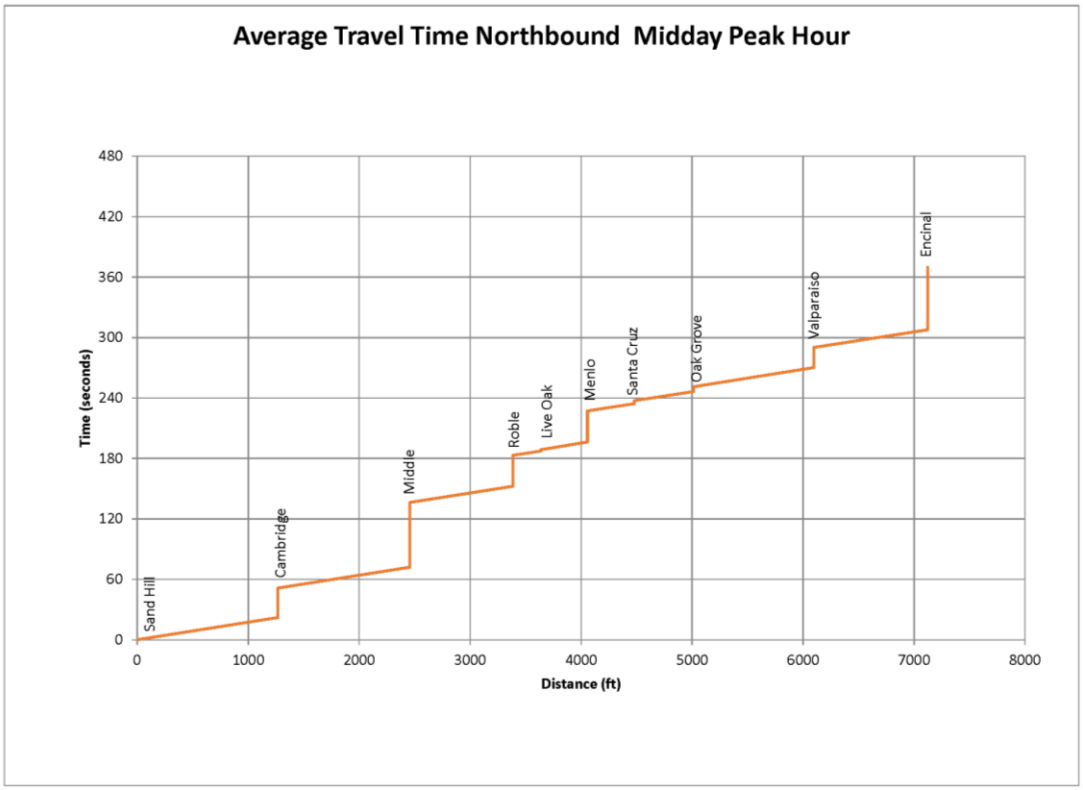
Direction of Travel	AM Peak [1]		Midday Peak [2]		PM Peak [3]	
	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed
NB El Camino Real [4]	3:48	21.5	4:35	17.5	5:24	14.9
SB El Camino Real [5]	5:06	15.7	3:48	21.3	5:00	16.1

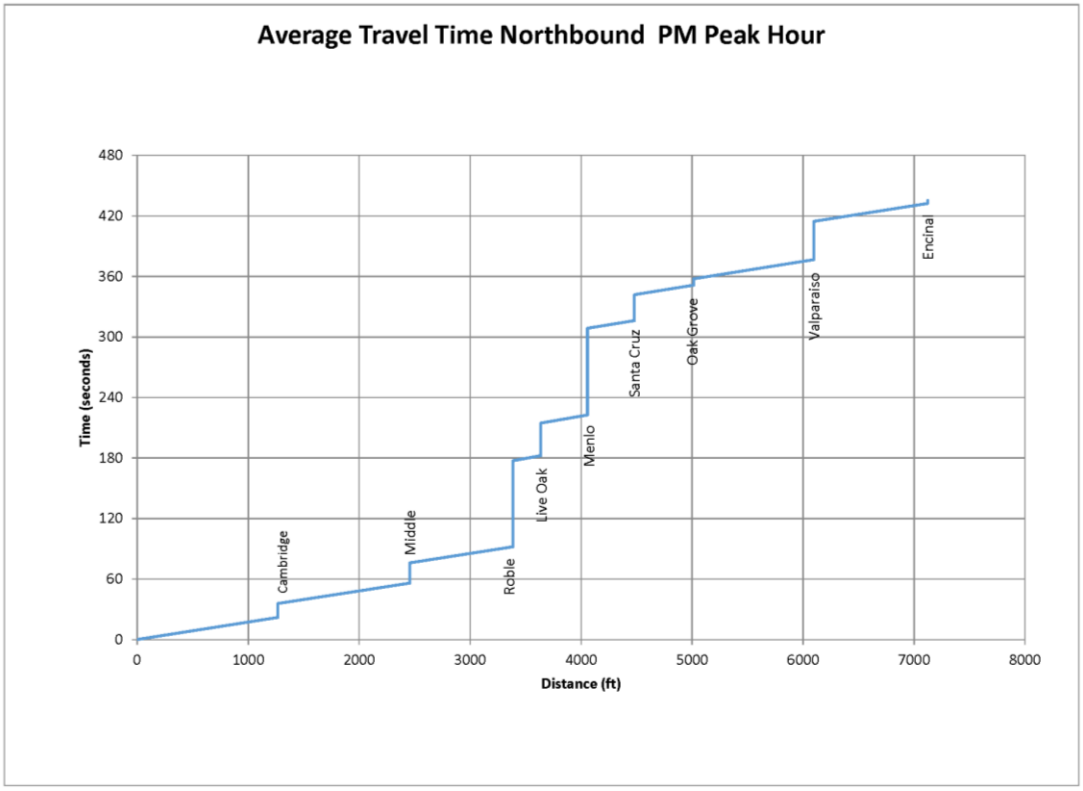
Notes: Travel Time is measured in minutes: seconds, Speed is measured in miles per hour (mph)
[1] a.m. peak period = 7:00 – 9:00 a.m.; [2] midday peak period = 11:30 a.m. – 1:30 p.m.; [3] p.m. peak period = 4:00 – 6:00 p.m.; [4] from Sand Hill Rd to Encinal Ave; [5] from Encinal Ave to Sand Hill Rd

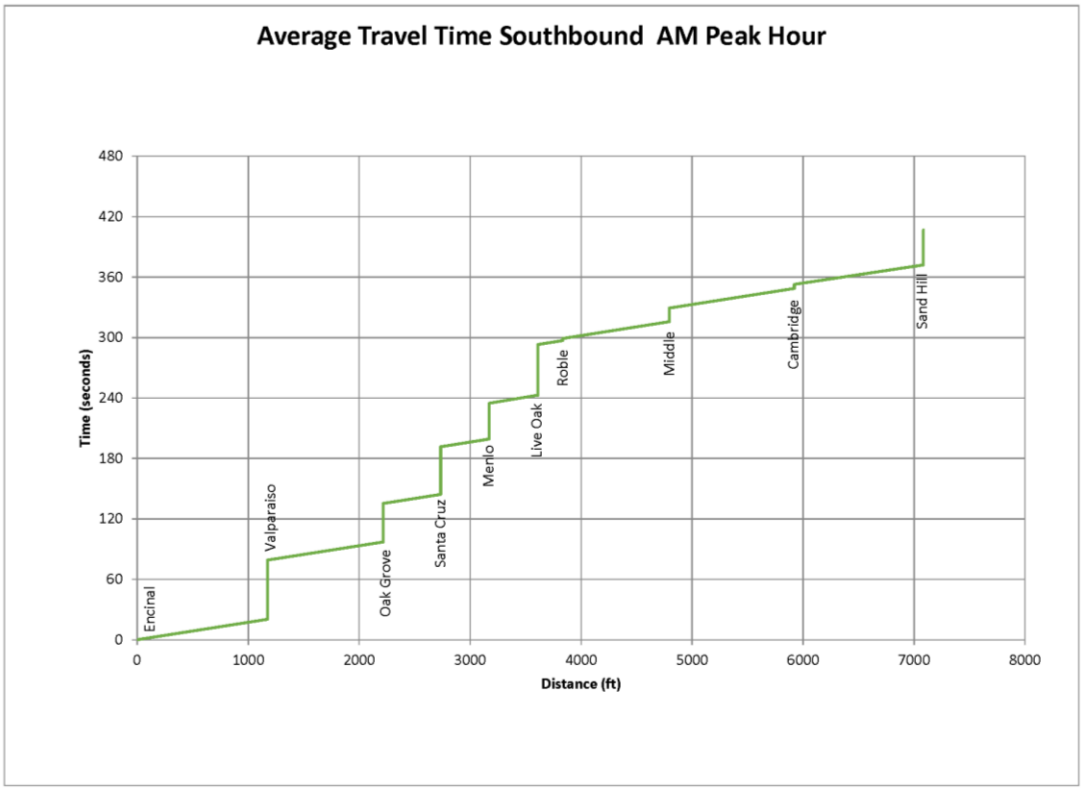
In the northbound direction, average speeds varied between 14.9 mph (p.m. peak) and 21.5 mph (a.m. peak) while in the southbound direction, average speeds varied between 15.7 mph (a.m. peak) and 21.3 mph (midday peak). The City, in Policy II-A-2 of its *General Plan,* has established a goal of maintaining an average travel speed of 14 mph or better along El Camino Real. Under existing conditions, surveyed travel speeds exceed 14 mph during all study periods.

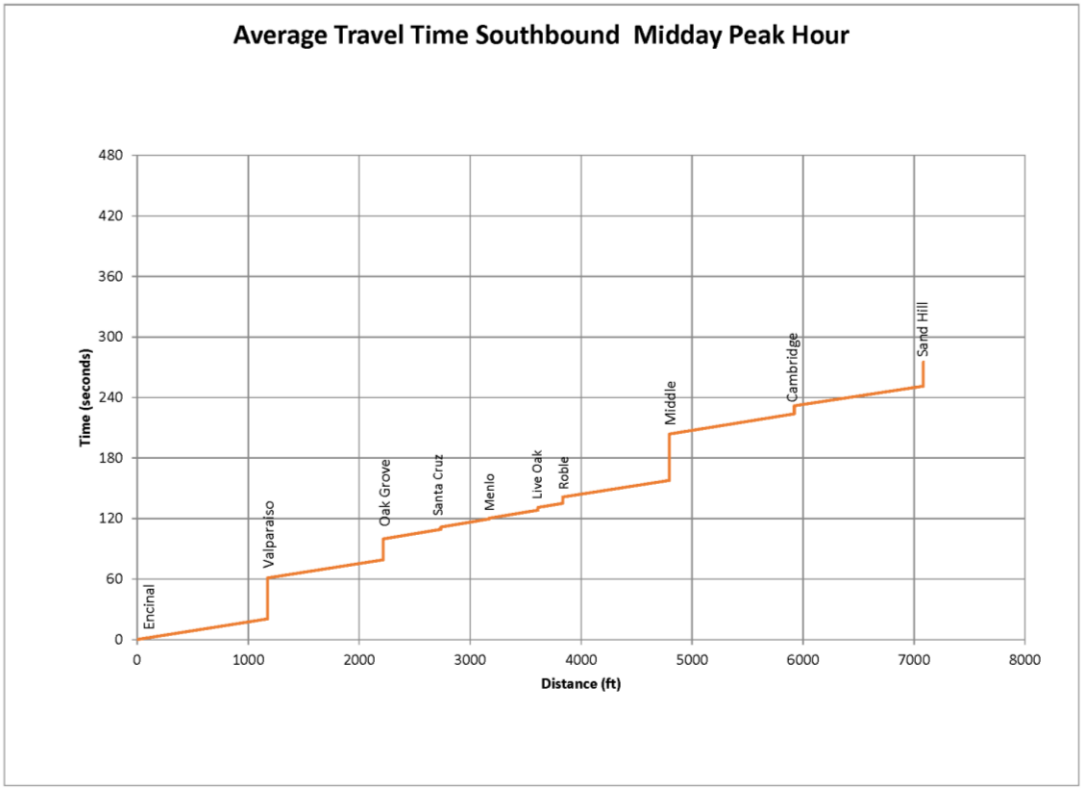
The charts below provide more details of the travel time in both directions during the three peak hours.

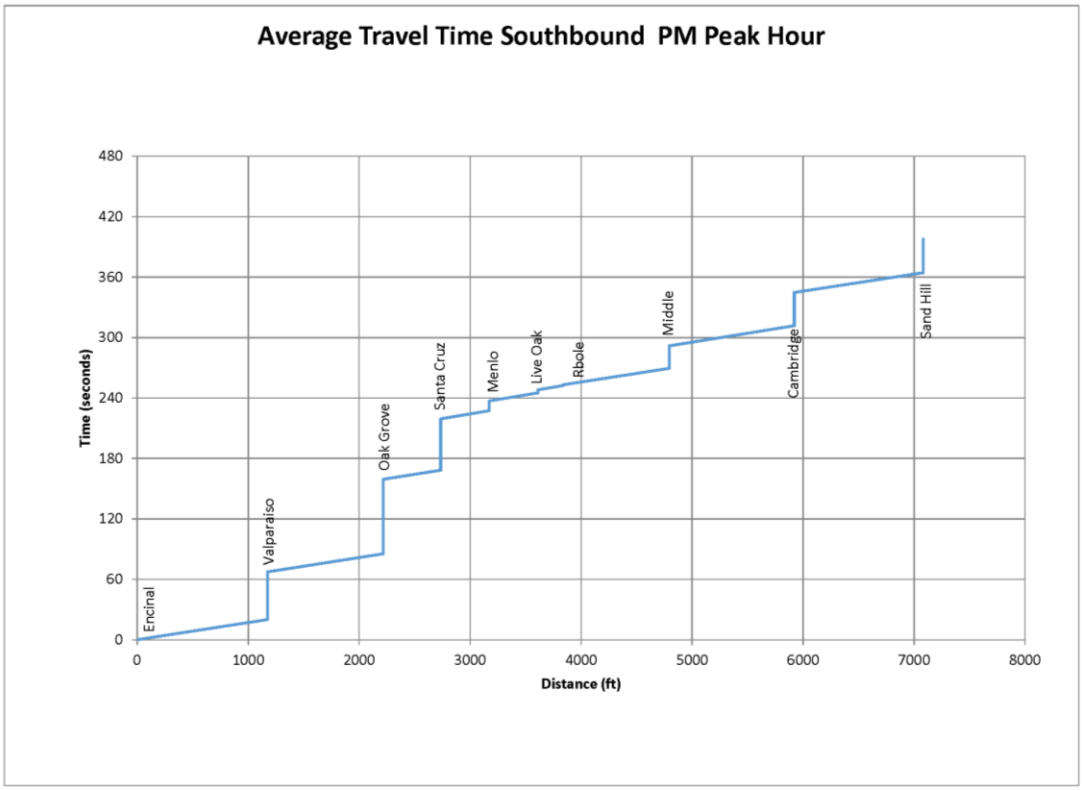



Average Travel Time Northbound Midday Peak Hour
Time (seconds)
Distance (ft)
0
60
120
180
240
300
360
420
480
0
1000
2000
3000
4000
5000
6000
7000
8000
Sand Hill
Cambridge
Middle
Roble
Live Oak
Menlo
Santa Cruz
Oak Grove
Valparaiso
Encinal


Average Travel Time Northbound PM Peak Hour
Time (seconds)
Distance (ft)
0
60
120
180
240
300
360
420
480
0
1000
2000
3000
4000
5000
6000
7000
8000
Cambridge
Middle
Roble
Live Oak
Menlo
Santa Cruz
Oak Grove
Valparaiso
Encinal


Average Travel Time Southbound AM Peak Hour
Time (seconds)
480
420
360
300
240
180
120
60
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Distance (ft)
Encinal
Valparaiso
Oak Grove
Santa Cruz
Menlo
Live Oak
Roble
Middle
Cambridge
Sand Hill


Average Travel Time Southbound Midday Peak Hour
Time (seconds)
480
420
360
300
240
180
120
60
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Distance (ft)
Encinal
Valparaiso
Oak Grove
Santa Cruz
Menlo
Live Oak
Roble
Middle
Cambridge
Sand Hill



Intersection Traffic Volumes

Peak hour intersection turning movement volumes at the study intersections are shown on Figure 3 with full details of the counts in Appendix D.

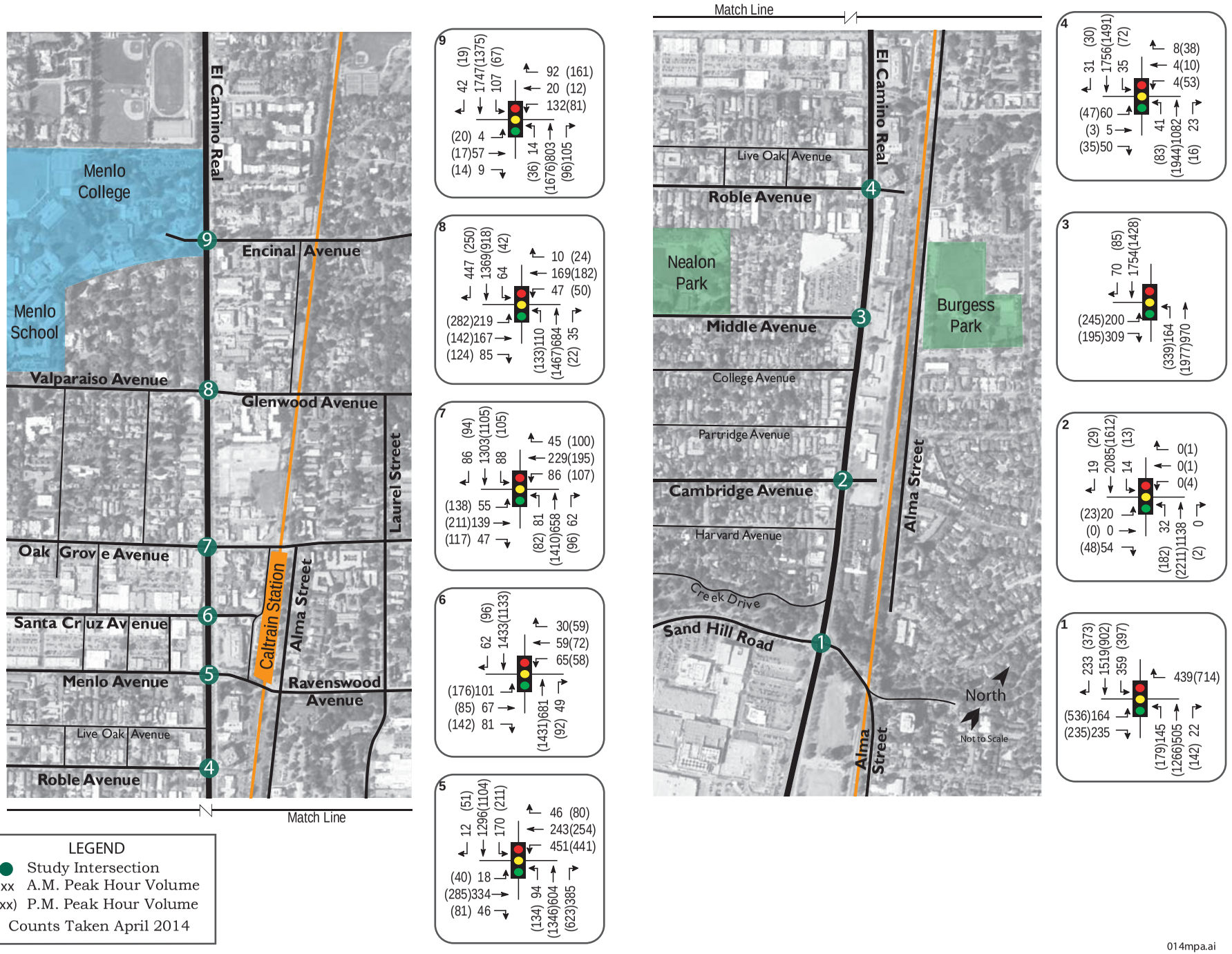
Intersection Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank 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. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. The study intersections were evaluated using the Synchro 8 application. The signalized methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology.

The ranges of delay associated with the various levels of service are indicated in Table 3.



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El Camino Real Corridor Study – Existing Conditions Report

Figure 3 – Existing Peak Hour Traffic Volumes

Table 3
Signalized Intersection Level of Service Definitions

LOS A	Delay of 0 to 10 seconds.
LOS B	Delay of 10 to 20 seconds.
LOS C	Delay of 20 to 35 seconds.
LOS D	Delay of 35 to 55 seconds.
LOS E	Delay of 55 to 80 seconds.
LOS F	Delay of more than 80 seconds.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2000

Standards of Significance

The City of Menlo Park's standards of significance are established in the City's *General Plan*. For signalized intersections within Menlo Park, including those controlled by Caltrans, the City has established an acceptable threshold of LOS D or better.

Calibration Process

Since the City employs an adaptive traffic signal system that automatically adjusts signal timing based on traffic demands, delays were calculated using signal timing calibrated to produce results similar to field-collected travel-time runs. The model's corridor travel time were determined using the SimTraffic application of Synchro and averaging the corridor travel times for each of five runs. Corridor travel times predicted by the Synchro model were within five percent of field-observed travel time runs after calibration.

Existing Intersection Operations

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations are provided in Appendix E.

Table 4
Existing Peak Hour Intersection Levels of Service

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

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

Currently, all study intersections along the corridor were found to be operating at LOS D or better, with the exception of El Camino Real/Sand Hill Road which operates at LOS E during the p.m. peak hour (which is in Palo Alto, and as a CMP intersection is considered acceptable at LSO E). Generally, the highest level of delay was found to occur during the p.m. peak hour at all but three of the study intersections.

Queuing

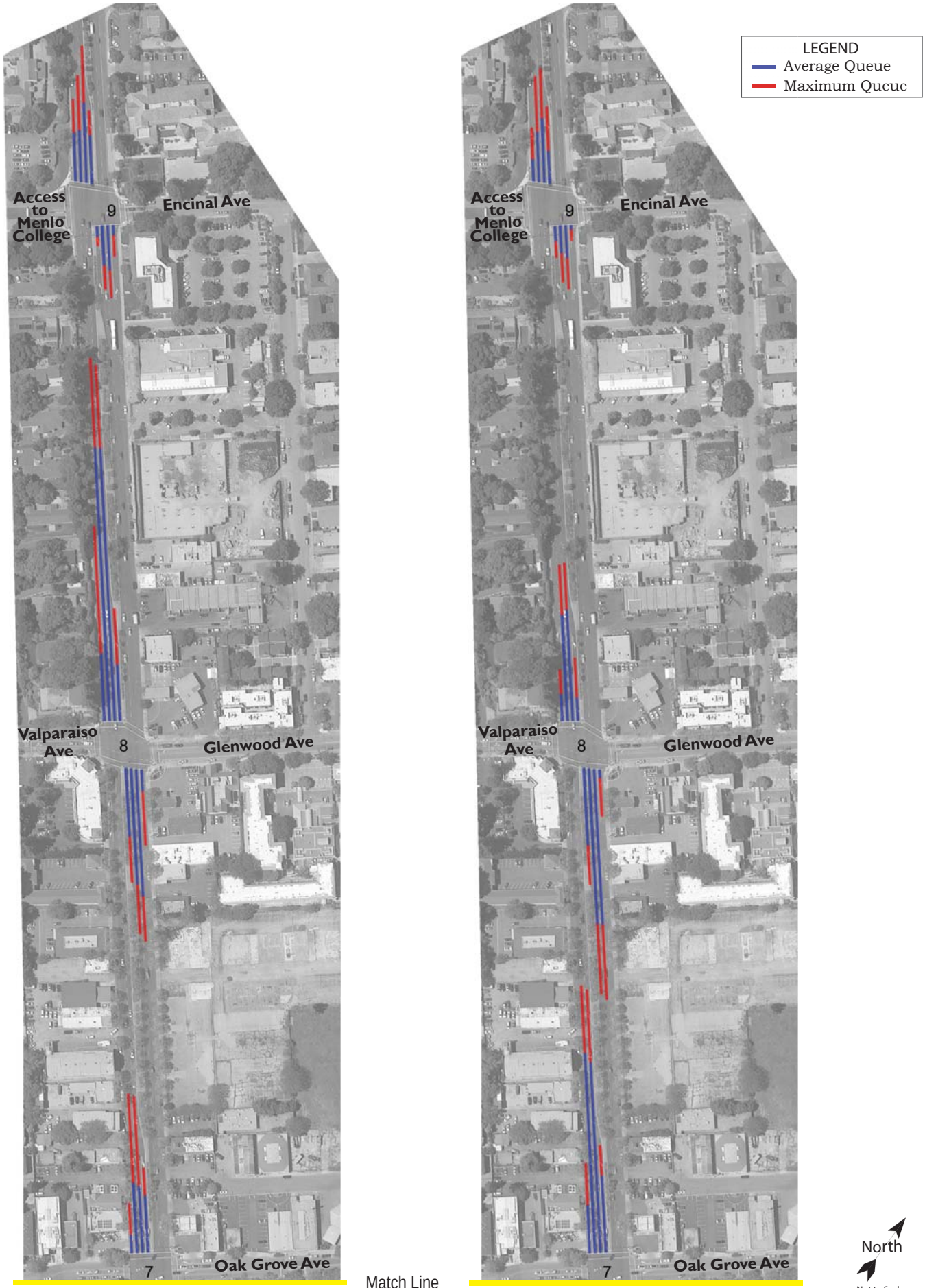
Vehicular queuing along the El Camino Real corridor at the study intersections was determined using the SimTraffic application of Synchro. Queue statistics were averaged over five runs of SimTraffic. In addition, vehicular queuing along El Camino Real was field-observed. After calibration of the Synchro models used for the SimTraffic application, results from the expected queuing from the SimTraffic application, including typical queues and maximum projected queues, were compared with field observations and were found to be consistent.

For each scenario the projected average and maximum queues on the El Camino Real approaches to the study intersections are shown in Figure 4. The queuing calculation results are contained in Appendix F. In general, these conditions reveal the following:

- The longest average queues were determined to be in the southbound direction during the a.m. peak hour, and in the northbound direction during the p.m. peak hour, 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.



AM Peak Hour **PM Peak Hour**

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Figure 4A – Queuing

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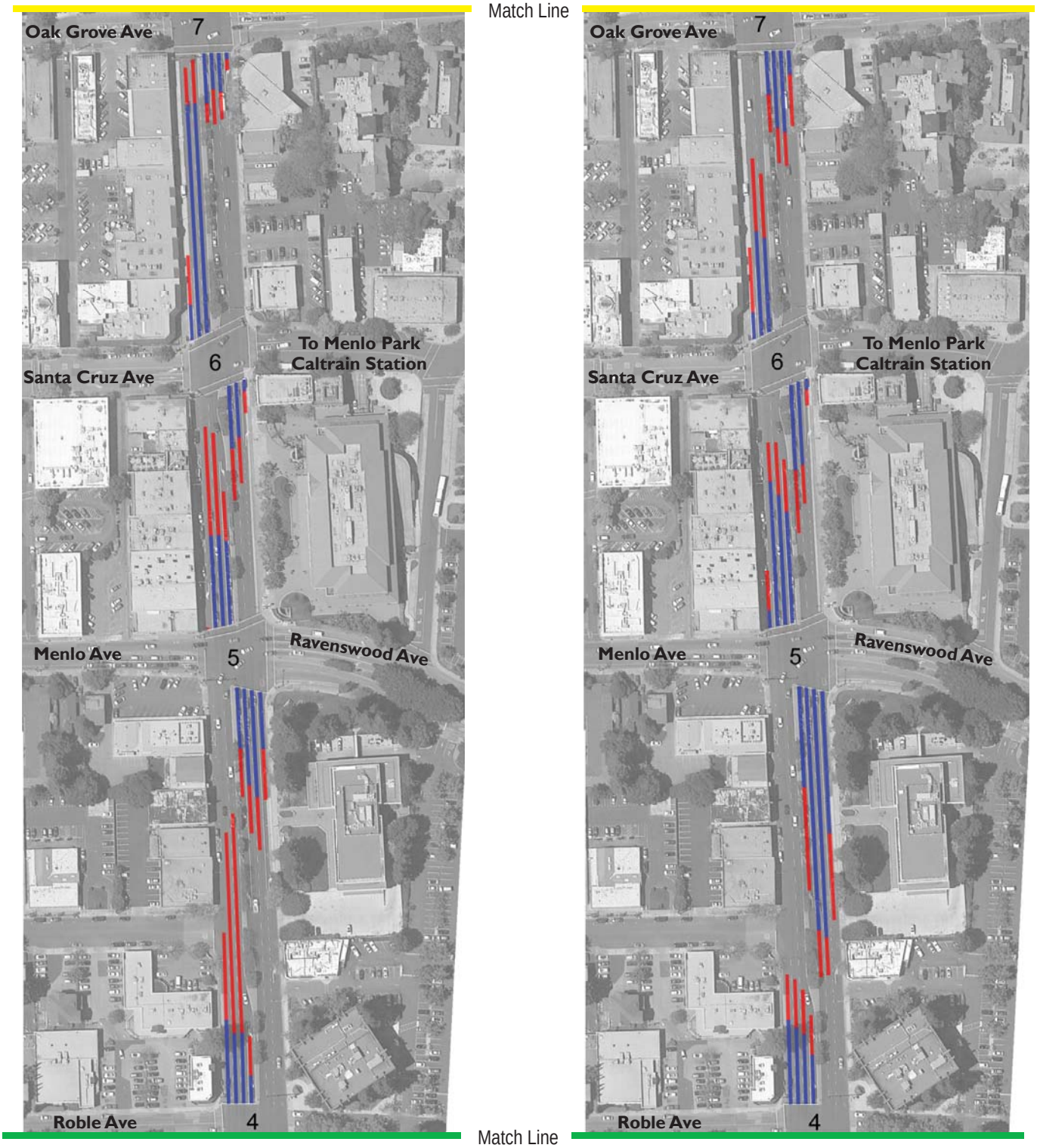

AM Peak Hour

PM Peak Hour

North

Not to Scale

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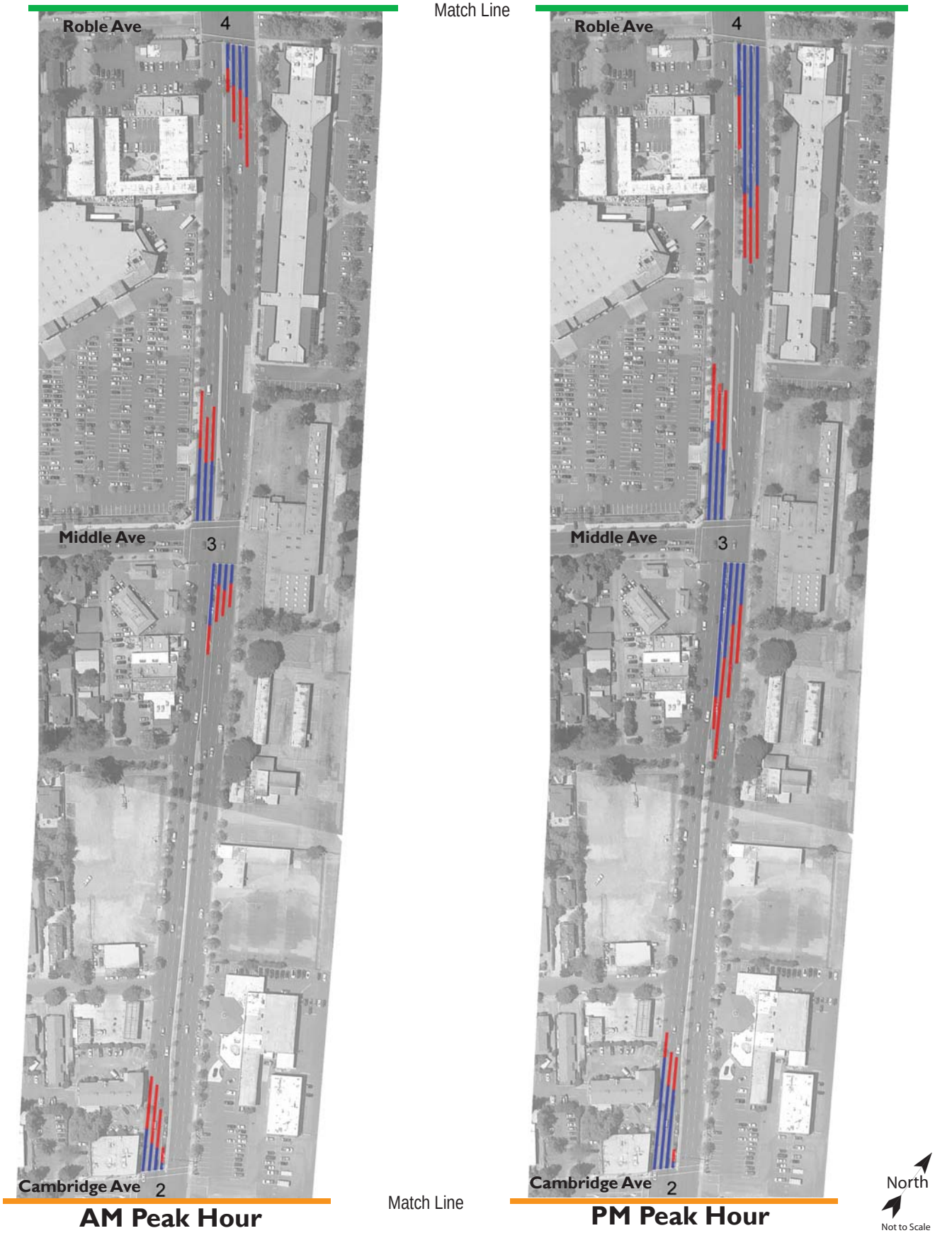
Figure 4B – Queuing

w-trans



AM Peak Hour

PM Peak Hour

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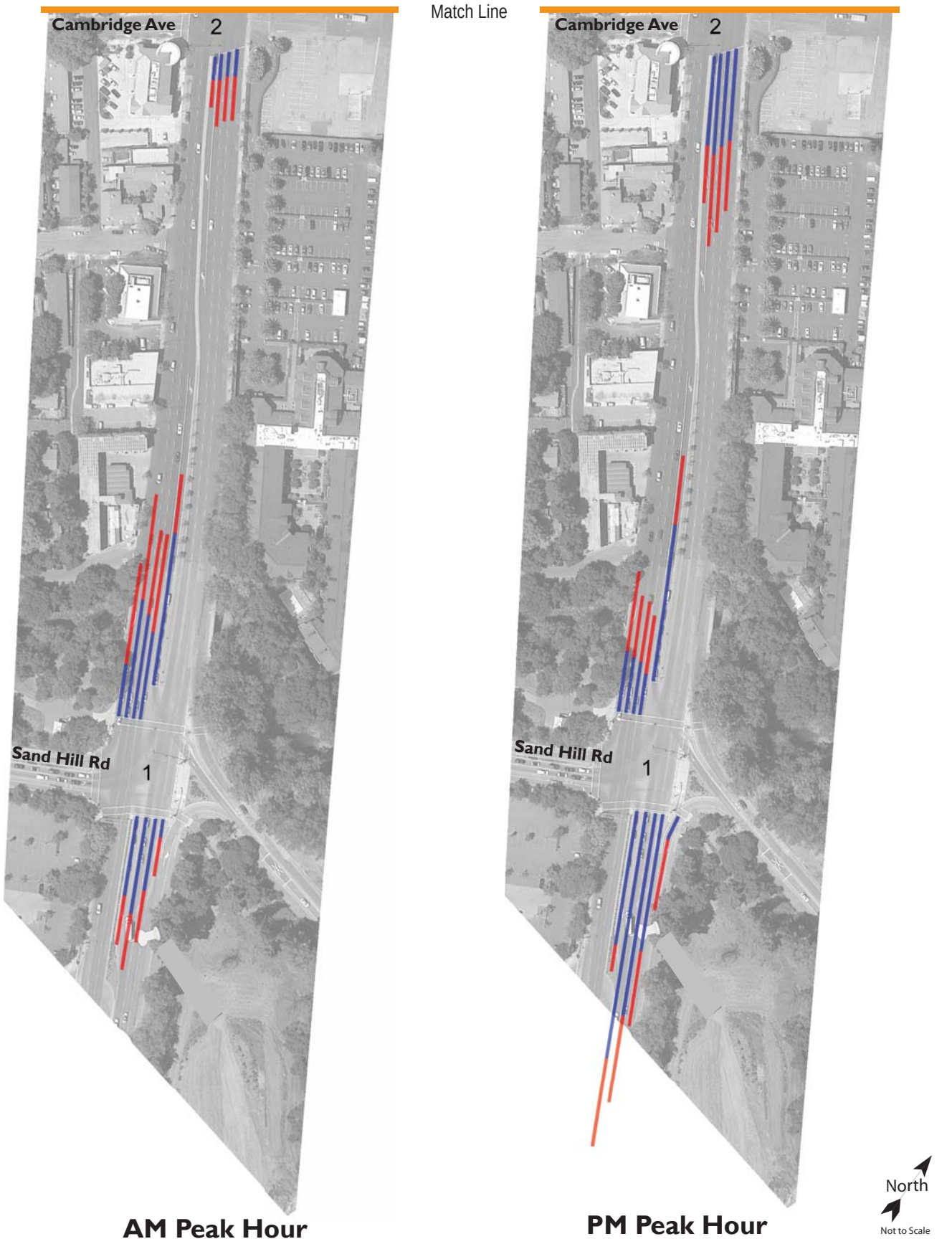
Figure 4C – Queuing

w-trans



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El Camino Real Corridor Study – Existing Conditions Report

Figure 4D – Queuing

w-trans

Non-Auto Modes of Transportation

Pedestrian Facilities

Within Menlo Park, continuous sidewalks are currently provided along both sides of El Camino Real; however, it is noted that the width and condition of the sidewalk varies along the corridor. As part of the corridor study, a detailed analysis of pedestrian facilities will be conducted and, where appropriate, improvement measures will be recommended.

Crosswalk Locations

Marked pedestrian crosswalks, along with pedestrian crossing signal equipment, are provided at all study intersections; however, at some intersections, crossings are not provided on one leg of the intersection as shown on Figure 5. At these locations, there is no traffic signal crossing equipment but also no signing prohibiting crossing, except for the south leg of El Camino Real at Menlo Avenue. 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, there are no signs or markings that prohibit pedestrians from crossing at these locations.

Curb Ramps

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. A complete inventory is shown in Appendix G.

Medians

There are existing raised medians on all sections of El Camino Real in the study corridor which are shown in Figure 2. Wider medians also provide tree coverage and landscaping while narrower sections have no landscaping and provide channelization.

Pedestrian Crossing Volumes

As part of the data collection effort, pedestrian crossings were counted during the a.m. and p.m. peak hours. The peak crossing volume for each of the study intersections is shown on Figure 6. 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*, California Department of Transportation (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.

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Figure 5 – Existing Crosswalk Location

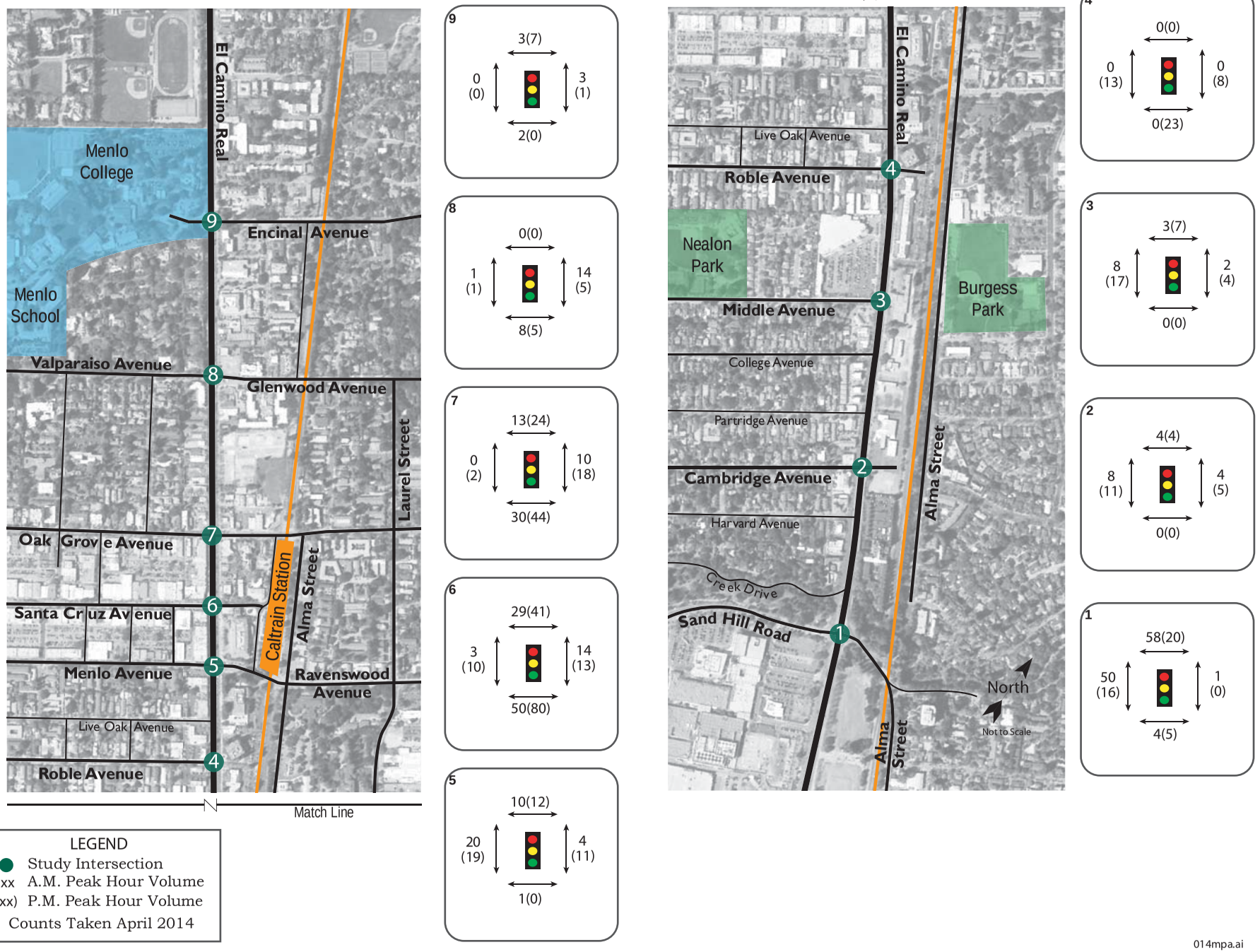

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Figure 6 – Existing Peak Hour Pedestrian Crossing Volumes

w-trans

In addition, the Downtown Specific Plan contains a "Future Class II/Minimum Class III" designation for locations where bicycle lanes are desired but may be infeasible in the near-term because they would require parking removal or right-of-way acquisition.

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 and 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.

A summary of Existing and Planned bicycle facilities is shown in Figure 7.

Bicycle Volumes

The peak hour bicycle volumes for each of the study intersections are shown on Figure 8. 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.

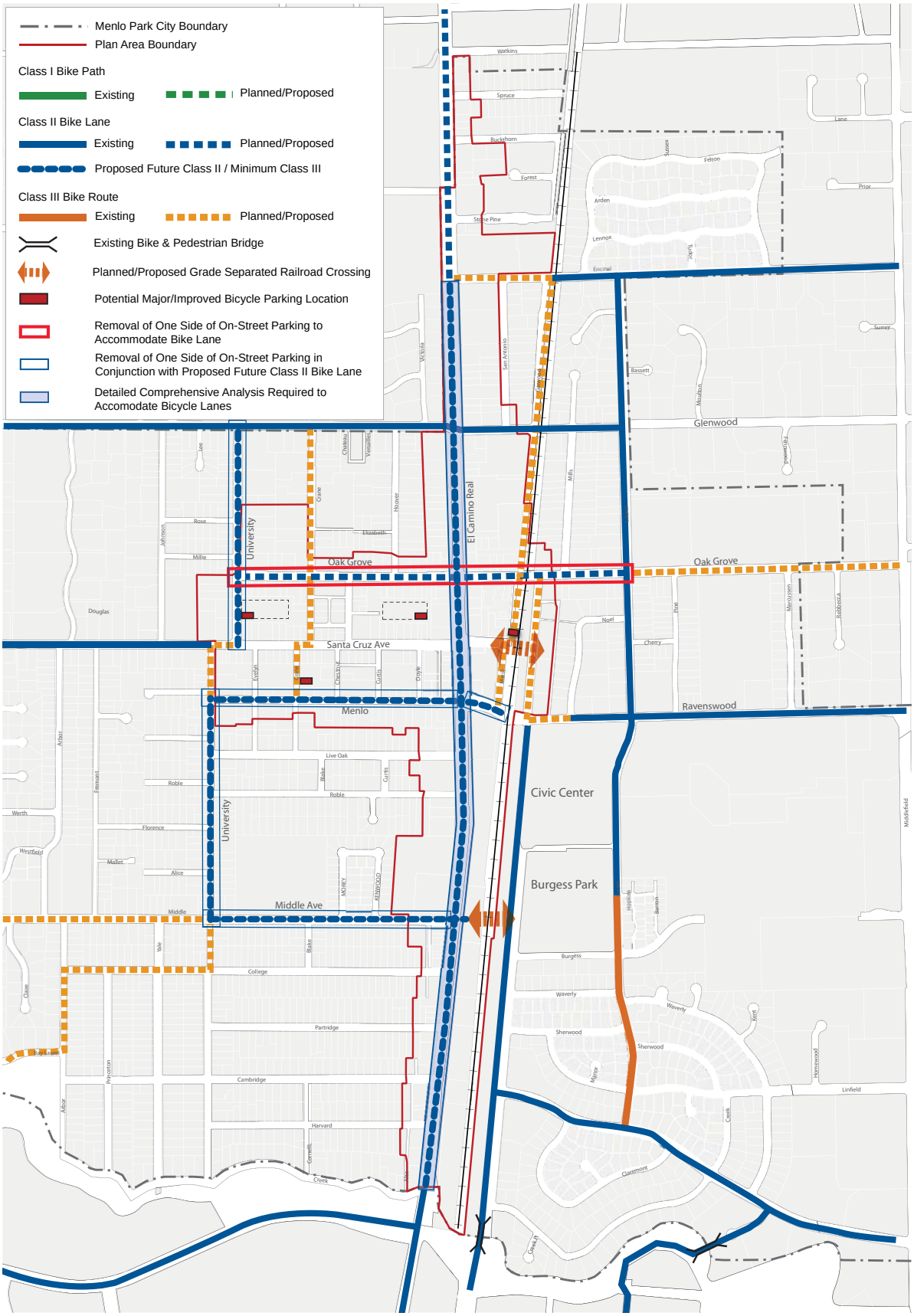
Transit Facilities

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. The transit lines and bus stop locations within the study area are shown in Figure 9.

In addition to local service provided by SamTrans, regional transit services are provided by Caltrain and the VTA within the vicinity of the project site and along the Peninsula. These services are not intended to serve riders traveling only within Menlo Park, but instead, they provide connections between Menlo Park and neighboring cities and counties.

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.



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El Camino Real Corridor Study – Existing Conditions Report

Figure 7 – Bicycle Facilities

LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume
- Counts Taken April 2014

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Figure 8 – Existing Peak Hour Bicycle Intersection Volumes

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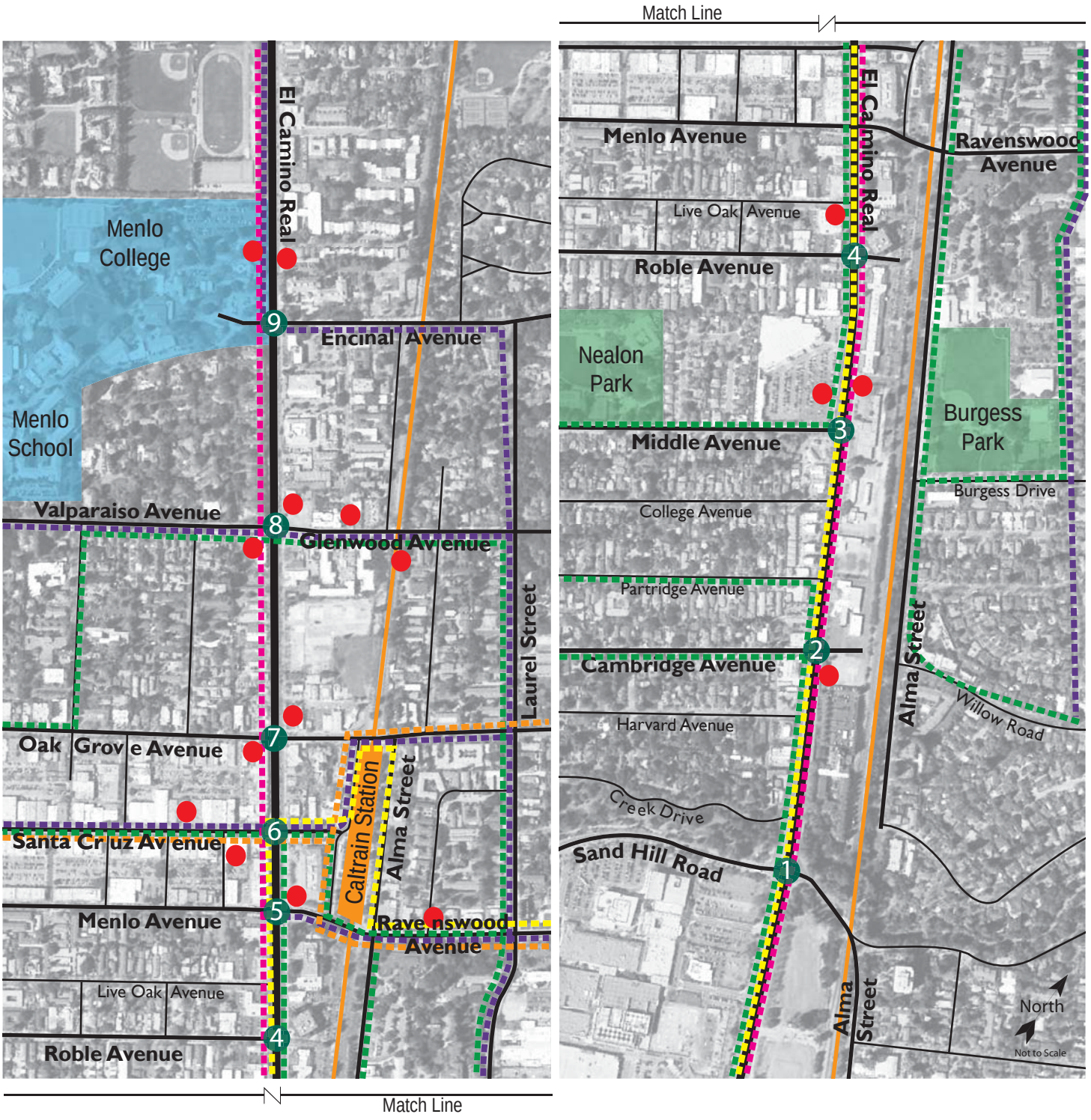

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El Camino Real Corridor Study – Existing Conditions Report

Figure 9 – Transit Facilities

The following SamTrans routes serve El Camino Real in Menlo Park:

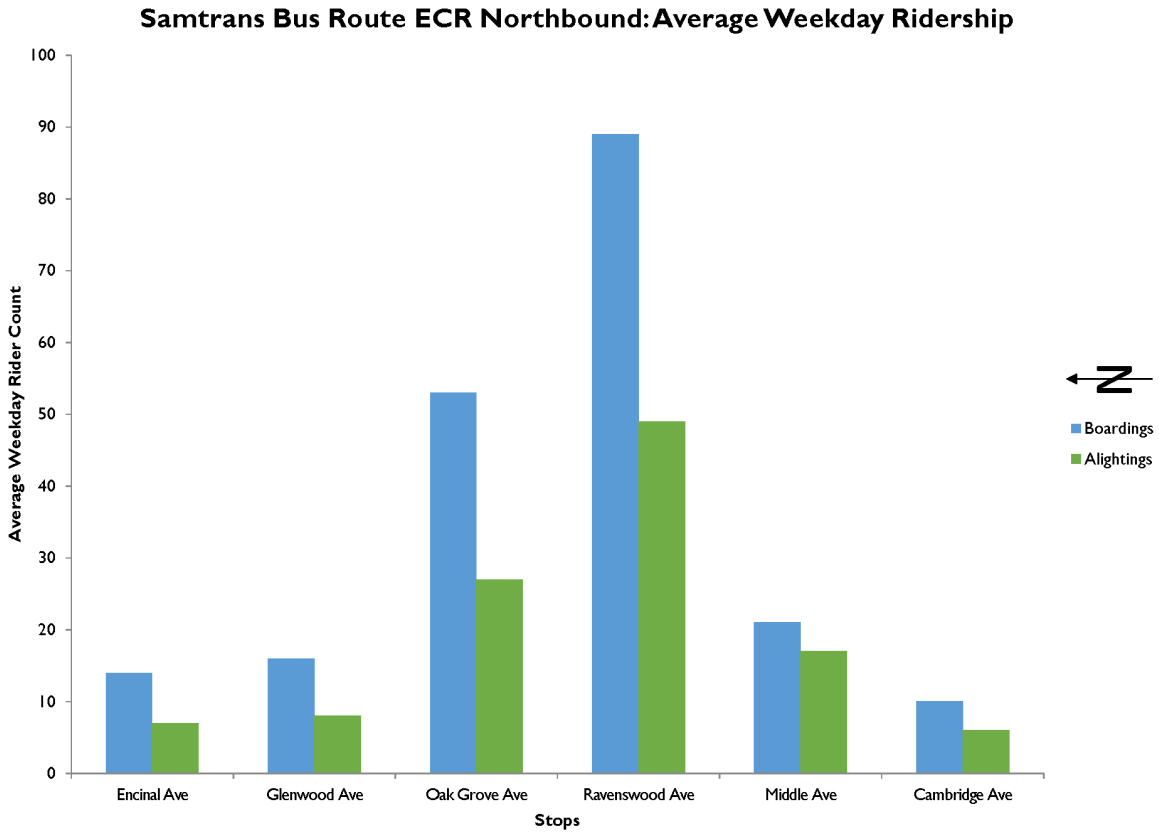
- *Route ECR* serves El Camino Real between Palo Alto and the Daly City BART Station. The route runs every day from approximately 5:00 a.m. to 2:00 a.m., with headways of approximately 15 to 20 minutes.

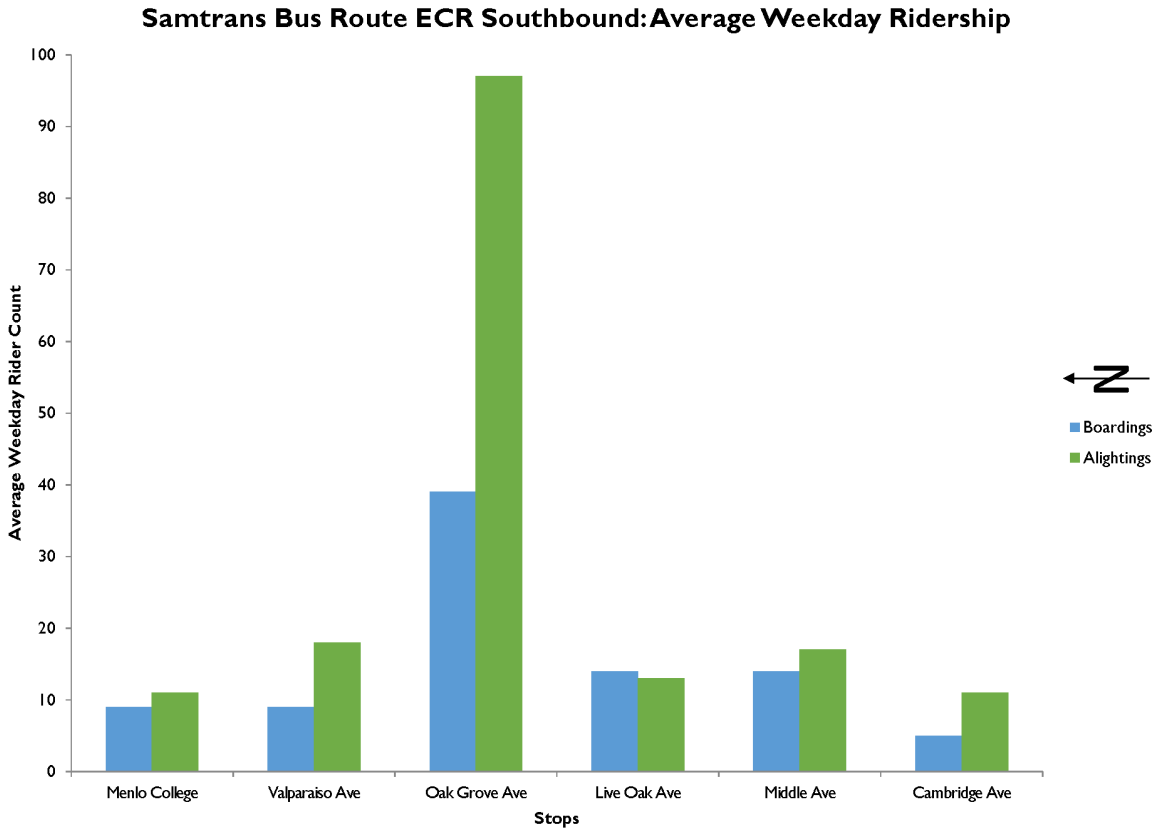
- *Route 286* serves Menlo Park and Atherton, crossing El Camino Real at Santa Cruz Avenue. The route operates four times daily in each of the westbound and eastbound directions, twice during the morning commute period and twice during the even commute period.

- *Routes 82, 83, 84,* and *86* provide school-oriented services. These routes operate only on school days and are timed to coincide with school arrival and dismissal times. The routes do not travel along El Camino Real within the project area, but cross El Camino Real at Valparaiso Avenue and Santa Cruz Avenue.

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 the following charts:



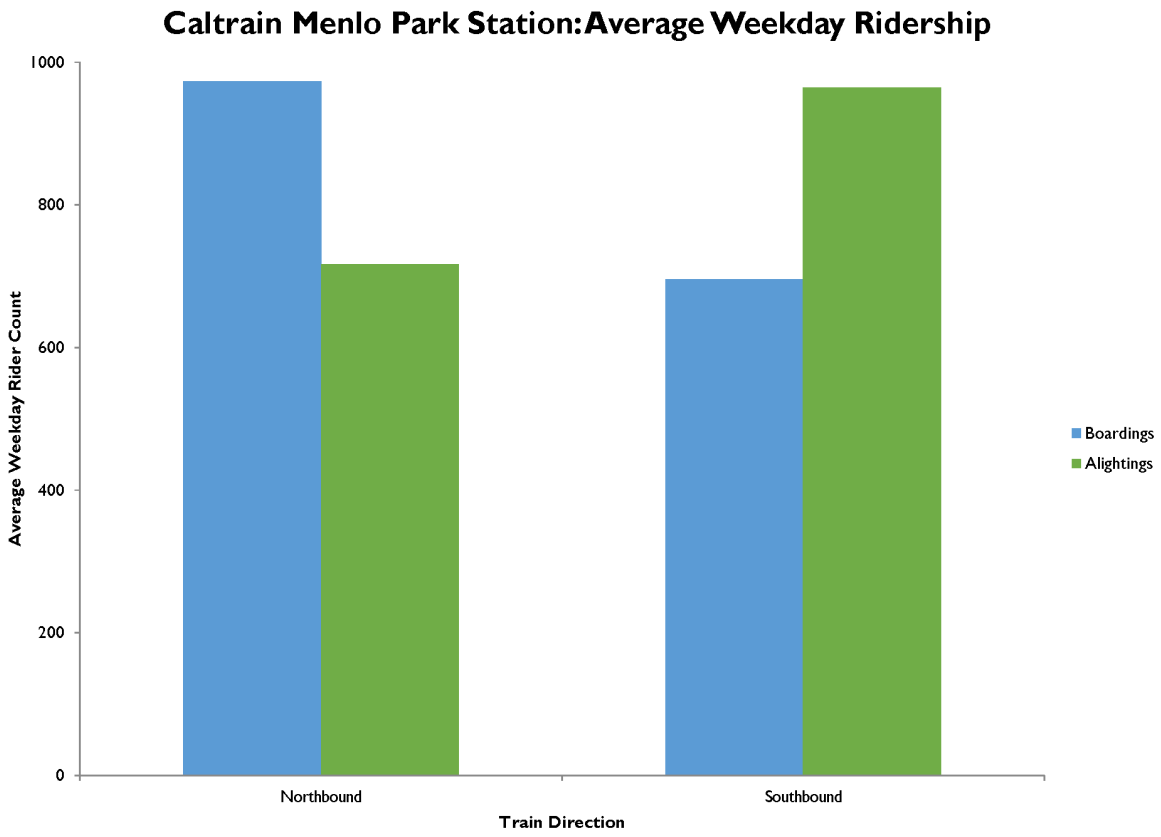


The majority of boardings and alightings occur at the Ravenswood Avenue and Oak Grove Avenue stops. The Ravenswood Avenue stop serves northbound riders, while the Oak Grove Avenue stops serve both northbound and southbound riders. These stops are located near the Menlo Park Caltrain Station and provide easy transfer between modes of transit. Based on the average weekday boardings and alightings, many riders appear to be travelling from the north to the Menlo Park Caltrain Station via the ECR.

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 the following chart:



The majority of riders leaving Menlo Park are travelling in the northbound direction, towards downtown San Francisco, and returning via southbound trains. However, there are a significant number of riders also travelling in the southbound direction, towards downtown San Jose, and returning via northbound trains. The lack of a larger directional split in average weekday Caltrain ridership demonstrates that many riders from Menlo Park are travelling to employment centers in both San Francisco and the greater San Jose area. Also, there are riders that travel to Menlo Park each day from the South Bay or San Francisco and the Peninsula for employment.

Santa Clara VTA

The Santa Clara Valley Transportation Authority (VTA) provides light rail services within Mountain View, Santa Clara, Sunnyvale, Milpitas, San Jose and Campbell as well as bus service throughout Santa Clara County. The nearest VTA Light Rail station is the Evelyn Station in Downtown Mountain View, with Caltrain providing a connection between Menlo Park and the light rail service. The nearest VTA bus stops are located on El Camino Real, south of Sand Hill Road.

Shuttle Services

Menlo Park Midday Shuttle

The City of Menlo Park provides hourly community shuttle service to the general public from 9:30 a.m. to 3:30 p.m. on weekdays, serving nearby senior centers, Downtown Menlo Park and Palo Alto, Menlo Park Caltrain Station, nearby shopping centers, libraries, and medical buildings such as the Menlo Medical Clinic and the VA Medical Center. The Menlo Park Midday shuttle travels along portions of El Camino

Real, but does not have an established shuttle stop. However, shuttles will stop anywhere along the route where it is safe and legal to stop.

Stanford Marguerite Shuttle

Nearby Stanford University, located south of Menlo Park, provides free public shuttle service that connects the university campus to other nearby destinations. The Marguerite Bohannon line (Line BOH) runs from Stanford University to Menlo Park Caltrain and eastern Menlo Park via El Camino Real. Line BOH stops along El Camino Real at Cambridge Avenue and also Roble Avenue.

Menlo Park 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 include the following:

Goal II-A: To maintain a circulation system using the Roadway Classification System that will provide for the safe and efficient movement of people and goods throughout Menlo Park for residential and commercial purposes.

- Policy II-A-1: Level of Service D (40 seconds average stopped delay per vehicle) or better shall be maintained at all City-controlled signalized intersections during peak hours, except at the intersection of Ravenswood Avenue and Middlefield Road and at intersections along Willow Road from Middlefield Road to US 101.

- Policy II-A-2: The City should attempt to achieve and maintain average travel speeds of 14 miles per hour or better on El Camino Real and other arterial roadways controlled by the State and at 46 miles per hour or better on U.S. Route 101 (Level of Service D).

Goal II-B: To promote the use of public transit.

- Policy II-B-1: The City shall consider transit modes in the design of transportation improvements and the review and approval of development projects.

- Policy II-B-2: As many activities as possible should be located within easy walking distance of transit stops, and transit stops should be convenient and close to as many activities as possible.

- Policy II-B-3: The City shall promote improved public transit service and increased transit ridership, especially to office and industrial areas and schools.

Goal II-C: To promote the use of alternatives to the single occupant automobile.

- Policy II-C-1: The City shall work with all Menlo Park employers to encourage the use of alternatives to the single occupant automobile in their commute to work.

- Policy II-C-7: Commuter shuttle service between the industrial work centers and the Downtown Transportation Center should be maintained and improved, within fiscal constraints. The City shall encourage SamTrans and other agencies to provide funding to support shuttle services.

Goal II-D: To promote the safe use of bicycles as a commute alternative and for recreation.

- Policy II-D-2: The City shall, within available funding, work to complete a system of bikeways within Menlo Park.

- Policy II-D-4: The City shall require new commercial and industrial development to provide secure bicycle storage facilities on-site.

Goal II-E: To promote walking as a commute alternative and for short trips.

- Policy II-E-1: The City shall require all new development to incorporate safe and attractive pedestrian facilities on-site.
- Policy II-E-2: The City shall endeavor to maintain safe sidewalks and walkways where existing within the public right of way.
- Policy II-E-3: Appropriate traffic control shall be provided for pedestrians at intersections.
- Policy II-E-4: The City shall incorporate appropriate pedestrian facilities, traffic control, and street lighting within street improvement projects to maintain or improve pedestrian safety.

Goal II-F: To provide adequate parking in the Downtown area, especially for retail customers and Caltrain patrons.

- Policy II-F-1: Adequate off-street parking should be required for all new development in the Downtown Area

Menlo Park El Camino Real and Downtown Specific Plan

Adopted by the City Council in June 2012, the *Menlo Park El Camino Real and 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:

- *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.*

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

City of Menlo Park 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.

City of Menlo Park Comprehensive Bicycle Development Plan

The 2005 *Comprehensive Bicycle Development Plan* (CBDP) 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 CBDP provide a long-range vision, while the policies provide specific action descriptions to implement the Plan. Following are the relevant bicycle-related goals and policies:

Goal 1: Expand and Enhance Menlo Park's Bikeway Network

- Policy 1.1: Complete a network of bike lanes, bike routes, and shared use paths that serve all bicycle user groups, including commuting, recreation, and utilitarian trips.

Goal 2: Plan for the Needs of Bicyclists

- Policy 2.1: Accommodate bicyclists and other non-motorized users when planning, designing, and developing transportation improvements.

- Policy 2.2: Review capital improvement projects to ensure that needs of bicyclists and other non-motorized users are considered in programming, planning, maintenance, construction, operations, and project development activities.

- Policy 2.3: Encourage traffic calming, intersection improvements, or other similar actions that improve safety for bicyclists and other non-motorized users.

- Policy 2.4: Require developers to adhere to the design standards identified in this Comprehensive Bicycle Development Plan.

Goal 3: Provide for Regular Maintenance of the Bikeway Network

- Policy 3.3: Develop a program to ensure that bicycle loop detectors are installed at all signalized intersections on the bike network and are tested regularly to ensure they remain functional.

- Policy 3.4 Require that construction or repair activities, both on street and of adjacent building, minimize disruption to bicycle facilities, ensure bicyclist safety at all times, and provide alternated routes if necessary.

Goal 4: Encourage and Educate Residents, Businesses and Employers in Menlo Park on Bicycling

- Policy 4.6: Encourage major Menlo Park employers and retailers to provide incentives and support facilities for existing and potential employees and customers that commute by bicycle.

- Policy 4.9: Promote bicycling as a healthy transportation alternative.

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.

The following are the relevant goals and policies:

Goal 2: More People Riding and Walking for Transportation and Recreation

- Policy 2.6: Serve as a resource to county employers on promotional information and resources related to bicycling and walking.

Goal 4: Complete Streets and Routine Accommodation of Bicyclists and Pedestrians

- 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.

- Policy 4.5: Encourage local agencies to adopt policies, guidelines, standards and regulations that result in truly bicycle-friendly and pedestrian-friendly land use developments, and provide them technical assistance and support in this area.

- Policy 4.6: Discourage local agencies from removing, degrading or blocking access to bicycle and pedestrian facilities without providing a safe and convenient alternative.

Caltrans Implementation of Deputy Directive 64-R1: Complete Streets – Integrating the Transportation System

El Camino Real is designated as State Route 82, so is operated by the California Department of Transportation (Caltrans) in coordination with the City of Menlo Park. Caltrans has adopted a Deputy Directive relevant to complete streets, noting that they provide safe mobility for all users, including motorists, bicyclists, pedestrians and transit riders, and contribute to the Department's mission/vision. The goals of implementing the complete street policy are to provide more options for people to go from one place to another, reduce traffic congestion and greenhouse gas emissions, promote walkable communities, and reduce barriers for persons with disabilities.

While there are no specific goals and policies of this Directive, local agencies are working in cooperation with Caltrans to further the intent of the Deputy Directive. Deputy Directive 64-Revision #1: Complete Streets: Integrating the Transportation System (DD-64-R1) was signed on October 2, 2008. Under this Directive Caltrans is directed to provide for the needs of travelers of all ages and abilities in all planning, programming, design, construction, operations, and maintenance activities and products on the State Highway System (SHS). Caltrans views all transportation improvements (new and retrofit) as opportunities to improve safety, access, and mobility for all travelers and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system. Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets" beginning early in system planning and continuing through project delivery, maintenance, and operations.

Providing complete streets increases travel options which, in turn, reduces congestion, increases system efficiency, and enables environmentally sustainable alternatives to single driver automotive trips. Implementing complete streets and other multi-modal concepts supports the California Complete Streets Act of 2008 (AB 1358), as well as the California Global Warming Solutions Act of 2006 (AB 32) and Senate Bill 375, which outline the State's goals of reducing greenhouse gas emissions. With AB 1358 and DD-64-R1, both Caltrans and local agencies are working to complete and address common goals.

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 *El Camino Real and Downtown Specific Plan* as well as this El Camino Real study are part of Menlo Park's efforts towards implementing the overall goals of the Grand Boulevard Initiative.

Collision History and Safety Conditions

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. The most current five-year period available is January 2009 through December 2013. Collision records for the intersection of El Camino Real/Sand Hill Road, located in the neighboring City of Palo Alto, were obtained from the Caltrans Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available for the El Camino Real/Sand Hill Road intersection is October 2007 through September 2012.

As presented in Table 5, 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.

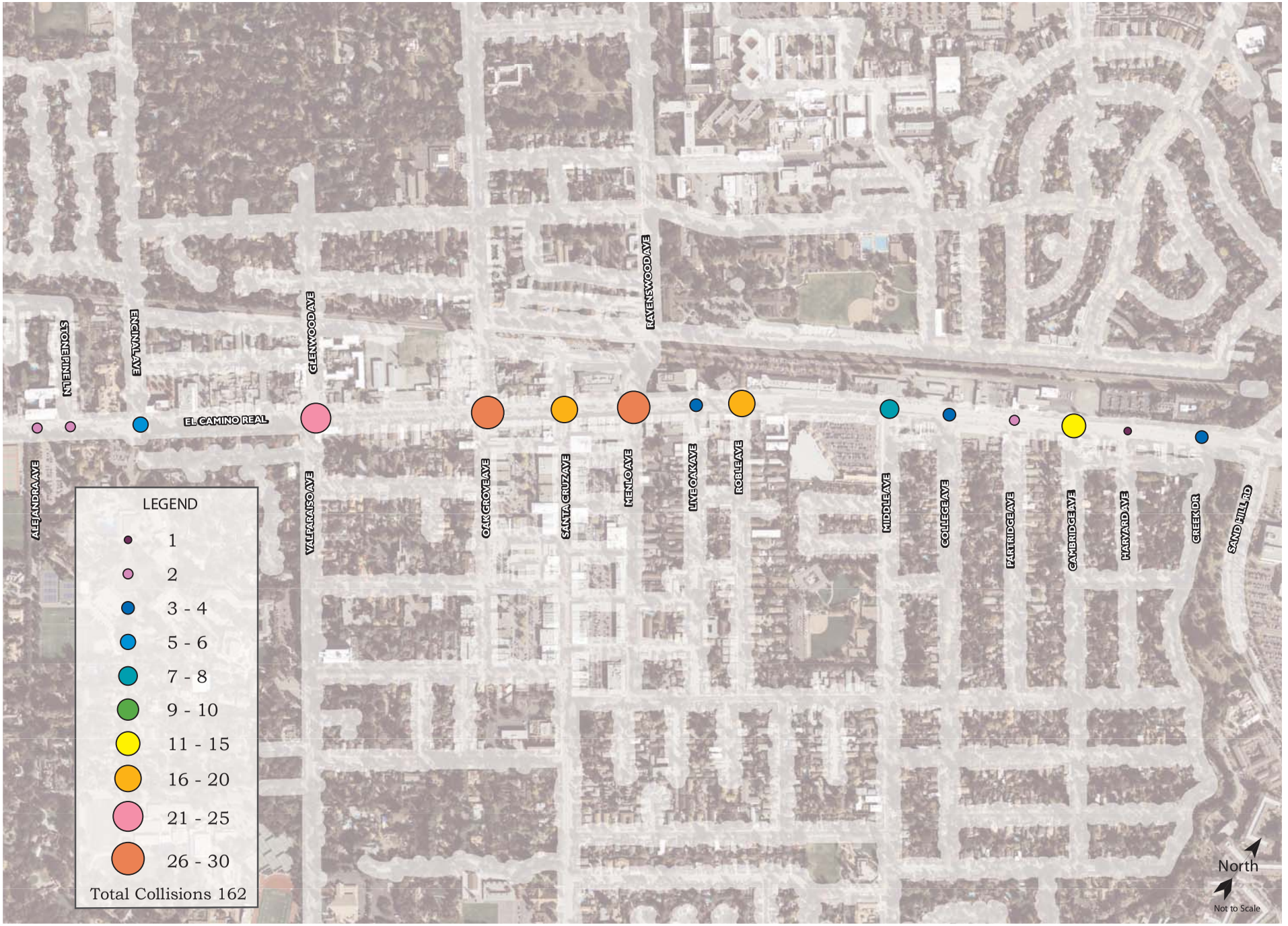
Table 5
Collision Rates at the Study Intersections Compared to Statewide Average

Study Intersection	Number of Collisions (2009-2013)*	Collision Rate (c/mve)	Injury Rate	Fatality Rate
1. El Camino Real/Sand Hill Rd	8	0.09 (0.27)	37.5% (41.9%)	0% (0.4%)
2. El Camino Real/Cambridge Ave	18	0.24 (0.27)	**44.4%** (41.9%)	0% (0.3%)
3. El Camino Real/Middle Ave	16	0.21 (0.21)	**43.8%** (42.4%)	0% (0.4%)
4. El Camino Real/Roble Ave	22	**0.32** (0.27)	40.9% (41.9%)	0% (0.4%)
5. El Camino Real/Menlo Ave-Ravenswood Ave	34	**0.40** (0.27)	**44.1%** (41.9%)	0% (0.4%)
6. El Camino Real/Santa Cruz Ave	23	**0.38** (0.27)	**47.8%** (41.9%)	0% (0.4%)
7. El Camino Real/Oak Grove Ave	36	**0.52** (0.27)	**44.4%** (41.9%)	0% (0.4%)
8. El Camino Real/Valparaiso Ave-Glenwood Ave	24	**0.36** (0.27)	37.5% (41.9%)	0% (0.4%)
9. El Camino Real/Encinal Ave	6	0.09 (0.27)	**83.3%**(41.9%)	0% (0.4%)

Note: c/mve = collisions per million vehicles entering; * = collision records for El Camino Real/Sand Hill Rd are dated October 2007 through September 2012; Statewide average rates are indicated in parentheses; **Bold** = actual rate greater than the Statewide average rate

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. However, out of all intersection-related collisions resulting in injury, all but four collisions resulted in minor injury only, and the remaining four collisions involved pedestrians and bicyclists. Collision maps of the intersection-related collisions and collisions between intersections are shown in Figure 10 and Figure 11. All collision data is included in Appendix H.



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El Camino Real Corridor Study – Existing Conditions Report

Figure 10 – All Collisions at Intersections (5-year period)

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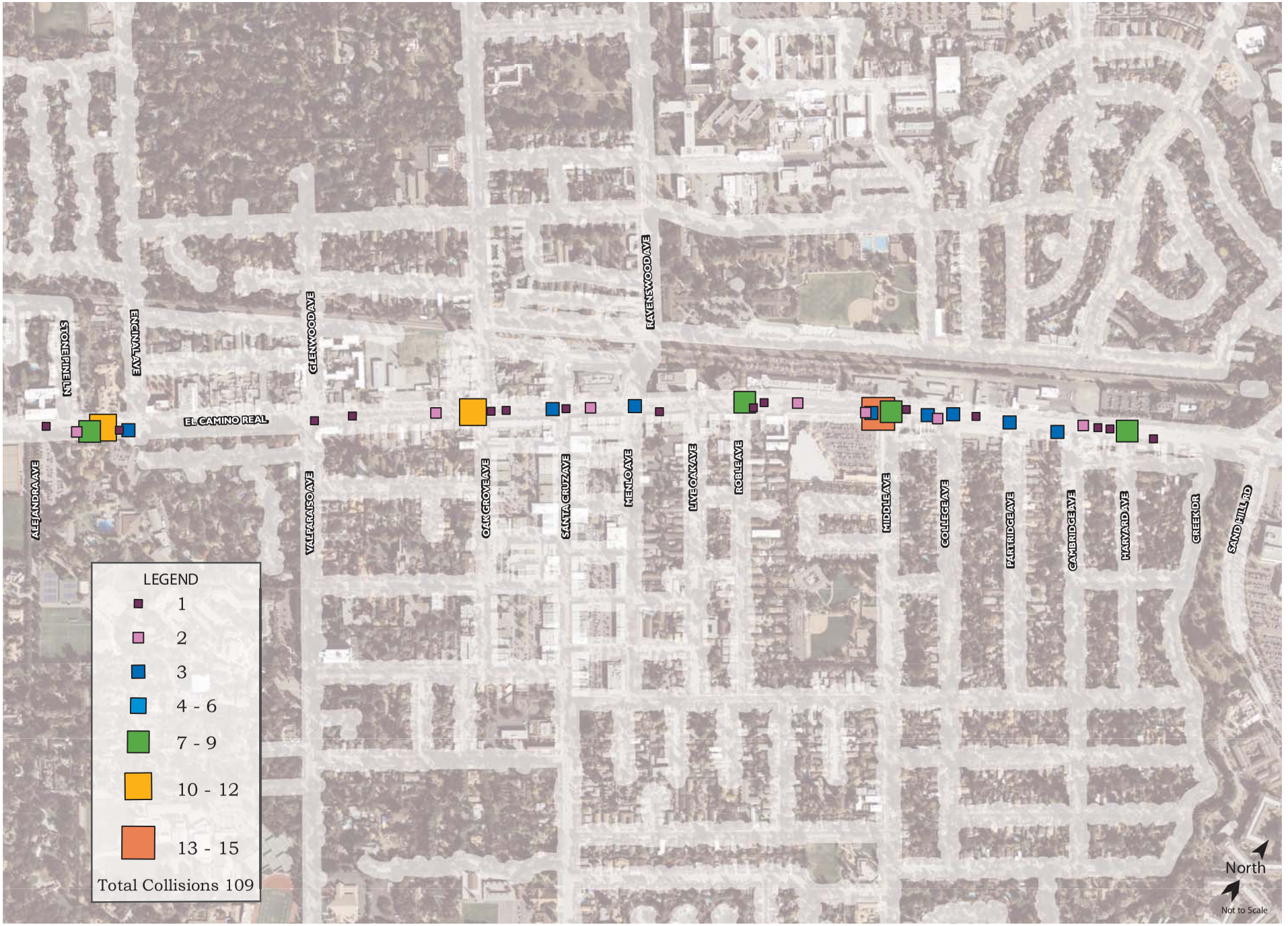

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El Camino Real Corridor Study – Existing Conditions Report

Figure 11 – All Collisions between Intersections (5-year period)

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Collision involving just pedestrian and bicycles were also reviewed. Because these types of collisions are less common than vehicle collisions, the analysis period was extended to 10 years. Over a 10-year period, the intersection of El Camino Real/Santa Cruz Avenue has experienced the highest number of pedestrian collisions, with four collisions, while the intersection of El Camino Real/Oak Grove Avenue experienced the most bicycle collisions, with four collisions. Collision maps of the reported pedestrian and bicycle collisions along the corridor in the last 10 years of available collision records are shown in Figure 12 and Figure 13.

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El Camino Real Corridor Study – Existing Conditions Report

Figure 12 – Pedestrian Collisions (10-year period)

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El Camino Real Corridor Study – Existing Conditions Report

Figure 13 – Bicycle Collisions (10-year period)

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Parking Facilities

Vehicle 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 I.

Off-Street Public Parking

Several off-street public parking plazas are located within Downtown Menlo Park, all to the west of El Camino Real. The first two hours of parking in these plazas is free, with an option to pay to extend time limits beyond two hours in some of the plazas.

Off-Street Private Parking

Shopping centers and businesses outside of the Downtown area generally provide off-street private parking. Parking in these lots is intended for the use of the site's employees and visitors and is controlled by the respective business or shopping center.

Off-Street Commuter Parking

Paid parking is available at the Menlo Park Caltrain station for the use of Caltrain riders. Caltrain sells both daily and monthly parking permits for the lot. The requirement for paid parking at the Caltrain station is enforceable at all times.

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. The time periods for the parking occupancy surveys included weekday midday peak period, weekday p.m. peak period, weekend midday peak period, and weekend p.m. peak period.

The street parking occupancy on El Camino Real during weekdays and weekends are shown in Table 6 and Table 7 respectively. Street parking spaces are typically underutilized along El Camino Real with the exception of the portion of El Camino Real between Oak Grove Avenue and Ravenswood Avenue-Menlo Avenue. It is worth noting that this portion of El Camino Real is adjacent to Downtown Menlo Park, where several off-street parking lots are available. Additionally, increased parking utilization was observed between College Avenue and Partridge Avenue on the west side of El Camino Real.

Table 6
Existing Weekday On-Street Vehicle Parking Occupancy – El Camino Real

Segment of El Camino Real	Weekday Parking Occupancy							
	Midday Peak				PM Peak			
	West Side		East Side		West Side		East Side	
	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %
Encinal Ave to Valparaiso Ave-Glenwood Ave	-	-	6	43%	-	-	2	14%
Valparaiso Ave-Glenwood Ave to Oak Grove Ave	8	53%	9	56%	5	33%	4	25%
Oak Grove Ave to Santa Cruz Ave	5	100%	-	-	0	0%	-	-
Santa Cruz Ave to Ravenswood Ave-Menlo Ave	7	88%	-	-	6	75%	-	-
Ravenswood Ave-Menlo Ave to Live Oak Ave	2	20%	-	-	4	40%	-	-
Roble Ave to Middle Ave	-	-	0	0%		-	0	0%
Middle Ave to College Ave	3	38%	-	-	0	0%	-	-
College Ave to Partridge Ave	5	83%	4	33%	4	67%	1	8%
Partridge Ave to Cambridge Ave	-	-	4	36%	-	-	2	18%
Cambridge Ave to Harvard Ave	-	-	0	0%	-	-	0	0%
Harvard Ave to Creek Dr	0	0%	0	0%	0	0%	0	0%

Notes: MD = Midday; Occ. = Occupancy; loading zones were not included in the parking occupancy calculation.

Table 7
Existing Weekend On-Street Vehicle Parking Occupancy – El Camino Real

Segment of El Camino Real	Weekend Parking Occupancy							
	Midday Peak				PM Peak			
	West Side		East Side		West Side		East Side	
	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %
Encinal Ave to Valparaiso Ave-Glenwood Ave	-	-	0	0%	-	-	9	64%
Valparaiso Ave-Glenwood Ave to Oak Grove Ave	4	27%	9	56%	4	27%	11	69%
Oak Grove Ave to Santa Cruz Ave	4	100%	-	-	1	25%	-	-
Santa Cruz Ave to Ravenswood Ave-Menlo Ave	7	88%	-	-	8	100%	-	-
Ravenswood Ave-Menlo Ave to Live Oak Ave	4	40%	-	-	6	60%	-	-
Roble Ave to Middle Ave	-	-	0	0%	-	-	1	5%
Middle Ave to College Ave	4	50%	-	-	2	25%	-	-
College Ave to Partridge Ave	4	67%	0	0%	3	50%	0	0%
Partridge Ave to Cambridge Ave	-	-	1	9%	-	-	1	9%
Cambridge Ave to Harvard Ave	-	-	0	0%	-	-	0	0%
Harvard Ave to Creek Dr	0	0%	0	0%	0	0%	0	0%

Notes: MD = Midday; Occ. = Occupancy; loading zones were not included in the parking occupancy calculation.

On-street parking on the side-streets approaching El Camino Real were also surveyed. The street parking occupancy on side-streets of El Camino Real during weekdays and weekends are shown in Table 8 and Table 9 respectively. Similar trends were found along side-streets of El Camino Real, with the highest parking utilization observed near downtown during both weekdays and weekends, and near Partridge Avenue during weekdays only.

Table 8
Existing Weekday On-Street Vehicle Parking Occupancy – Side Streets

Side-Street	Weekday Parking Occupancy							
	Midday Peak				PM Peak			
	West of ECR		East of ECR		West of ECR		East of ECR	
	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %
Encinal Ave (east to San Antonio Ave)	-	-	6	46%	-	-	1	8%
Valparaiso Ave-Glenwood Ave (Hoover St to San Antonio Ave)	-	-	0	0%	-	-	0	0%
Oak Grove Ave (Hoover St to Merrill St)	11	79%	5	31%	7	50%	9	56%
Santa Cruz Ave (Doyle St to Merrill St)	7	88%	7	58%	7	88%	7	58%
Live Oak Ave (up to 100 feet west of ECR)	0	0%	-	-	1	25%	-	-
College Ave (up to 100 feet west of ECR)	3	60%	-	-	1	20%	-	-
Partridge Ave (up to 100 feet west of ECR)	6	100%	-	-	1	17%	-	-
Harvard Ave (up to 100 feet west of ECR)	3	43%	-	-	2	29%	-	-
Creek Dr (up to 100 feet west of ECR)	1	25%	-	-	1	25%	-	-

Notes: MD = Midday; ECR = El Camino Real; Occ. = Occupancy; loading zones were not included in the parking occupancy calculation.

Table 9
Existing Weekend On-Street Vehicle Parking Occupancy – Side Streets

Side-Street	Weekend Parking Occupancy							
	Weekend Midday Peak				Weekend PM Peak			
	West of ECR		East of ECR		West of ECR		East of ECR	
	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %	Parked Veh.	Occ. %
Encinal Ave (east to San Antonio Ave)	-	-	8	62%	-	-	0	0%
Valparaiso Ave-Glenwood Ave (Hoover St to San Antonio Ave)	-	-	1	33%	-	-	0	0%
Oak Grove Ave (Hoover St to Merrill St)	5	36%	12	75%	2	14%	1	6%
Santa Cruz Ave (Doyle St to Merrill St)	7	88%	8	67%	8	100%	7	58%
Live Oak Ave (up to 100 feet west of ECR)	2	50%	-	-	3	75%	-	-
College Ave (up to 100 feet west of ECR)	0	0%	-	-	1	20%	-	-
Partridge Ave (up to 100 feet west of ECR)	0	0%	-	-	0	0%	-	-
Harvard Ave (up to 100 feet west of ECR)	0	0%	-	-	1	14%	-	-
Creek Dr (up to 100 feet west of ECR)	0	0%	-	-	0	0%	-	-

Notes: MD = Midday; ECR = El Camino Real; Occ. = Occupancy; loading zones were not included in the parking occupancy calculation.

Bike Parking

Bike parking is provided at one location along El Camino Real: the southbound SamTrans bus stop at Cambridge Avenue. Outside of the El Camino Real Corridor, bike racks are provided in public parking lots between Santa Cruz Avenue and Menlo Avenue, bike parking corrals in the parking lane on Santa Cruz Avenue, and also at the Caltrain station. In addition, a bike locker with 50 bike spaces is provided at the Caltrain station. In other areas, bicyclists park their bikes at bike racks on private property or locked to various street signs.

Study Participants and References

Study Participants

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Appendix B

Community Survey Report

El Camino Real Corridor Study

Community Survey Report

Internal Draft - January 2015

Prepared for W-Trans by

DYETT & BHATIA
Urban and Regional Planners

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1. Introduction

The City of Menlo Park is conducting the El Camino Real Corridor Study to evaluate potential transportation and safety improvements to El Camino Real in the City of Menlo Park. The study will consider alternatives for modifying the Corridor to allow for a possible addition of a bicycle lane and/or additional through lanes. Ultimately, the project will be consistent with the goals outlined in the El Camino Real/Downtown Specific Plan for balanced capacity, bicyclist and pedestrian connectivity, transit access, parking, and safety, as well as the City's Complete Streets Policy. Figure 1 shows the Study Area.

The City conducted an online survey during the initial phase of the Study, following the project's first community 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.

This report presents and analyzes the results of the survey. Appendix A contains the original survey questions as they appeared online. Appendix B contains the summary tables and cross-tabulations used in this analysis. A list of the open-ended responses provided for questions 9, 17, 18, and 19 can be found in Appendix C.

2. Methodology

The survey was conducted using SurveyMonkey, an online service, and was announced via the City's El Camino Real project website. Results were exported from the site as summary files and cross-tabulations.

Questions included three general types of questions: multiple choice questions about respondents' location and habits; questions that asked respondents to rate their agreement with a given statement or to rate the desirability of a proposed improvement; and open-ended questions. Questions 1 through 9 were used in cross-tabulations to assess whether respondents' location or habits had a significant relationship to the ratings they assigned to different statements or improvements. Notable correlations are discussed in the analysis.

3. Survey Results

LOCATION

Questions 1 and 2 asked participants where they live or work in relation to the El Camino Real Corridor—in Menlo Park within a half-mile of the Corridor, in Menlo Park farther than a half-mile from the Corridor, outside of Menlo Park within a half-mile of the Corridor, or none of the above (outside of Menlo Park, farther than a half-mile from the Corridor). Responses are described in Chart 1 and Table 1 for where participants live, and Chart 2 and Table 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).

Chart 1: Where Respondents Live

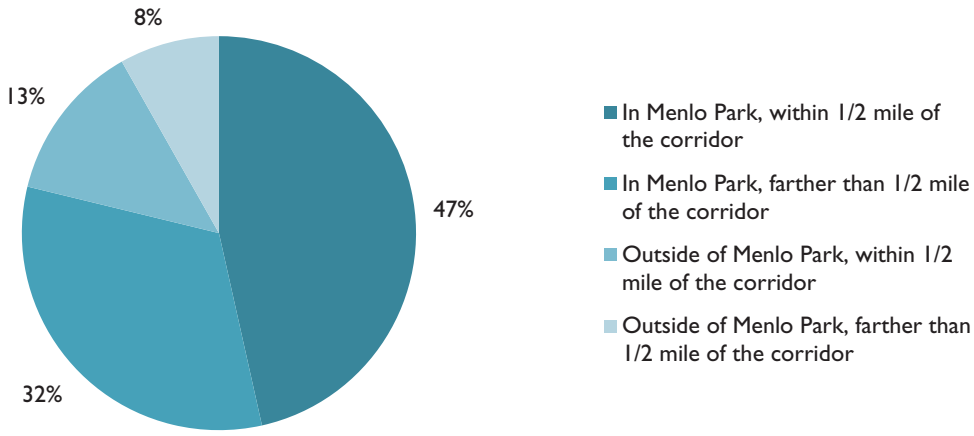

Table 1: Where Respondents Live

Location	*Number of Respondents*	*Percent of Total*
In Menlo Park, within 1/2 mile of the Corridor	147	47%
In Menlo Park, farther than 1/2 mile of the Corridor	102	32%
Outside of Menlo Park, within 1/2 mile of the Corridor	41	13%
Outside of Menlo Park, farther than 1/2 mile of the Corridor	26	8%
Total	316	100%

Figure 1: Study Area

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.

For those working in Menlo Park, the majority live in the same location category as their workplaces.

Chart 2: Where Respondents Work

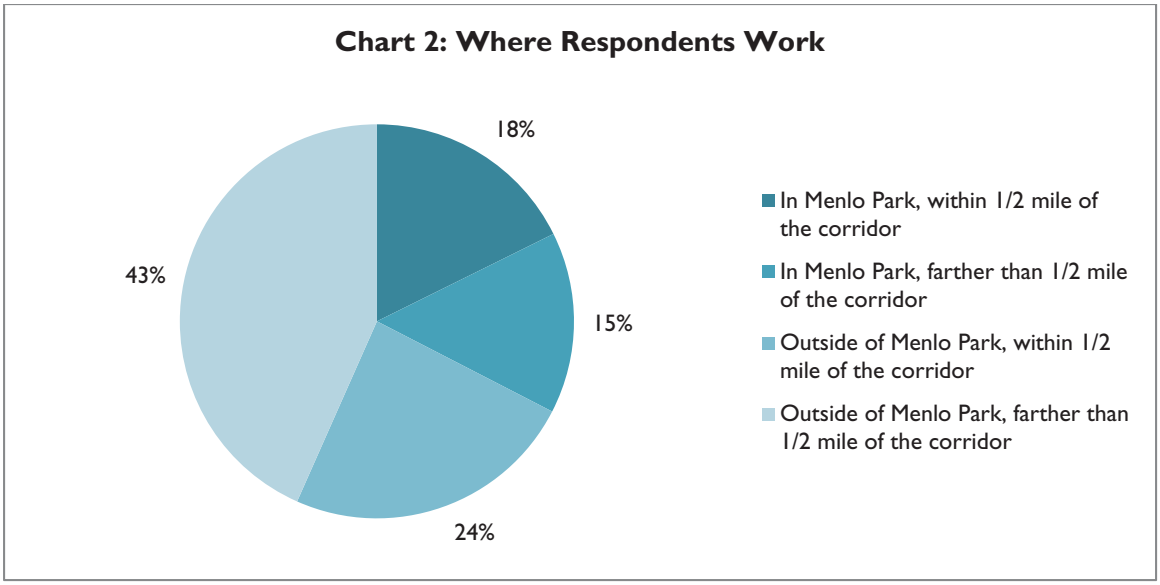

Table 2: Where Respondents Work

Location	*Number of Respondents*	*Percent of Total*
In Menlo Park, within 1/2 mile of the Corridor	56	18%
In Menlo Park, farther than 1/2 mile of the Corridor	47	15%
Outside of Menlo Park, within 1/2 mile of the Corridor	76	24%
Outside of Menlo Park, farther than 1/2 mile of the Corridor	137	43%
Total	316	100%

REASONS TO TRAVEL ON EL CAMINO REAL

Question 9 asked participants why they typically travel on El Camino Real. The question offered five general categories of activities—travel for shopping, patronizing local businesses, travel to and/or from work, travel to and/or from school, and for physical activity—as well as an "other" response that allowed for an open-ended answer. Respondents were asked to check all that applied, and many selected more than one response.

As shown in Chart 3 and Table 3 below, the most common reason that respondents visit El Camino Real is to travel for shopping, at 75 percent of respondents. Sixty-nine percent of respondents travel to patronize local business, and 50 percent travel for work. Smaller percentages use it to travel for school (19 percent) and for physical activity (17 percent).

Within each category, the largest share of respondents tended to live in Menlo Park, primarily within half a mile of the El Camino Real Corridor. For those who travel for shopping, local businesses, work, or school, 45 to 50 percent of respondents live in Menlo Park within a half-mile of the Corridor, while another 25 to 40 percent live in Menlo Park farther than a half-mile from the Corridor. The smallest percentages of respondents for each response category live outside of Menlo Park farther than half a mile from the Corridor. Among those who use El Camino Real for physical activity, over 90 percent live in Menlo Park.

The "other" responses tended to fall into one of six general categories of responses:

1. To connect to other cities in the region
2. To access the library and recreation center
3. For events and children's activities
4. To cross from east to west
5. To visit friends and family
6. To access services

A full list of the open-ended responses can be viewed in Appendix C.

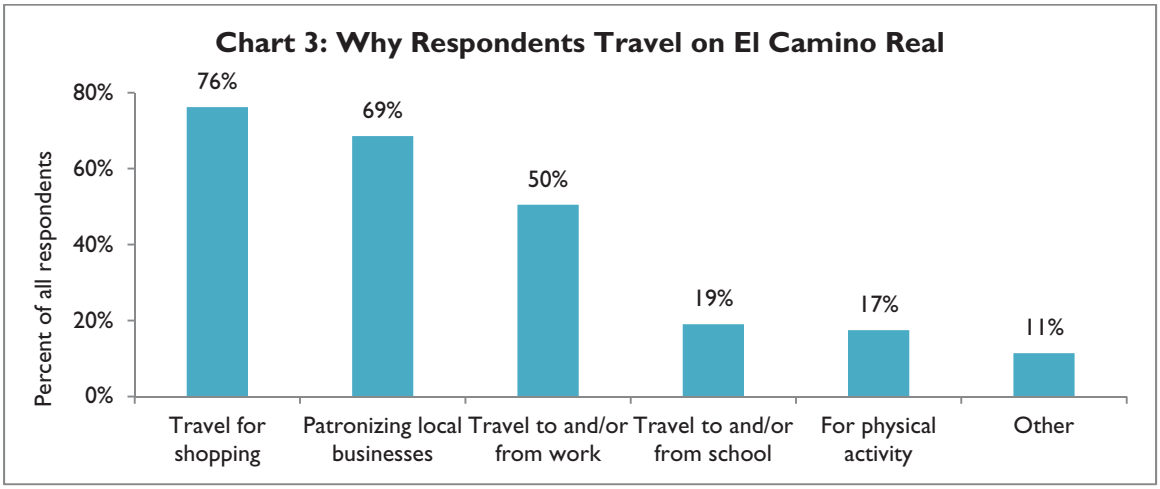

Table 3: Why Respondents Travel on El Camino Real

Reason	*Number of Respondents*	*Percent of Total*
Travel for shopping	240	76%
Patronizing local businesses	216	69%
Travel to and/or from work	159	50%
Travel to and/or from school	60	19%
For physical activity	55	17%
Other	36	11%
Total	315	

TRANSPORTATION MODES

Questions 3 through 8 asked respondents about their use of various modes of travel on El Camino Real. Questions 3 through 6 focused on the frequencies with which participants drive a vehicle, ride a bike, use local bus transit, or walk along El Camino Real.

The majority of respondents use multiple forms of transportation to access El Camino Real. In fact, only 22 percent of respondents exclusively drive along El Camino Real, only 5 percent exclusively bicycle there, and less than 1 percent exclusively walks (only one respondent). No respondents use bus transit as their only form of transportation along El Camino Real.

Chart 4 and Table 4 describe the percentage of respondents who use each of the four modes at least sometimes compared to those who stated that they "almost never" use each mode. As each respondent may use multiple modes, each column shows a percentage of the total number of respondents. The transportation mode used by the largest share of survey respondents was driving, with 84 percent of respondents driving El Camino Real at least a few times a week. Walking and bicycling each have similar shares of respondents, with 61 percent of respondents walking and 60 percent bicycling at least sometimes on weekends. Comparatively few respondents, only 6 percent, use bus transit service along El Camino Real.

Chart 4: How Respondents Travel El Camino Real

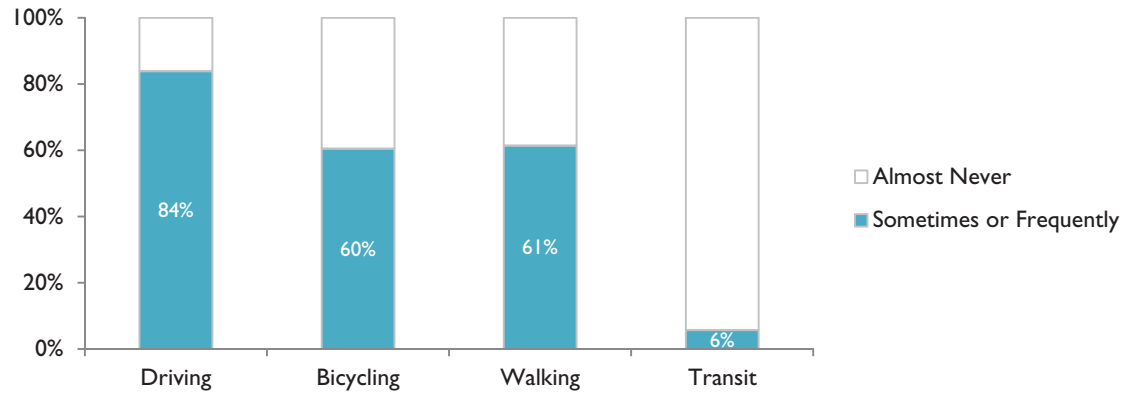

Table 4: How Respondents Travel El Camino Real

Transportation Method	*Number of Respondents*	*Percent of Total*
Driving	265	84%
Bicycling	191	60%
Walking	194	61%
Transit	18	6%
Total Respondents	316	

Driving

Driving was the most common form of transportation among survey respondents, with 84 percent driving El Camino Real at least a few times a week. Most respondents who drive on El Camino Real drive on a daily basis, with nearly 50 percent of respondents driving on the Corridor at least once a day. Chart 5 and Table 5 describe the frequency with which respondents drive El Camino Real.

Those driving most frequently tend to live in Menlo Park and work outside of Menlo Park. Following the overall trend for reasons respondents visit El Camino Real, those driving at the highest frequencies tend to be visiting for shopping, to patronize local businesses, and to commute to work. Those driving a few times a week are more likely traveling to shop (75 percent) and patronize local businesses (68 percent) and commute (39 percent), than to travel for school or physical activity, though the percentage of commuters is still much lower than among those driving multiple times a day. If a respondent drives and travels El Camino Real for work, he or she is more likely to be driving multiple times a day.

A majority of the respondents who drive along El Camino Real travel the Corridor using other forms of transportation in addition to driving, mainly bicycling and walking. For instance, 55 percent of drivers also bike, 62 percent also walk, and 4 percent also use bus transit. Over a quarter of drivers at all frequencies walk along or across El Camino Real at least a few times a week.

Of those 16 percent of respondents who almost never drive El Camino Real, most use an alternative form of transportation to access the Corridor, with bicycle being the most common form. Ninety percent of those not driving ride a bicycle on El Camino Real at least sometimes, with 82 percent of those not driving bicycling several times a week or daily. Sixty-one percent of those not driving walk along El Camino Real; 29 percent of those not driving walk several times a week or daily. Fourteen percent of those not driving use bus transit along the Corridor; only six out of seven respondents use transit several times a week, and one uses transit mostly on weekends.

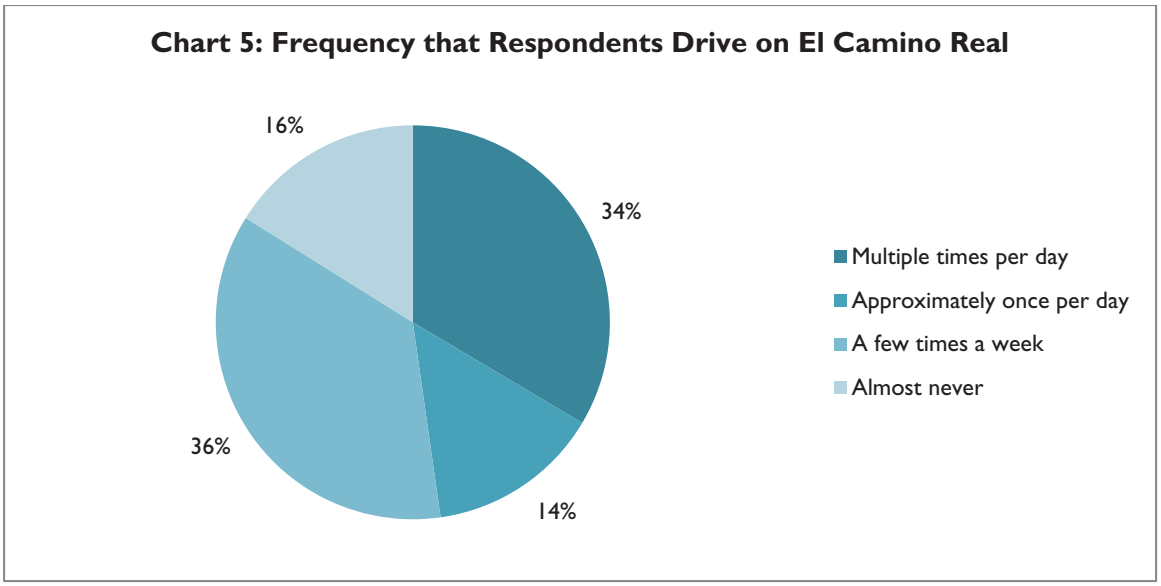

Table 5: Frequency that Respondents Drive on El Camino Real

Frequency	*Number of Respondents*	*Percent of Total*
Multiple times per day	106	34%
Approximately once per day	45	14%
A few times a week	114	36%
Almost never	51	16%
Total	316	100%

Walking

Walking was the second-most common form of transportation among respondents, with 61 percent walking along or across the Corridor at least sometimes. Among those who walk, more tend to do so on weekends (26 percent of respondents) or several times per week (25 percent of respondents), while a smaller portion walks on a daily basis (10 percent). Chart 6 and Table 6 describe the frequency that respondents walk along or across El Camino Real.

Respondents who walk along El Camino Real are more likely to live in Menlo Park within a half mile of the Corridor (84 percent of those walking live in this area), and are far less likely to live outside of Menlo Park farther than half a mile from the Corridor. There is no significant pattern that describes where they tend to work.

Reasons that those who walk along El Camino Real have for traveling the Corridor follow the overall trend, with most traveling for shopping and patronizing local businesses, followed, to a lesser degree, by travel to and from work. There is a difference, however, among those who walk El Camino Real on a daily basis, for which 55 percent of respondents who walk the Corridor

selected physical activity as a reason that they travel there (a higher percentage than among respondents in general).

Most of the 38 percent of respondents who almost never walk El Camino Real access the Corridor using a vehicle or a bicycle, while few use bus transit. Eighty-three percent of those who do not walk the Corridor tend to drive. Forty percent tend to use bicycle, with most cycling several times per week or daily. Only 2 percent said that they use bus transit on El Camino Real.

Most of the respondents who do walk along El Camino Real also travel the Corridor using other transportation modes, generally driving or bicycling. Eighty-four percent also drive, while 73 percent also bike.

Survey participants were also asked if they had children who have to cross El Camino Real to get to school, to which 19 percent of respondents said yes.

Chart 6: Frequency that Respondents Walk along El Camino Real

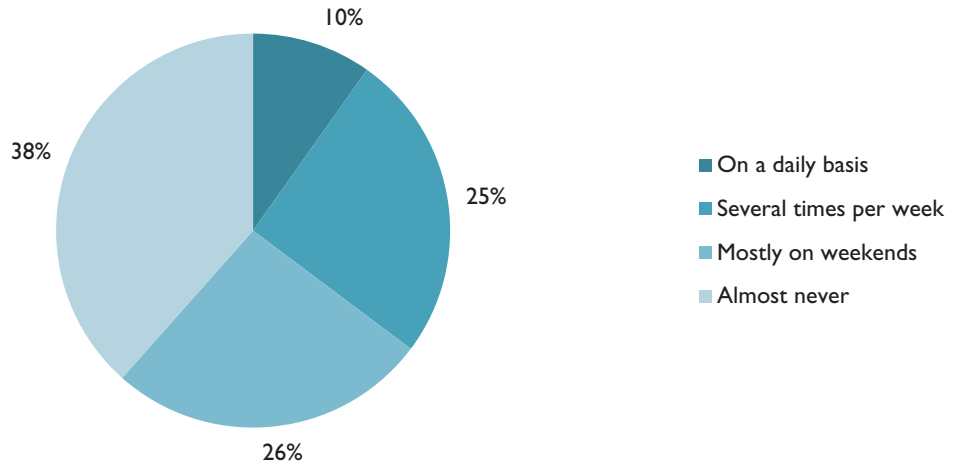

Table 6: Frequency that Respondents Walk along El Camino Real

Frequency	*Number of Respondents*	*Percent of Total*
On a daily basis	31	10%
Several times per week	80	25%
Mostly on weekends	83	26%
Almost never	121	38%
Total	315	100%

Bicycling

Bicycling was the third-most common form of transportation among respondents, with just three respondents fewer than walking. Sixty percent of respondents bike along El Camino Real at least sometimes. Most respondents who bike do so on a weekly basis, with 22 percent of respondents biking several times a week and another 19 percent biking on a daily basis. Chart 7 and Table 7 describe the frequency with which respondents bicycle along El Camino Real.

Those cycling most frequently are more likely to live in Menlo Park and work outside of Menlo Park, though those cycling on a daily basis are also generally more likely to live and work within half a mile of the Corridor.

Reasons that bicyclists on El Camino Real may visit the Corridor are similar to the overall trend, with the exception of those cycling daily – for those cycling at this frequency, the most common reason to travel El Camino Real is travel to and from work (74 percent), just barely more common than travel for shopping (72 percent). At least half of those cycling several times a week or mostly on weekends travel for work. If a respondent bikes and travels El Camino Real for work, he or she is more likely to be cycling on a daily basis.

Of those 40 percent of respondents who almost never cycle along El Camino Real, most drive to access the Corridor.

A majority of the respondents who bike along El Camino Real travel the Corridor using other forms of transportation in addition to biking, mainly driving and walking. There is nearly the same number of those driving (76 percent of bicyclists) as those walking (74 percent of bicyclists). Generally, cycling and driving frequencies appear inversely related, with those driving more often cycling less often and vice versa.

Chart 7: Frequency that Respondents Bike El Camino Real

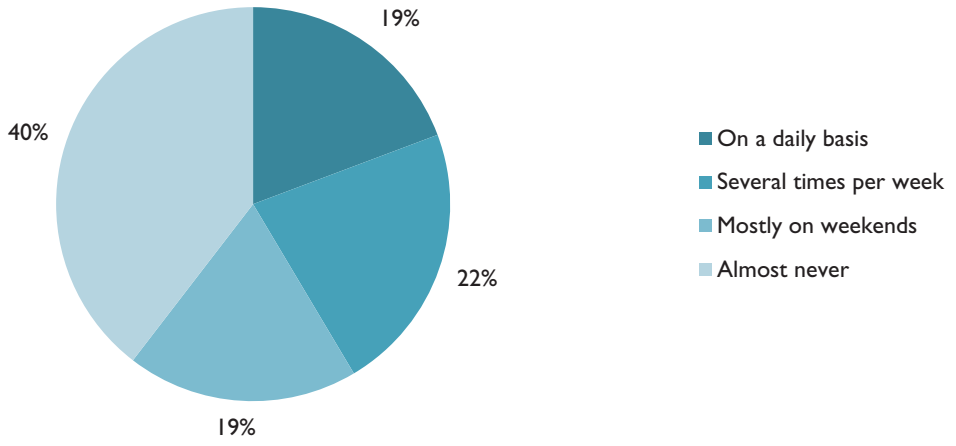

Table 7: Frequency that Respondents Bike El Camino Real

Frequency	*Number of Respondents*	*Percent of Total*
On a daily basis	61	19%
Several times per week	70	22%
Mostly on weekends	60	19%
Almost never	125	40%
Total	316	100%

Transit

Local bus transit was the least common form of transportation used among respondents, with only 6 percent of respondents. Most transit users responding to the survey ride at a frequency of several times a week (4 percent of respondents) with smaller numbers riding mostly on weekends (1 percent of respondents or 22 percent of respondents using transit) and on a daily basis (1 percent of respondents or 11 percent of respondents using transit). Chart 8 and Table 8 describe the frequency with which respondents use transit along El Camino Real. The sample size for this transportation mode was very small and may not be indicative of the habits of all users of transit along El Camino Real in Menlo Park.

Those respondents using transit along El Camino Real live and work in all four location categories. Reasons for traveling El Camino Real differ by frequency of transit usage. Both daily riders travel the Corridor for work, school, and local businesses. Those riding several times per week followed nearly the same distribution as survey respondents overall, with the highest share (92 percent of transit users) traveling for shopping, followed by patronizing local businesses (75 percent of transit users) and traveling to and from work (58 percent of transit users. For the four respondents using transit mostly on weekends, all travel the Corridor for work, three for shopping and local businesses, and one for school.

Of the 94 percent of respondents who almost never use local bus transit along El Camino Real, most drive along the Corridor, though a majority also bicycles and walks. For those who do use transit on El Camino Real, most also bike, walk, and drive. Respondents in this transportation category differ from the others in that driving is not the most common form of transportation used in addition to transit. The most common is biking, as 89 percent of transit users also bike the Corridor, while 83 percent of transit users also walk there. Sixty-one percent of transit users also drive, the lowest percentage of drivers among the bicycling, walking, and transit using categories.

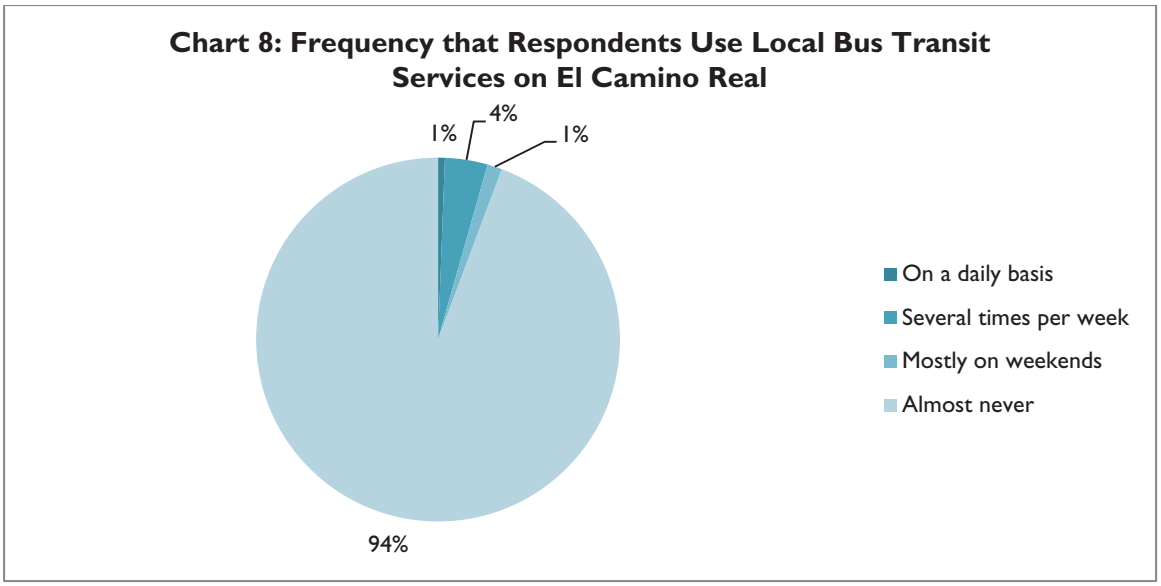

Table 8: Frequency that Respondents Use Local Bus Transit Services on El Camino Real

Frequency	*Number of Respondents*	*Percent of Total*
On a daily basis	2	1%
Several times per week	12	4%
Mostly on weekends	4	1%
Almost never	298	94%
Total	316	100%

Caltrain

Question 8 asked participants how they commonly travel to the Menlo Park Caltrain station, which can be accessed from El Camino Real via Oak Grove Avenue and Santa Cruz Avenue. Most respondents use the station in some capacity, with 43 percent indicating that they rarely use Caltrain. The most common transportation method used to access Caltrain is bicycle, which accounts for 37 percent of those who use the Caltrain station. The second-most common mode of transportation to the station is walking, at 34 percent of station users. Twenty-two percent of station users (12 percent of respondents) drive to Caltrain and park there. Only 7 percent of station users (4 percent of respondents) said that they commonly are dropped off at the station by another vehicle or transit. Chart 9 and Table 9 describe how respondents commonly access the Menlo Park Caltrain station.

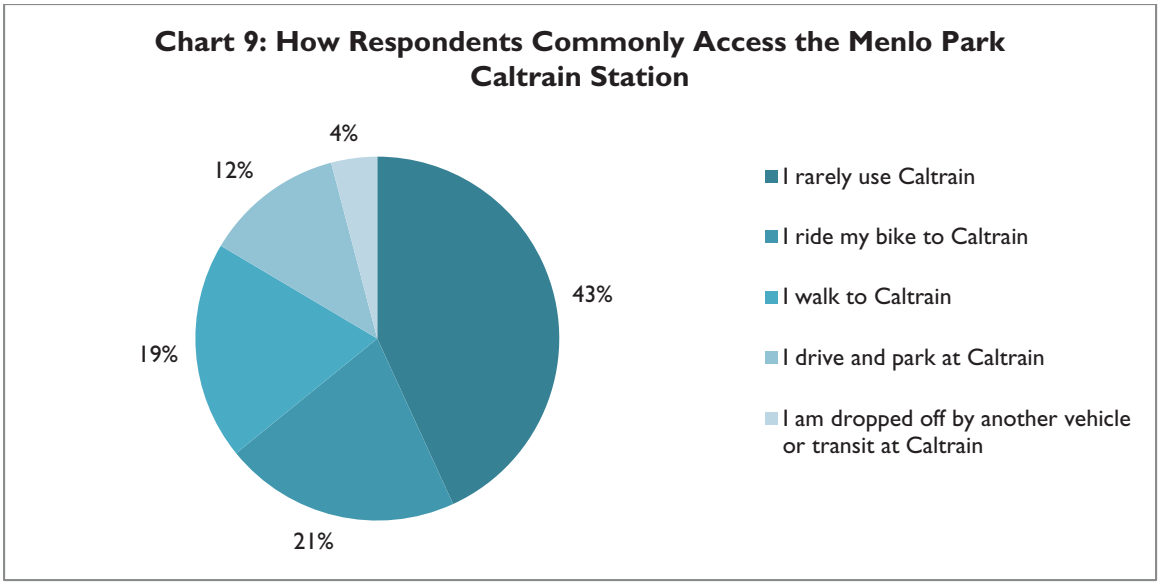

Table 9: How Respondents Commonly Access the Menlo Park Caltrain Station

Transportation Method	*Number of Respondents*	*Percent of Total*
I rarely use Caltrain	136	43%
I ride my bike to Caltrain	66	21%
I walk to Caltrain	61	19%
I drive and park at Caltrain	39	12%
I am dropped off by another vehicle or transit at Caltrain	13	4%
Total	315	100%

OPINIONS AND CONCERNS

Questions 11 through 14 asked participants to indicate their opinions on a series of statements on safety, the environment, and the walking, transit, vehicle traffic, bicycle, and parking environments on El Camino Real. The statements included in the survey were originally made by community members at the community workshop on April 30, 2014.

Safety and Environmental

These statements gauged respondents' opinions on general safety, children's safety, air quality, and signage. Chart 10 and Table 10 describe respondents' agreement with these statements. Responses showed agreement that safety on El Camino Real could be improved. A large majority of respondents agreed that children's safety when crossing the Corridor for school should be a high priority for the community, and only a very small portion of respondents disagreed. Though a very high percentage of respondents with children who cross El Camino Real strongly agreed (70 percent) or agreed (17 percent) with this statement, the majority of respondents without children who cross the Corridor also strongly agreed (47 percent) or agreed (29 percent).

A majority of respondents also agreed that the Corridor is only safe for vehicles regardless of which transportation modes they tend to use. Air quality was also a concern, with a majority of respondents agreeing that it should be a high priority to mitigate poor air quality resulting from traffic congestion. Regarding the clarity of signage for cross streets and turns, respondents tended to be neutral or split evenly between agreement and disagreement.

Chart 10: Opinions on General Safety and Environmental Concerns

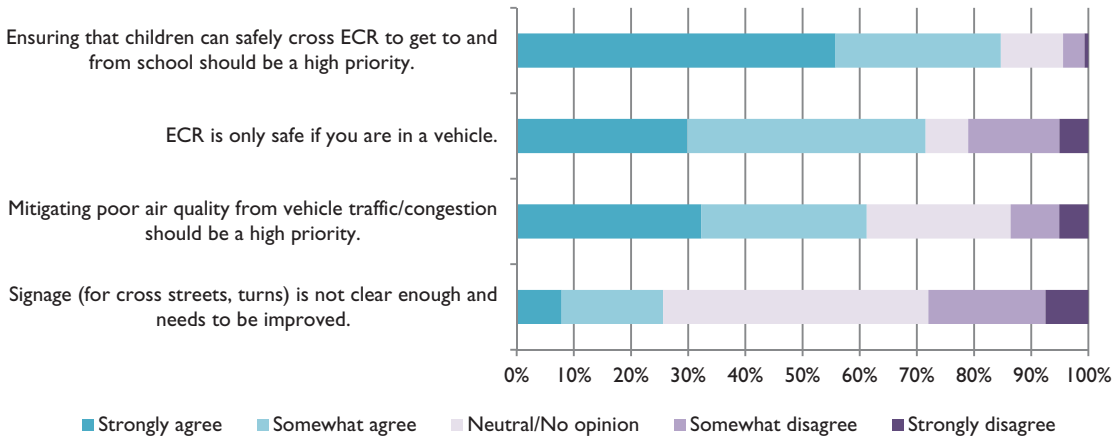

Table 10: Opinions on General Safety and Environmental Concerns

	Strongly disagree	*Somewhat disagree*	*Neutral/ No opinion*	*Somewhat agree*	*Strongly agree*	*Response Count*
Ensuring that children can safely cross ECR to get to and from school should be a high priority.	1%	4%	11%	29%	56%	294
ECR is only safe if you are in a vehicle.	5%	16%	7%	42%	30%	295
Mitigating poor air quality from vehicle traffic/congestion should be a high priority.	5%	8%	25%	29%	32%	294
Signage (for cross streets, turns) is not clear enough and needs to be improved.	7%	20%	46%	18%	8%	293

Walking Environment

The statements in Question 12 focused on pedestrian facilities and safety, and addressed concerns about paths, bicycles on the sidewalk, vehicle speeds, and crossing signals. Chart 11 and Table 11 describe respondents' levels of agreement with these statements. Despite the responses to Question 11, in which the majority of respondents believed that the Corridor was only safe if you were in a vehicle and that ensuring safe crossing for school children should be a high priority, most respondents agreed that signal lengths are currently appropriate for pedestrian safety, and disagreed that vehicle speeds should be slowed to improve pedestrian safety. There was not a strong difference in responses between participants who walk and respondents who drive. There was, however, also a sense that bicycles on the sidewalk pose a danger to pedestrians, as more than 60 percent agreed and just over 20 percent disagreed. A majority (nearly 70 percent) of respondents also agreed that there should be a parallel separated pedestrian path; less than 10 percent disagreed. Both cyclists and pedestrians tended to agree with this statement. Most respondents claimed that they would walk rather than drive for short trips if pedestrian conditions improved on El Camino Real. Agreement was strongest among those living in Menlo Park near the Corridor, those working within half a mile of the Corridor, those frequently bicycling, and those already walking.

Chart 11: Opinions on Walking Environment

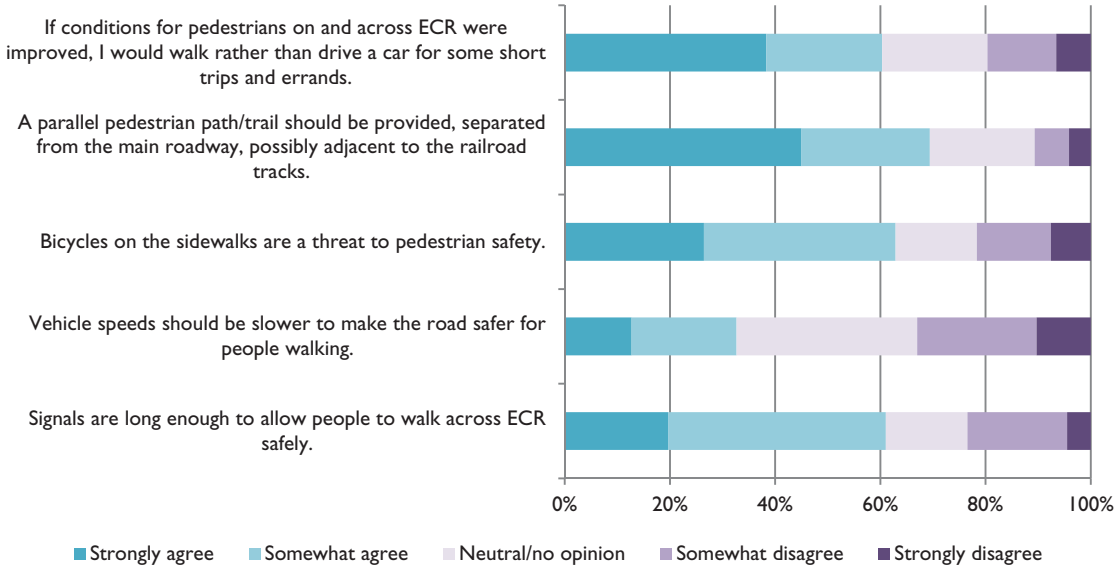

Table 11: Opinions on Walking Environment

	Strongly disagree	*Somewhat disagree*	*Neutral/ No opinion*	*Somewhat agree*	*Strongly agree*	*Response Count*
Signals are long enough to allow people to walk across ECR safely.	4%	19%	16%	41%	20%	290
Vehicle speeds should be slower to make the road safer for people walking.	10%	23%	34%	20%	13%	291
Bicycles on the sidewalks are a threat to pedestrian safety.	8%	14%	16%	37%	27%	291
A parallel pedestrian path/trail should be provided, separated from the main roadway, possibly adjacent to the railroad tracks.	4%	7%	20%	24%	45%	291
If conditions for pedestrians on and across ECR were improved, I would walk rather than drive a car for some short trips and errands.	7%	13%	20%	22%	38%	290

Transit

This statement evaluated participants' interest in a dedicated bus or bus rapid transit (BRT) lane. Chart 12 and Table 12 describe respondents' levels of agreement with this statement. Most respondents disagreed that there should be BRT along El Camino Real through Menlo Park (40 percent) and nearly the same amount were neutral or had no opinion. Those more likely to agree with the statement tended to live outside of Menlo Park, almost never drive, or frequently walk or bike.

Chart 12: Opinions on Transit

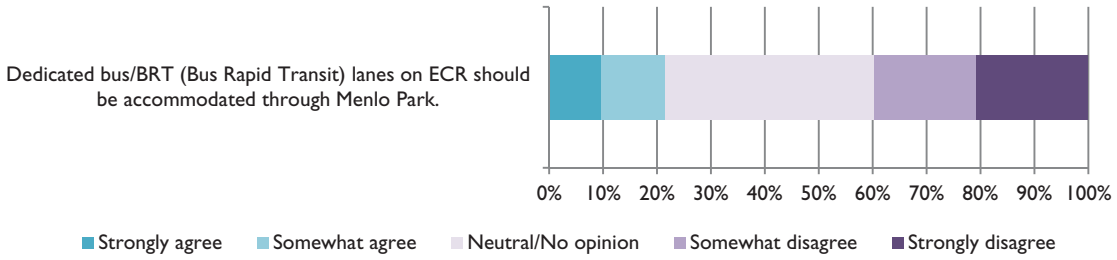

Table 12: Opinions on Transit

	Strongly disagree	*Somewhat disagree*	*Neutral/ No opinion*	*Somewhat agree*	*Strongly agree*	*Response Count*
Dedicated bus/BRT (Bus Rapid Transit) lanes on ECR should be accommodated through Menlo Park.	21%	19%	39%	12%	10%	289

Vehicle Traffic Environment

These statements represented opinions on priorities and actions to be taken regarding vehicle traffic conditions on El Camino Real. Chart 13 and Table 13 describe respondents' levels of agreement with these statements. Most (more than 60 percent) of respondents agreed that there is already adequate capacity for automobiles, and that improvements should prioritize alternative transportation modes. Respondents who said that they drive on El Camino Real tended to be neutral on this statement, with similar numbers somewhat agreeing and disagreeing, though among the most frequent drivers, respondents were more likely to agree than disagree. Respondents who frequently bicycle were particularly likely to support this statement, with 80 percent of daily riders in strong support. Pedestrians also tended to be in strong support. Along the same lines, respondents were more likely to disagree than agree with the statement that improving automobile traffic flow should be the highest priority for the Corridor. Those who drive on El Camino Real were more likely than the other demographics to agree with this statement, with over 50 percent of those driving multiple times a day, and 60 percent of those driving once per day agreeing.

Responses generally revealed preferences for statements that prioritized convenience for locals. Respondents were far more likely to agree than disagree that controlling spillover traffic in neighborhoods adjacent to the Corridor should be a priority, very strongly disagreed with the prioritization of regional through-traffic, and even more strongly disagreed that lanes should be widened to accommodate large trucks and delivery vehicles. There was a relatively balanced response to the statement that regional through-traffic and local traffic should be separated—though respondents were most likely to agree, nearly the same number of respondents were neutral, and only slightly fewer disagreed.

Chart 13: Opinions on Vehicle Traffic Environment

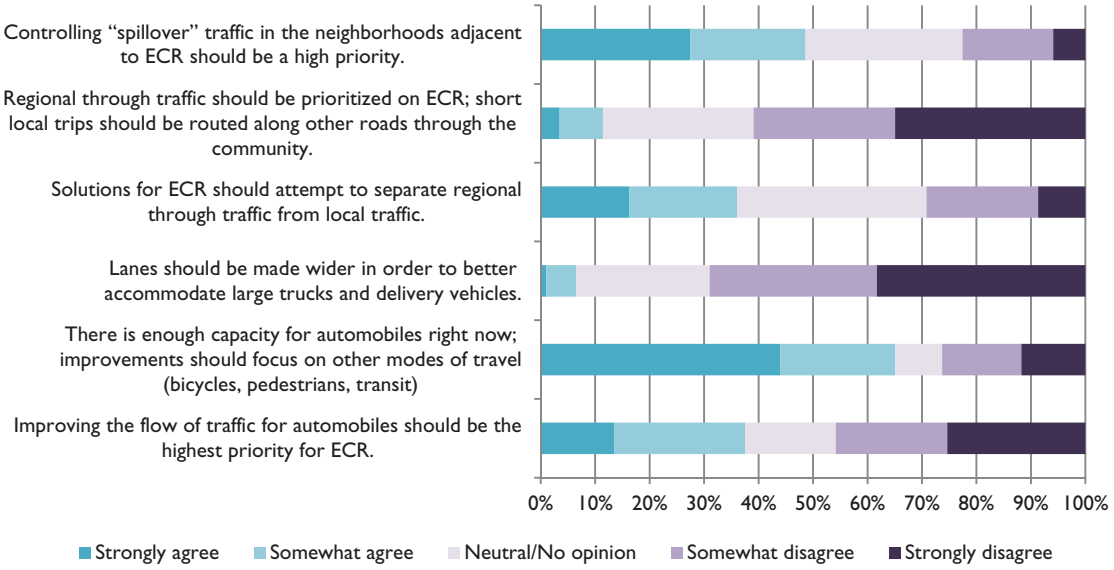

Table 13: Opinions on Vehicle Traffic Environment

	Strongly disagree	*Somewhat disagree*	*Neutral/ No opinion*	*Somewhat agree*	*Strongly agree*	*Response Count*
Improving the flow of traffic for automobiles should be the highest priority for ECR.	25%	20%	17%	24%	14%	288
There is enough capacity for automobiles right now; improvements should focus on other modes of travel (bicycles, pedestrians, transit)	12%	15%	9%	21%	44%	289
Lanes should be made wider in order to better accommodate large trucks and delivery vehicles.	39%	31%	25%	6%	1%	290
Solutions for ECR should attempt to separate regional through traffic from local traffic.	9%	20%	35%	20%	16%	288
Regional through traffic should be prioritized on ECR; short local trips should be routed along other roads through the community.	35%	26%	28%	8%	3%	289
Controlling "spillover" traffic in the neighborhoods adjacent to ECR should be a high priority.	6%	17%	29%	21%	27%	288

Bicycle Environment

Question 15 included statements about bicycle safety and potential bicycle improvements, and parallel routes. Two statements gauged opinions on the best place to accommodate bicycle traffic—one stated that there should be continuous bike lanes along El Camino Real, another stated that bicycles are best accommodated on parallel routes. Chart 14 and Table 14 describe respondents' levels of agreement with these statements.

A majority of respondents agreed with both statements, though 11 percent more agreed that there should be bike lanes, and more respondents tended to disagree that bicycles were best accommodated on parallel routes. Preferences tended to differ based on whether the respondent was a daily or frequent cyclist, versus primarily a driver: frequent cyclists were generally more

likely to favor bike lanes, with daily cyclists 40 percent more likely to strongly agree with bike lanes than with parallel routes. On the other hand, frequent drivers were more likely to prefer parallel routes than bike lanes. Respondents indicated that existing parallel routes are not currently effective for bicycle travel, with over 80 percent agreeing that they are too discontinuous or conflicted. Regarding potential bike lanes, most respondents agreed that they should be physically separated from vehicle traffic. A large majority of cyclists agreed with this statement, as did a majority of drivers.

Respondents also largely agreed that the Corridor is not currently safe or convenient for crossing by bicycle. Over 70 percent of respondents agreed that they would consider bicycling rather than driving for short trips if bicycle conditions on El Camino Real were improved. This includes the majority of frequent drivers, frequent and weekend cyclists, and all but two transit-riding respondents.

Chart 14: Opinions on Bicycle Environment

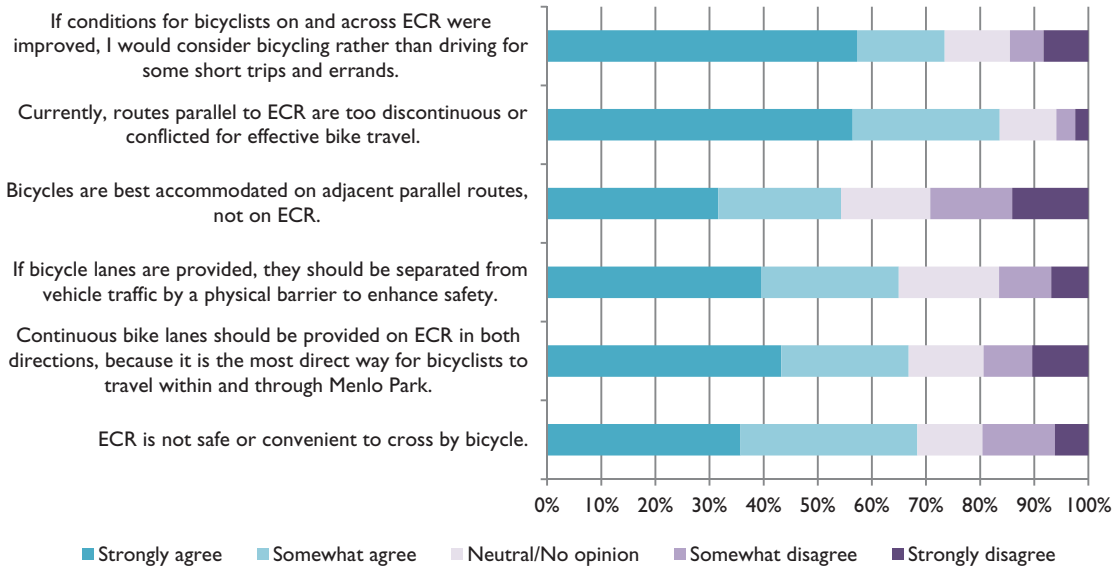

Table 14: Opinions on Bicycle Environment

	Strongly disagree	*Somewhat disagree*	*Neutral/ No opinion*	*Somewhat agree*	*Strongly agree*	*Response Count*
ECR is not safe or convenient to cross by bicycle.	6%	13%	12%	33%	36%	291
Continuous bike lanes should be provided on ECR in both directions, because it is the most direct way for bicyclists to travel within and through Menlo Park.	10%	9%	14%	23%	43%	289
If bicycle lanes are provided, they should be separated from vehicle traffic by a physical barrier to enhance safety.	7%	10%	19%	25%	40%	291
Bicycles are best accommodated on adjacent parallel routes, not on ECR.	14%	15%	16%	23%	32%	291
Currently, routes parallel to ECR are too discontinuous or conflicted for effective bike travel.	2%	3%	10%	27%	56%	287
If conditions for bicyclists on and across ECR were improved, I would consider bicycling rather than driving for some short trips and errands.	8%	6%	12%	16%	57%	290

Parking Environment

These statements gauged participants' opinions on parking along El Camino Real. Chart 15 and Table 15 describe respondents' agreement with these statements. Respondents were more likely to agree with statements that the space currently occupied by on-street parking could be used more effectively for purposes other than parking. Respondents were more likely to strongly disagree than agree with the statement that on-street parking on El Camino Real is essential for customers of small businesses there. If parking were to be replaced by another use, bicycle lanes were the alternative use with the highest and strongest levels of agreement, with nearly 70 percent in agreement. There was less agreement with converting parking to space for vehicle travel (at 45 percent, less than a majority); however, respondents were still more likely to agree with converting parking to space for vehicles than they were to agree that street parking is essential on El Camino Real. Regardless of the reason for parking removal, a majority of respondents agreed that any parking removed from El Camino Real should be replaced as off-street parking located nearby.

Chart 15: Opinions on Parking Environment

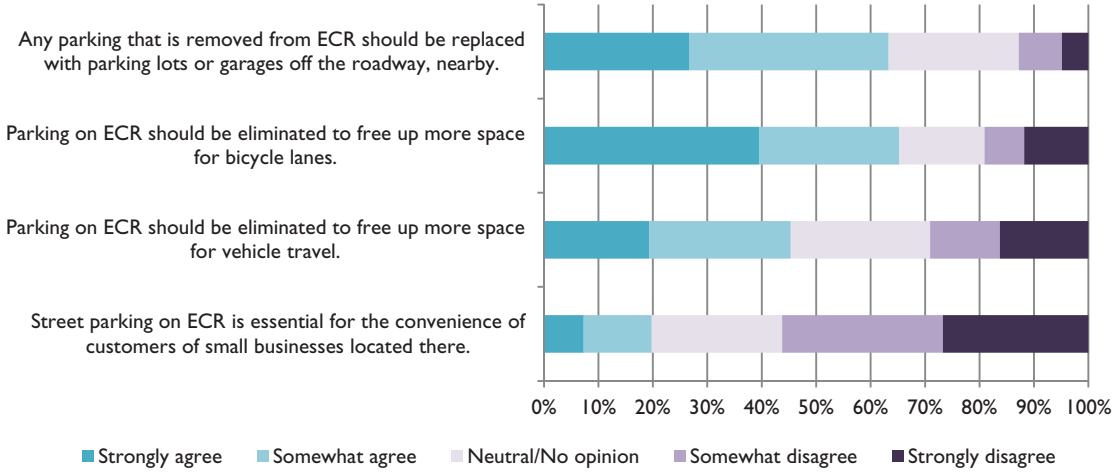

Table 15: Opinions on Parking Environment

	Strongly disagree	*Somewhat disagree*	*Neutral/ No opinion*	*Somewhat agree*	*Strongly agree*	*Response Count*
Street parking on ECR is essential for the convenience of customers of small businesses located there.	27%	30%	24%	13%	7%	288
Parking on ECR should be eliminated to free up more space for vehicle travel.	16%	13%	26%	26%	19%	289
Parking on ECR should be eliminated to free up more space for bicycle lanes.	12%	7%	16%	26%	40%	288
Any parking that is removed from ECR should be replaced with parking lots or garages off the roadway, nearby.	5%	8%	24%	37%	27%	289

POTENTIAL CHANGES ON EL CAMINO REAL

Question 10 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 16 and Table 16 describe the responses for each item; the table also includes an average rating score for each item.

The idea rated as most desirable based on its average score is "Enhanced pedestrian safety and crossings on El Camino Real." 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.

Other items that received a majority of desirable responses were:

- 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

These included all of these bicycle- and pedestrian-related improvements, two improvements to signalization, and an improvement related to vehicle safety.

The least-desirable improvement, based on average score, was "More convenient on-street parking on El Camino Real." 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.

Other items where there were more undesirable responses than desirable responses were:

- 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

These were mainly vehicle-related improvements that altered travel speeds or that would increase the number of through-lanes or on-street parking spaces on El Camino Real.

There were also three improvements that received more neutral responses than either desirable or undesirable responses, though each of these items was still considered more desirable than undesirable:

- More landscaped medians on ECR
- Additional transit service along ECR
- Timing traffic signals to favor east west access

Responses to this question generally corresponded to the opinions expressed in responses to questions 11 through 16. For example, the desirability of pedestrian and bicycle improvements reflects respondents' tendency to agree with statements promoting pedestrian and cyclist safety. Likewise, the relative unpopularity of additional through-lanes and on-street parking reflects respondents' opinions that there is adequate vehicle capacity on El Camino Real, and that on-street parking along the Corridor is nonessential and should be eliminated.

Chart 16: Preferences for Potential Changes on El Camino Real

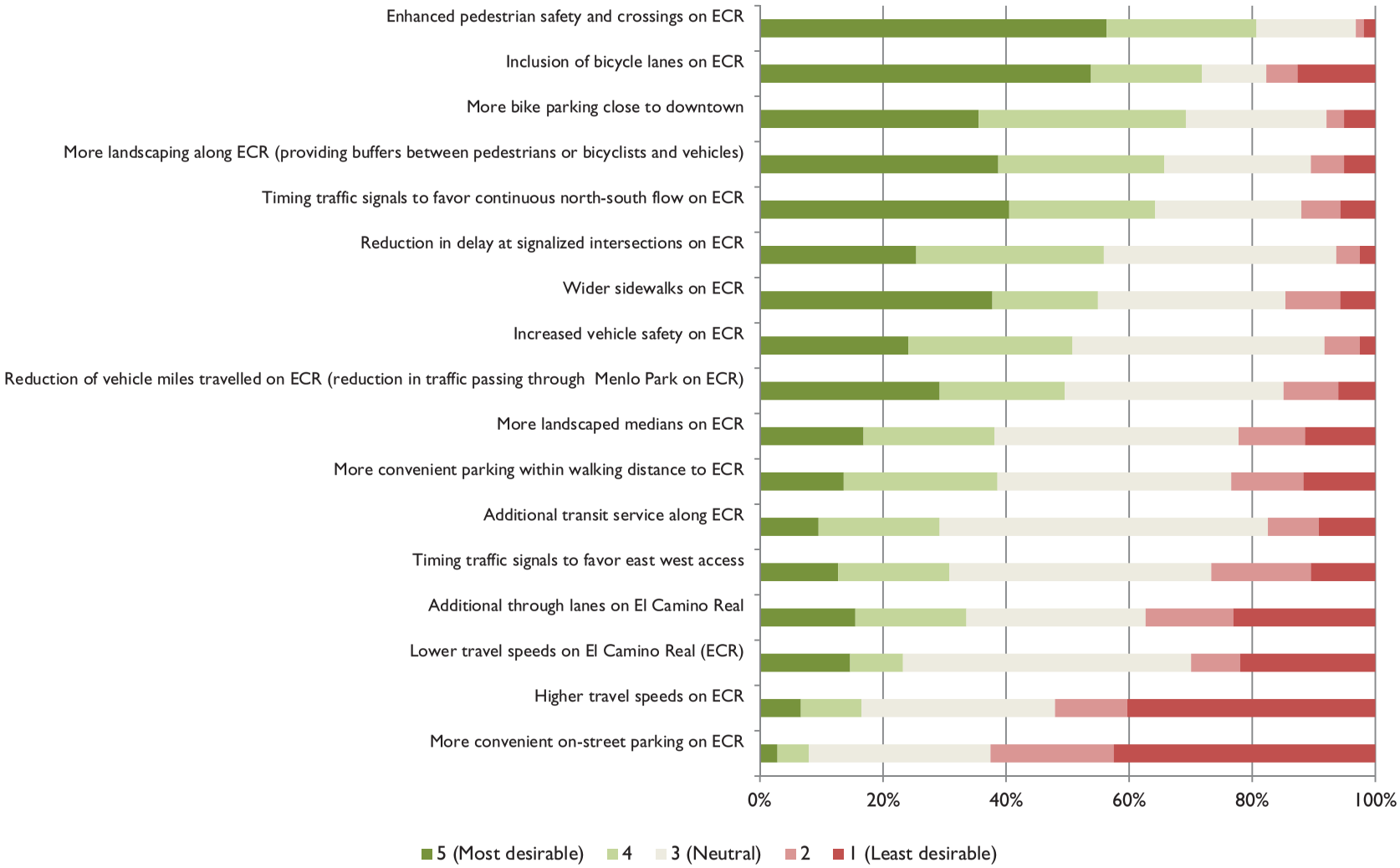

Table 16: Preferences for Potential Changes on El Camino Real

		Percent of Total					
		1	*2*	*3*	*4*	*5*	
Potential Improvement	*Rating Average*	*Least Desirable*		*Neutral*		*Most Desirable*	*Number of Respondents*
Enhanced pedestrian safety and crossings on ECR	4.32	2%	1%	16%	24%	57%	316
Inclusion of bicycle lanes on ECR	3.95	13%	5%	10%	18%	54%	316
More bike parking close to downtown	3.92	5%	3%	23%	34%	36%	315
More landscaping along ECR (providing buffers between pedestrians or bicyclists and vehicles)	3.89	5%	5%	24%	27%	39%	315
Timing traffic signals to favor continuous north-south flow on ECR	3.87	6%	6%	24%	24%	41%	316
Reduction in delay at signalized intersections on ECR	3.72	3%	4%	38%	30%	25%	315
Wider sidewalks on ECR	3.72	6%	9%	30%	17%	38%	315
Increased vehicle safety on ECR	3.64	3%	6%	41%	27%	24%	315
Reduction of vehicle miles travelled on ECR (reduction in traffic passing through Menlo Park on ECR)	3.58	6%	9%	36%	20%	29%	315
More landscaped medians on ECR	3.21	11%	11%	40%	21%	17%	315
More convenient parking within walking distance to ECR	3.17	12%	12%	38%	25%	14%	316
Additional transit service along ECR	3.12	9%	8%	53%	20%	10%	315
Timing traffic signals to favor east west access	3.06	10%	16%	43%	18%	13%	315
Additional through lanes on El Camino Real	2.89	23%	14%	29%	18%	16%	316
Lower travel speeds on El Camino Real (ECR)	2.86	22%	8%	47%	9%	15%	314
Higher travel speeds on ECR	2.31	40%	12%	31%	10%	7%	315
More convenient on-street parking on ECR	2.06	43%	20%	30%	5%	3%	315

OPEN-ENDED QUESTIONS

Questions 17 through 19 asked open-ended questions and allowed respondents to identify specific concerns and problematic locations along El Camino Real. Full text of the open-ended responses can be found in Appendix C.

Q17. In your opinion, how well does El Camino Real currently serve your transportation needs?

There were a total of 235 responses to this question. Responses generally corresponded to the following categories:

- **Well:** El Camino Real adequately serves the respondent's current needs
- **Not well:** El Camino Real does not adequately serve the respondent's needs or desires
- **Mixed:** The respondent that some needs may be met, but others are not
- **Other:** The respondent's opinion could not be determined from the response

In many cases, respondents also offered details about their transportation needs, and how they related to the El Camino Real Corridor. Common themes among the responses included concerns about the visual environment, future development, alternative transportation, safety, signalization, east/west crossings, and congestion, and a tendency for respondents to seek alternative routes in order to avoid the Corridor.

Most responses, 59 percent, could be categorized as "not well." These stated outright that the Corridor failed to serve their needs or were composed entirely of complaints. Congestion and safety were the main issues cited overall by respondents who felt that their needs were not being met. Specifically, respondents were concerned that traffic and congestion made vehicular travel along El Camino Real too time-consuming or dangerous, particularly during commute times. Thus, the Corridor is not serving the needs of these respondents who would use it in order to commute.

Meanwhile, nearly half of the "not well" responses cited their needs as bicyclists, pedestrians, and transit riders as being neglected along the Corridor. Those who must travel by these modes (as well as those who would prefer to but are afraid or are unable to do so), highlighted a lack of facilities and unsafe conditions as a barrier to their use of the Corridor. Many respondents described difficulty crossing El Camino Real. This was mentioned in relation to driving, bicycling, and walking, and was attributed to the congested and dangerous intersections along the Corridor. One safety concern related specifically to children—many respondents pointed out that the Corridor was too dangerous to serve the needs of children, particularly students, who live in the area and find it challenging to travel the Corridor to reach the destinations such as the school, library, and recreation center. Many of the responses in this category (over 25 percent) indicated that as a result of the concerns discussed above, the respondent regularly seeks alternative routes to avoid El Camino Real.

Additionally, 25 percent of responses were "mixed," where respondents identified both needs that were and were not met, or where respondents indicated that the Corridor was "OK" but then identified an area where their needs were not being met. Concerns described in these responses

were similar to those in the "not well" category. Most responses followed a similar pattern, first stating something positive about the Corridor—it is "OK" or "adequate," is a direct route for the respondent's travel needs, is effective during non-commute hours, is effective for car travel, is adequate for pedestrians at crosswalks—and then stating that the respondent finds it difficult during commute hours or during active times of the day, dangerous for walking or bicycling, too congested or dangerous, or that the respondent actually tends to avoid the route when possible.

About 12 percent of responses could be categorized as "well." These stated that El Camino Real adequately served their needs and did not note any complaints about needs that were not being met. However, the responses revealed that in many cases, needs were only just being met. Characteristic responses included statements like "OK," "just tolerable," "barely adequately," and similar phrases suggesting that respondents still find aspects of traveling the Corridor to be unpleasant.

Four percent of the responses were categorized as "other." These included suggested improvements, descriptions of conditions on El Camino Real that did not indicate whether or not the respondent felt their needs were being met, and other comments. These responses can be found in Appendix C.

Q18. Specifically, what is the most important traffic/transportation/circulation issue to you on the El Camino Real Corridor in the City of Menlo Park?

There were a total of 239 responses to this question. In many cases, respondents noted more than one issue; these are also included in the following discussion. The issues identified by respondents can be divided into the following categories, and many of these sentiments mirror the priorities expressed in the earlier questions:

- **Alternatives to driving:** Sixty-two percent of responses identified a need for more alternatives to automobile travel along the Corridor, including improved public transportation options, bicycling, and walking, to accommodate both the needs and desires of different travelers, and the reduction of the number of cars traveling the Corridor.
- **Bicycle facilities and safety:** Fifty-six percent of responses included bicycle facilities and safety as important issues. Responses called for safety improvements both at crossings and along El Camino Real, with the primary improvement being the addition of bike lanes. Some responses indicated a need for separated bike lanes to ensure the safety of riders. Many responses focused specifically on the safety of students who may bicycle along or across the Corridor.
- **Safety:** Forty-one percent of respondents were concerned about safety along the Corridor, including bicycle, pedestrian, and student safety.
- **Traffic:** Thirty-two percent of responses mentioned traffic as a concern. The issue of traffic was often related to other issues, such as potential causes (such as on-street parking, poorly-timed lights, no alternatives to driving), and impacts (such as frustrated drivers behaving dangerously, safety concerns for cyclists and pedestrians, cars cutting through neighborhoods to avoid El Camino Real). Some respondents were also concerned about traffic impacts of future development in the city and along the Corridor.

- **Pedestrian facilities and safety:** Twenty-six percent of responses mentioned pedestrian facilities and safety. Respondents were particularly concerned with safety at pedestrian crossings, and requested improvements in pedestrian-friendliness at intersections. Requests for pedestrian improvements tended to be grouped with requests for bicycle improvements.
- **Crossing El Camino Real:** Nineteen percent of responses were concerned with the safety and convenience of crossing El Camino Real. Pedestrian crossings were a main concern, as were bicycle crossings. Drivers also reported frustration with long lights, blockages, and risky behavior at crossings.
- **Traffic lights:** Fifteen percent of respondents brought up traffic lights in their responses. Most often, the context involved the timing of the lights—many respondents felt that the lights are currently poorly timed, and that changing the timing could improve traffic flow along the Corridor. Many considered their experiences with waiting at individual traffic lights through multiple signal cycles as an indicator of poor traffic performance on the street. Some discussed unsafe driving behaviors at lights, as well as the need to improve signals and safety for cyclists and pedestrians at intersections.
- **Vehicle lanes:** Eleven percent of responses to this question mentioned vehicle travel lanes as an important issue. Regarding the number of lanes desired on El Camino Real, there were both responses suggesting that traffic is too great for existing lanes or that additional lanes are needed, and that there should not be any additional lanes or that existing lanes could be eliminated (Question 10 specifically asked participants whether or not they considered additional lanes desirable, and responses tended to be neutral or to indicated undesirability). Respondents also identified the points where three lanes merge into two as problem areas responsible for bottlenecks. There were also some mentions of unsafe or problematic behavior at specific turn lanes along the Corridor that contribute to traffic and safety concerns.
- **Parking:** Five percent of respondents mentioned parking as an issue. These respondents indicated that parking along El Camino Real may contribute to traffic and safety problems, either by causing bottlenecks or by endangering cyclists or pedestrians. Some had suggestions for improving or removing parking along the Corridor.
- **East-west connections:** Five percent of responses specifically mentioned El Camino Real as a barrier when traveling between the eastern and western portions of the city.
- Less common themes:
  - *Transit:* Three percent of responses specifically mentioned a need for more public transit options.
  - *Student Safety:* Three percent of responses focused on improving safety and accessibility for students and children to walk and bike along and across El Camino Real.
  - *Overpass/Underpass:* Three percent of responses requested the construction of an overpass or underpass to facilitate crossings on El Camino Real.
  - *Streetscaping:* Two percent of responses emphasized the need to improve the appearance of El Camino Real, requesting plantings, landscaping, and multi-modal design.

- *Desirable uses:* One percent responses suggested that the Corridor could be improved by adding more retail businesses or restaurants, markets, and housing.
- *Other:* There were six other issues highlighted in responses, which include minimizing delays caused by the train and the need for more roads connecting to Middlefield.

Q19. Specifically, what intersection or portion of El Camino Real do you have concerns with traffic/transportation/circulation, if any?

There were a total of 210 responses to this question. Respondents indicated specific intersections and/or segments of El Camino Real that they felt were problematic, and many discussed their concerns with those intersections or segments.

Table 17 describes the frequency with which specific intersections were mentioned. The most frequently mentioned intersection by far was the intersection between El Camino Real and Menlo Avenue/Ravenswood Avenue, followed by Middle Avenue and Sand Hill Road.

Table 17: Intersections of Concern

Intersection	*Number of Mentions*
Menlo/Ravenswood	73
Middle	34
Sand Hill	26
Oak Grove[a]	21
Santa Cruz	17
Cambridge	14
Valparaiso/Glenwood	10
Encinal	7
Roble	5
Creek	5
Live Oak	3
Partridge	3

Notes:

a. One of these mentions is ambiguous; it was written as "[O…]," and assumed to refer to Oak Grove.

Many respondents also described concerns that they had with specific intersections.

- **Encinal:** Respondents were mainly concerned with crossing El Camino Real.
- **Valparaiso/Glenwood:** Some respondents were concerned with the crossing, some were concerned with turns off El Camino Real.
- **Oak Grove:** Concerns included vehicles running red lights, and safety of pedestrians and cyclists trying to cross El Camino Real.

- **Santa Cruz:** Concerns included unsafe pedestrian crossing, signal timing, and vehicles running red lights.
- **Menlo/Ravenswood:** Respondents cited a range of concerns including poor bicycle and pedestrian safety; large amounts of traffic, congestion, and conflict between different modes due to the popularity of destinations in the vicinity; turning; and signal timing.
- **Roble:** The only specific concern for Roble was cars blocking cross-traffic at the intersection.
- **Middle:** Concerns included congestion, particularly congestion related to the Safeway and gas station, and the unsafe and inconvenient crossing for pedestrians and cyclists.
- **Cambridge:** Concerns included U-turns and pedestrian crossings.
- **Creek:** The only specific concern noted for Creek Drive is that the bridge is too narrow for pedestrians.
- **Sand Hill:** Concerns included signal timing and vehicles running red lights.

Live Oak Avenue and Partridge Avenue are counted here based on responses that indicated "all intersections" in the Study Area, and have no specific concerns associated with them. The general concerns discussed in these responses are related to safety or, specifically, bicycle safety.

Table 18 describes the frequency that intersections were mentioned as part of problematic segments of the Corridor. Segments of concern included intersections throughout the Study Area. The frequency of inclusion peaks at Menlo Avenue/Ravenswood Avenue, and generally decreases towards the northern and southern boundaries of the Study Area. Many respondents described segments using landmarks such as the Caltrain station, the Stanford Shopping Center, and Palo Alto; these were associated with the nearest intersection and included in the analysis.

Table 18: Intersections in Segments of Concern

Intersection[a]	*Number of Mentions*
Encinal	10
Valparaiso/Glenwood	29
Oak Grove	34
Santa Cruz	44
Menlo/Ravenswood[b]	50
Live Oak[b]	43
Roble[b]	41
Middle[b]	44
Partridge[b]	34
Cambridge[b]	33
Creek[b]	32
Sand Hill[b]	30

Notes:

a. Intersections are listed from north to south.

b. One response described a segment from the Stanford Shopping Center to "Ringwood," which was assumed for this analysis to include intersections from Ravenwood to Sand Hill Road.

Descriptions of respondents' concerns about these segments were focused mainly on congestion or bicycle safety. The areas mentioned most frequently, such as Menlo/Ravenswood, may be considered the most congested and most challenging for cyclists.

4. Summary of Key Issues

TRANSPORTATION NEEDS

Most respondents use multiple forms of transportation along El Camino Real—mainly 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.

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.

There may need to be a closer examination of public transit needs along the corridor. The sample of transit riders responding to the survey was too small to draw supportable generalizations. 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 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.

Appendix C

Best Practices Report

Summary of Best Practices

Introduction

The *Menlo Park El Camino Real Downtown Specific Plan*, adopted in June 2012, emphasizes the character and extent of enhanced public spaces, the character and intensity of private infill development, and circulation and connectivity improvements to preserve and enhance community life. The plan focuses on improvements along the El Camino Read corridor in the City of Menlo Park, as well as downtown Menlo Park and the Menlo Park Caltrain Station area. For transportation circulation, the Specific Plan envisions the following:

- *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.*

Through the completion of these visions, the Specific Plan accommodates all travel modes, with an emphasis on pedestrians, bicyclists, transit users and parking for downtown. The Specific Plan focuses development in areas well served by transit with a mix of uses in close proximity in order to reduce the reliance on private motor vehicles. The 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 from the Downtown Specific Plan, following is a "toolbox" of potential improvement measures for the El Camino Real corridor which would support the goals of each mode. This toolbox focuses on curb to curb improvements within the public right-of-way to create Complete Streets. The details of additional circulation improvements outside of the roadway are summarized in the Specific Plan. Images and specific examples of these measures which have been implemented in the Bay Area are shown.

Pedestrian Improvements

Through new development and redevelopment, the Specific Plan anticipates an increase in the number of pedestrians along El Camino Real and in the station area and downtown, the Specific Plan focuses on pedestrian east-west connectivity across El Camino Real, north-south connectivity along El Camino Real, and circulation through the downtown area supported by the following modifications:

- *Improved pedestrian comfort and accommodation*
- *Addition of track-separated pedestrian/bicycle access across the railroad tracks*
- *Reduced pedestrian crossing distances across El Camino Real*

The following improvement measures, and accompanying examples, would aid in the improvement of the pedestrian environment along the El Camino Real Corridor as outlined by the Specific Plan:

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

Figure 1 Ladder Crosswalk (Main Street/Harrison Street, San Francisco)

Figure 2 Brick Crosswalk (El Camino Real/Stanford Avenue, Palo Alto)

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

Figure 3 Curb Extensions and High Visibility Elements (Mission Street at Alp Avenue, Daly City)

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.

Figure 4 Pedestrian Refuge Island (Van Ness Avenue/McAllister Street, San Francisco)

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.

Figure 5 Leading Pedestrian Interval (Mission Street/6th Street, San Francisco)

Figure 6 Pedestrian Countdown Signal

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

Figure 7 Enhanced Active when Present Signage (San Pablo Avenue/Madison Avenue, El Cerrito)

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

Figure 8 No Right Turn on Red (Winchester Boulevard/Daves Street, Los Gatos)

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

Figure 9 Pedestrian Gates at Railroad Crossings

Note: All of the pedestrian crossings of El Camino Real are at signalized intersections, so additional enhancements which apply to uncontrolled intersection crossings are not included in this discussion.

Bicycle Improvements

The Specific Plan highlights bicycling as an important mode of transportation for the City. Many Menlo Park residents commute to work by bicycle taking advantage of a mild climate and relatively flat terrain to access many destinations within close proximity to their home or place of employment. In accordance with the Menlo Park Comprehensive Bicycle Development Plan (CBDP), the Specific Plan establishes a comprehensive bicycle network for the El Camino Real corridor, downtown area, and Caltrain station area. This network recommends a combination of bicycle paths, bicycle lanes, and bicycle routes. The Specific Plan includes recommended facilities included in the DBDP, upgraded recommendations from the DBDP, and new recommendations to improve east-west connectivity and north-south facilities. The concept of El Camino Real in the Specific Plan embraces providing a continuous bike route along the length of the corridor, with the potential for a dedicated bike lane in the future.

The following improvement measures, and accompanying examples, would aid in the implementation of bicycle network improvements along El Camino Real as outlined in the Specific Plan:

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.

Figure 10 Conventional Bike Lane (Folsom Street, San Francisco)

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.

Figure 11 Buffered Bike Lane (Fourth Street, San Jose)

3. Physically 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.

Figure 12 Two Way Cycle Track (Fernside Boulevard, Alameda)

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.

Figure 13 Shared Lane Markings (Scott Street, San Francisco)

5. Parallel Bicycle Boulevard – Parallel streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority.

Figure 14 Bicycle Boulevard (Milvia Street which is parallel to Shattuck Avenue, Berkeley)

6. Colored Bike Facilities – Increases the visibility of the bicycle facility, identifies potential conflict areas, and reinforces bicycle priority in conflict areas.

Figure 15 Green Conflict Zone Markings at driveways (Fell Street, San Francisco)

7. Bicycle Through Lanes at Intersections – Enable bicyclists to correctly position themselves to travel through the intersection, minimizing conflict and creating predictability

Figure 16 Through Bike Lane (Oak Street/Lake Merritt Boulevard, Oakland)

8. Intersection/Bicycle Crossing Markings – Increase bicycle visibility and reduce exposure in the intersection.

Figure 17 Intersection Bicycle Crossing Markings (Market Street/Octavia Blvd, San Francisco)

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.

Figure 18 Green Bike Box (Scott Street/Oak Street, San Francisco)

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.

Figure 19 Two-State Turn Queue Boxes (Eighth Street/Folsom Street (top) and 11th Street/ Howard Street (bottom), San Francisco)

11. Bicycle Turn Signal Heads – Provide for specific bicycle turn movement at signalized intersections.

Example Pending

12. Full Bicycle Signal – Standard three lens signal specifically for bicycles provide priority to bicycle movements at intersections and accommodates bicycle-only movements.

Figure 20 Bicycle Signal (Panhandle Park along Fell Street, San Francisco)

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

Figure 21 Bicycle Parking (Embarcadero BART Station, San Francisco)

Transit Improvements

The land use intensification as part of the Specific Plan will result in increased travel along El Camino Real and around downtown Menlo Park. Transit must play an important role in accommodating the increases travel to reduce the reliance on private vehicles and relieve pressure from the roadway network. The Specific Plan supports transit improvements by recommending the following:

- *Increase shuttle service to serve added travel demand;*
- *Improve east-west connectivity and reduce demand for parking in the plan area; and*
- *Continue employer-sponsored programs that support and increase transit use.*

The following improvement measures, and accompanying examples, would aid in the improvement of transit services in the El Camino Real corridor and connectivity to the Caltrain Station as outlined by the Specific Plan:

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.

Figure 22 Bus Bulb (San Francisco)

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.

Figure 23 Far-Side Bus Stop (San Pablo Avenue/Stanford Avenue, Oakland)

3. Midblock Bus Stops – Recommended for important destinations or locations where multiple buses may queue.

Figure 24 Midbock Bus Stop (Broadway at the 12th Street BART Station, Oakland)

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.

Figure 25 Real Time Arrival Display (VTA Bus Stop)

Figure 26 Bus Shelter (Muni Bus Stop, San Francisco)

Streetscape Improvements

The Specific Plan proposes streetscape improvements on El Camino Real that unify the street experience by using a common language of trees, paving materials, and lighting elements. The intent of these improvements is to encourage walking and pedestrian activity along El Camino Real with improved walkability and comfort. These streetscape improvements should incorporate the green street standards of the *San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook*. This guidebook recommends sustainable stormwater facilities to minimize pollution, stream degradation, and localized flooding. The following improvement measures, and accompanying examples, would aid in streetscape improvements as outlined by the Specific Plan:

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.

Figure 27 Street Trees (Shattuck Avenue, Berkeley)

2. Median Enhancements – Additional trees and landscaping to complete tree canopy or shade where possible.

Figure 28 Medians (Octavia Boulevard, San Francisco)

3. Parklet – Public seating platforms that convert curbside parking spaces into community spaces along narrow or congested sidewalk to increase public space and seating.

Figure 29 Parklet (Clement Street, San Francisco)

Figure 29 Streetview of Parklet (Clement Street, San Francisco)

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.

Figure 30 Art & Soul Festival (Downtown Oakland)

Figure 31 Farmers Market (Center Street, Berkeley)

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

Figure 323 Temporary Plaza (Telegraph Avenue at Broadway, Oakland)

Figure 33 Jane Warner Plaza (17th Street/Castro Street, San Francisco)

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

Figure 34 Vegetated Swale (Freedom Park Road, Sacramento County)

7. Infiltration/Flow-Through Planters – Contained landscaping areas designed to capture and retain stormwater runoff.

Figure 35 Flow-Through Planters (San Pablo Avenue, El Cerrito)

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

Figure 36 Porous Asphalt (Bay Street Demonstration Parking Lot, Fremont)

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

Figure 37 Rain Garden (Cesar Chavez Street, San Francisco)

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

Figure 29 Green Curb Extension (Donnelly Avenue, Burlingame)

11. Pavement Reallocation - The available pavement should be delineated to serve all needs, including travel lanes, safety islands, bike lanes, and landscaping. Therefore, it is necessary under certain circumstances to reallocate the pavement space to better serve all users. The reallocation of pavement could reduce travel speeds, improve safety and operations, enhance neighborhood character, improve access, and reduce imperious pavement area to decrease water run-off. Pavement reallocation could include the narrowing of travel lanes, the removal of supplemental turn lanes, or the removal of on-street parking. The additional space could be used to add buffers to bike lanes, construct green infrastructure elements, or extend the width of sidewalks.

Parking

The proposed improvements of the Specific Plan to create additional public space, such as widened sidewalks, will affect the amount and availability of on-street parking supplies. In order to mitigate these affects, the Specific Plan recommends the construction of up to two new parking garages and the creation of a Parking Management Plan to improve the utilization of parking in downtown Menlo Park. Focusing on the Parking Management Plan, as it affects part of the curb-to-curb focus of this summary of best practices, it is recommended that it could encompass varied time limits for parking, parking pricing, and the accommodation of car-share program. Additionally, changing the design of on-street parking could have a positive effect on the available parking supply. The following management strategies and design standards, and accompanying examples, would aid in parking improvements as outlined by the Specific Plan:

1. Short On-Street Parking Time Limits – Used to encourage turnover in areas where high turnover is expected or warranted.

Figure 38 Short-Term Parking Restrictions (Berkeley)

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.

Figure 39 Early Bird Off-Street Parking Rates (Oakland)

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.

Figure 40 Variable Parking Rates (Berkeley)

Figure 41 Single Point of Payment Parking Meter (Oakland)

4. Vegetated Parking Lanes – Utilize street trees or planters to separate parking spaces.

Figure 42 Trees used as buffers in parking lane (Grant Avenue, Novato)

5. Parking Lanes as Buffers – Place the parking lane between the bicycle lane and the travel lane to increase bicycle protection.

Figure 43 Parking used as buffers for bike lane (JF Kenndy Drive, San Francisco)

Appendix D

Intersection Levels of Service

	Existing		No Project		Alt 1		Alt 2		Alt 3	
Vehicular Delay - Intersection Average	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
AM										
1. ECR/Sand Hill	33.9	C	41.7	D	37.3	D	41.7	D	42.8	D
2. ECR/Cambridge	4.9	A	8.5	A	7.8	A	8.5	A	7.4	A
3. ECR/Middle	14.7	B	23.7	C	26.2	C	23.7	C	25.3	C
4. ECR/Roble	10.2	B	7.1	A	6.9	A	7.1	A	8.3	A
5. ECR/Ravenswood-Menlo	38.3	D	40.6	D	75.1	E	40.4	D	41.6	D
6. ECR/Santa Cruz	22.5	C	15.6	B	23.3	C	16.0	B	16.1	B
7. ECR/Oak Grove	20.7	C	24.2	C	22.7	C	24.3	C	25.3	C
8. ECR/Glenwood-Valparaiso	38.6	D	69.6	E	121.1	F	70.5	E	129.0	F
9. ECR/Encinal	13.8	B	18.1	B	14.9	B	19.5	B	19.4	B
PM										
1. ECR/Sand Hill	65.8	E	75.5	E	85.9	F	75.5	E	72.7	E
2. ECR/Cambridge	11.6	B	11.5	B	11.9	B	11.5	B	11.3	B
3. ECR/Middle	15.9	B	27.6	C	33.7	C	28.0	C	29.2	C
4. ECR/Roble	13.5	B	13.1	B	10.9	B	12.9	B	15.8	B
5. ECR/Ravenswood-Menlo	53.8	D	62.5	E	51.3	D	53.3	D	62.6	E
6. ECR/Santa Cruz	18.7	B	17.7	B	23.0	C	21.0	C	25.6	C
7. ECR/Oak Grove	30.6	C	40.5	D	31.8	C	40.6	D	41.2	D
8. ECR/Glenwood-Valparaiso	31.4	C	61.4	E	112.0	F	62.4	E	78.4	E
9. ECR/Encinal	10.2	B	18.1	B	14.2	B	19.1	B	23.1	C
Ave	27.94	C	36.43	D	41.63	D	36.03	D	39.99	D

Appendix E

Intersection Queuing

Approx. 95th %-ile Queue (Avg on Thru Lanes Only)		Existing		No Project		Alt 1		Alt 2		Alt 3	
	Available Storage (ft)	Queue Length	% of Storage	Queue Length	% of Storage	Queue Length	% of Storage	Queue Length	% of Storage	Queue Length	% of Storage
AM											
NB ECR											
1. approaching Sand Hill	1350	225	17%	530	39%	over	exceeds storage	over	exceeds storage	over	exceeds storage
2. approaching Cambridge	1030	120	12%	345	33%	335	33%	410	40%	275	27%
3. approaching Middle	1080	90	8%	365	34%	450	42%	470	44%	290	27%
4. approaching Roble	840	175	21%	100	12%	613	73%	115	14%	185	22%
5. approaching Ravenswood-Menlo	610	235	39%	215	35%	over	exceeds storage	160	26%	255	42%
6. approaching Santa Cruz	340	155	46%	145	43%	105	31%	150	44%	155	46%
7. approaching Oak Grove	390	105	27%	175	45%	220	56%	180	46%	185	47%
8. approaching Glenwood-Valparaiso	990	365	37%	690	70%	400	40%	505	51%	410	41%
9. approaching Encinal	1020	160	16%	245	24%	150	15%	250	25%	160	16%
SB ECR											
9. approaching Encinal	550	225	41%	over	exceeds storage	over	exceeds storage	over	exceeds storage	over	exceeds storage
8. approaching Glenwood-Valparaiso	1010	980	97%	over	exceeds storage	over	exceeds storage	over	exceeds storage	over	exceeds storage
7. approaching Oak Grove	1000	355	36%	95	10%	185	19%	90	9%	90	9%
6. approaching Santa Cruz	410	over	exceeds storage	205	50%	320	78%	145	35%	165	40%
5. approaching Ravenswood-Menlo	340	285	84%	180	53%	300	88%	230	68%	200	59%
4. approaching Roble	610	155	25%	160	26%	120	20%	180	30%	85	14%
3. approaching Middle	840	220	26%	240	29%	285	34%	240	29%	290	35%
2. approaching Cambridge	1080	140	13%	165	15%	130	12%	130	12%	120	11%
1. approaching Sand Hill	1020	350	34%	610	60%	390	38%	725	71%	500	49%
PM											
NB ECR											
1. approaching Sand Hill	1350	490	36%	over	exceeds storage	over	exceeds storage	over	exceeds storage	over	exceeds storage
2. approaching Cambridge	1030	305	30%	650	63%	500	49%	395	38%	655	64%
3. approaching Middle	1080	205	19%	290	27%	355	33%	360	33%	355	33%
4. approaching Roble	840	485	58%	265	32%	345	41%	235	28%	355	42%
5. approaching Ravenswood-Menlo	610	480	79%	over	exceeds storage	over	exceeds storage	555	91%	over	exceeds storage
6. approaching Santa Cruz	340	205	60%	185	54%	335	99%	260	76%	275	81%
7. approaching Oak Grove	390	175	45%	365	94%	over	exceeds storage	350	90%	over	exceeds storage
8. approaching Glenwood-Valparaiso	990	585	59%	over	exceeds storage	over	exceeds storage	over	exceeds storage	over	exceeds storage
9. approaching Encinal	1020	120	12%	300	29%	95	9%	300	29%	420	41%
SB ECR											
9. approaching Encinal	550	195	35%	over	exceeds storage	545	99%	over	exceeds storage	over	exceeds storage
8. approaching Glenwood-Valparaiso	1010	325	32%	450	45%	over	exceeds storage	430	43%	over	exceeds storage
7. approaching Oak Grove	1000	535	54%	600	60%	225	23%	265	27%	540	54%
6. approaching Santa Cruz	410	255	62%	185	45%	210	51%	170	41%	195	48%
5. approaching Ravenswood-Menlo	340	285	84%	over	exceeds storage	330	97%	over	exceeds storage	305	90%
4. approaching Roble	610	200	33%	265	43%	175	29%	265	43%	420	69%
3. approaching Middle	840	255	30%	405	48%	370	44%	350	42%	325	39%
2. approaching Cambridge	1080	235	22%	210	19%	170	16%	205	19%	170	16%
1. approaching Sand Hill	1020	175	17%	340	33%	280	27%	330	32%	295	29%