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1. **Introduction**

This chapter introduces the project study area, needs and objectives, and presents an overview of the East Palo Alto Highway 101 Pedestrian & Bicycle Overcrossing planning process and Feasibility Study contents.

1.1 **Purpose & Need**

The City of East Palo Alto Highway 101 Pedestrian/Bicycle Overcrossing Project addresses long-standing travel safety and community access issues that result from the division of the community by the U.S. Route 101 corridor. Highway 101 separates the dense residential areas in the south (where approximately one-third of city residents live) from the majority of the city’s services, schools, parks, and jobs to the north. Establishing a new Class I shared-use trail over this barrier – away from heavy vehicle traffic – will enhance public safety, promote walking and bicycling, and reduce vehicular trips on University Avenue and other congested roadways. The project will also improve community health by providing recreational opportunities and linkages to the Bay Trail and City of Palo Alto, and will enhance community identity by establishing a highly visible gateway above the busy regional highway.

*Pedestrians and bicyclists currently have but one option – a narrow sidewalk on University Avenue - to connect between the two sides of East Palo Alto over Highway 101.*  
*Image: Bryan Goebel, Streetsblog*
1.2 Project Overview

The City of East Palo Alto General Plan (1999) identifies the need to create safe and convenient bicycle and pedestrian connections, while the East Palo Alto Capital Improvement Plan (2011) specifically identifies the need for a dedicated pedestrian and bicycle crossing of Highway 101 in East Palo Alto. This grade-separated crossing would provide connectivity from the residential Woodland community to the rest of East Palo Alto on the northern side of Highway 101, including access to shopping and community centers, schools, and the regional trail system.

The purpose of this Feasibility Study is to evaluate potential locations and alignments, and to recommend a preferred alignment and configuration for a grade-separated bicycle and pedestrian overcrossing of Highway 101 in East Palo Alto. The planning evaluation and report were made possible through a grant provided by the San Mateo County Transportation Authority. The Feasibility Study includes consideration of the potential environmental, engineering, operational and permitting issues associated with each alignment.

1.3 Organization of Report

The remainder of the Feasibility Study report is organized as follows:

Chapter 2 – Planning & Outreach
This chapter provides details from existing plans and policies that support and inform development of the overcrossing. The chapter summarizes outreach activities and feedback that led to the selection of a preferred project location, and outlines the eight (8) project goals that will be used to guide implementation.

Chapter 3 – Project Setting
This chapter documents existing demographics, land uses, circulation, and relevant infrastructure elements within the project area. Circulation information includes vehicle counts and classifications for key roadways, a description of existing and proposed bikeways, sidewalk conditions, and transit/shuttle services. Existing utilities and creek features are also documented.

Chapter 4 – Demand and Safety
This chapter summarizes available and projected travel demand data, distinguishes types of trips made by walking and biking, and assesses a wide range of safety factors from collision history to personal security and public health.

Chapter 5 – Alternatives Analysis
Chapter 5 provides a summary analysis of the alignment alternatives that were considered at the preferred project location. This analysis includes a narrative description of the pros and cons for each alternative, graphic depictions, and a decision matrix using criteria scoring in order to identify the preferred overcrossing alignment(s).

Chapter 6 – Implementation & Funding
This chapter outlines next steps and considerations for the permitting, environmental clearance, design, and funding of the overcrossing project.
2. Planning & Outreach

2.1 Relevant Plans and Policies

This section presents a summary of key planning and policy documents relevant to a Highway 101 pedestrian and bicycle overcrossing in East Palo.

**East Palo Alto General Plan (1999)**

The City of East Palo (EPA) General Plan serves as a policy guide for determining the appropriate physical development and character of the community. Within the document, there are numerous references that support a diverse circulation system with vehicular, transit, bicycle, and pedestrian linkages.

General Plan goals and policies that help guide the placement and design of a pedestrian/bicycle overcrossing include:

- **Land Use Goal 2.0**: Create an enhanced image and identity for East Palo Alto.
- **Policy 2.2**: Promote high quality in the design of all public and private development projects.
- **Land Use Goal 3.0**: Enhance the character of community neighborhoods.
- **Policy 3.2**: Ensure that new development is compatible with the physical character of its site, surrounding land use, and available public infrastructure.
- **Circulation Goal 3.0**: Increase use of public transit and non-vehicular methods of travel.
- **Policy 3.3**: Provide and maintain a circulation system that supports bicycle and pedestrian travel.

The General Plan states that creating greater access to open space is a means of expanding recreational opportunities within the City. Greater access is to be provided by seeking joint use agreements with other public owners of open space and recreational lands, such as the Ravenswood School District. As stated in the Conservation and Open Space Element, the City intends to expand and improve the physical access points to recreational lands through signage, improved bicycle and pedestrian linkages, and other forms of access improvements.

The City’s General Plan is currently being updated, a process that is expected to further increase compatibility and policy support for a non-motorized overcrossing of Highway 101.

**East Palo Alto Community-Based Transportation Plan - CBTP (2004)**

The East Palo Alto CBTP reflects a collaborative planning effort between the City of East Palo Alto, its residents, community-based organizations, and transit service providers to identify priority transportation gaps and strategies for improving mobility for low-income, underserved populations. Of the nine primary gaps/needs identified by the Stakeholder Agency Committee (SAC), six may be considered relevant or supportive for the Highway 101 Overcrossing Project:

- Improve bus and shuttle stops to make it easier and safer for people to use transit
- Enhance transportation systems to make travel easier to primary destinations
Chapter 2 | Existing Conditions

- Improve affordability of transportation services
- Improve connections between land use and transit
- Enhance community health and safety through transportation improvements
- Increase coordination between transportation systems and services, both public and private

Included among the final CRTP priority recommendations is to provide “enhanced transit transfer sites” at four potential locations within East Palo Alto, including the Home Depot/IKEA area. At these frequent transfer locations, site amenities such as “shelters, lighting, trash receptacles, information boards or kiosks, newspaper racks, bicycle racks, and public phones” are strongly encouraged to increase transit patron comfort.

Bay Access Master Plan – BAMP (2007)

In 2007, the City of East Palo Alto Redevelopment Agency published the Baylands Access Master Plan (BAMP) to create a vision for accessing the Bay and other recreational opportunities that will guide East Palo Alto policy makers and the San Francisco Bay Conservation and Development Commission (BCDC). The plan includes visions for a new trail along San Francisquito Creek as well as a pedestrian crossing over Highway 101 near the creek.

A significant portion of the BAMP documents open space deficits and priorities as established by typical standards and prior planning efforts. At the time the BAMP was written, the City had 16 acres of parkland, or .54 acres/1,000 residents, compared to a widely recognized target standard of 3 acres/resident (or a total target of 88 acres of parks and recreational open space). The BAMP also summarizes specific priority park amenities established in the 1995 East Palo Alto Parks, Recreation, and Open Space Recommendations Report, as well as the 2003 East Palo Alto Recreation and Community Services Strategic Plan. In addition to improved Bay access, these amenities include bicycle and pedestrian trails, safer crossings of Highway 101, playgrounds and tot lots, pocket parks with picnic areas along San Francisquito Creek, and multi-purpose fields/centers.

The BAMP logically emphasizes connections between the Bay Trail and improved open space amenities along San Francisquito Creek in the Woodland Park neighborhood, which is devoid of usable open space (despite high residential densities). Although subsequent analysis has revealed a potential undercrossing of Highway 101 at the creek is infeasible due to flooding concerns, the BAMP nevertheless remains an important document for supporting improvements across Highway 101 and prioritizing recreational opportunities.
**East Palo Alto Bicycle Transportation Plan (2011)**

The East Palo Alto Bicycle Transportation Plan (Bike Plan) furthers the community vision of safe, widely distributed roadways serving multiple modes of transportation. Until the 1999 General Plan is updated, the 2011 Bike Plan will be used to help implement the Bay Access Master Plan and the General Plan transportation recommendations.

The Bike Plan identifies twenty-five segments of Class I, II, and III bike lanes. The highest priority missing link is identified as a Pedestrian Overcrossing (POC) of Highway 101, which is also supported by the Bay Access Master Plan (BAMP). The POC is envisioned to reconnect parts of the City separated by Highway 101 to the Gateway 101 Shopping Center; of particular interest are those commuters and City residents who reside in the high density housing in the Willow and Woodland neighborhoods on the west side of Highway 101 so that they can easily access essential services. The POC would also enable commuters to conveniently go to work, school, or retailers, including the City's top two employment destinations of Palo Alto and Menlo Park.

As envisioned in the Bike Plan, the POC would meet Caltrans Class I bikeway and Americans with Disabilities Act (ADA) standards, and help reduce exposure to toxic air contaminants that are highest along the University Avenue truck route. Furthermore, it may cater to a wider segment of the community is less inclined to bicycle ride, or walk, on the existing high volume University Avenue bridge. Based on bicycle tour feedback and preliminary site analysis, the Bike Plan highlights the Euclid Avenue and Newell Road/Clarke Avenue areas as the most promising potential crossing locations for future consideration.

**East Palo Alto Capital Improvement Plan (2011)**

The East Palo Alto Capital Improvement Plan (CIP) identifies public projects that the City will undertake to meet the goals of the City's General Plan, and proposes an implementation schedule for those projects based on the availability of funding. The capital projects listed under the Street and Transportation category are intended to improve the safety, efficiency, and reliability of the City’s transportation needs for all modes of travel. Projects are divided into two groups: current projects and future projects. Future projects are projects with no projected source of funding and are unlikely to be constructed during the life of the CIP (Fiscal Years 2011/12 – 2015/16). These projects are in the CIP so that the City is prepared to act if a potential funding source becomes available in the future.

The following three projects in the CIP address bicycle and/or pedestrian access across Highway 101:

1. **Project No. ST-07: Highway 101 Pedestrian/Bicycle Overcrossing.** This current project has an estimated cost of $6 million. The CIP describes the project as construction of a bicycle/pedestrian crossing over Highway 101 and associated improvements to connect to existing roadways and trails. The project would provide a pedestrian/bicycle link between the two sides of the City divided by Highway 101. It would link the residents of the Woodland Neighborhood with city services and recreation opportunities on the other side of the freeway. The project would encourage bicycle/pedestrian transportation, which would improve the overall health of the community.

   This project furthers General Plan Circulation Policy 3.3, to “provide and maintain a circulation system that supports bicycle and pedestrian travel”. This project would further this policy by enhancing the functionality of the City’s non-motorized transportation system. The General Plan Circulation Element promotes closing gaps in the existing bikeway system, which this project would
Chapter 2 | Existing Conditions

Travel analysis strongly suggests that Highway 101 is a significant barrier to increasing active transportation to Brentwood Elementary and other area schools. In addition to promoting new facilities, the Safe Routes to School program provides ongoing education and encouragement activities to ensure proper safety habits and awareness among student families.

2. **Project No. ST-14: University Avenue Bridge Overcrossing**. This future project has an estimated cost of $6 million. This project will provide for the widening of the University Avenue/US 101 overpass to provide safer pedestrian and bicycle travel. The project will be completed in phases including the widening of the overpass bridge to the west, construction of a new diagonal off-ramp from SB 101 onto SB University Avenue, and widening of the overpass on the east. Design and planning work for the project was completed in 2004 in the form of a project Plan, Specifications and Estimate (PS&E). The City intends to modify the plans to include new improvements to the interchange and to secure the necessary funds. The design of the improvements will be required to meet Caltrans standards.

3. **Project No. ST-15: Highway 101 Pedestrian/Bicycle Underpass**. This project has an estimated cost is $4 million, and involves construction of a bicycle/pedestrian underpass where Highway 101 intersects with San Francisquito Creek. At the time the CIP was prepared, Caltrans was in the planning/design stage of a project to replace the portion of Highway 101 (and frontage roads) which crosses over San Francisquito Creek in order to improve the flow of vehicular traffic at that point. The City had been working with Caltrans to determine the feasibility of incorporating a pedestrian/bicycle underpass into the design of the new freeway section. This project is no longer feasible based on subsequent flooding analysis and the completion of the Highway 101 Auxiliary Lane project.


The San Mateo County Office of Education contracted with Alta Planning + Design and the Silicon Valley Bicycle Coalition (SVBC) in 2011 to provide Safe Routes to School (SR2S) improvement plans for select schools around the county. The Ravenswood City School District was one of the selected school districts. Walk audits and student/parent travel surveys were performed at all elementary and middle schools in the Ravenswood City School District in early 2012.

Three of the schools (Brentwood Elementary, Ronald McNair Middle, and the Ravenswood Child Development Center) all share a large city block nearby the overcrossing study area off of Clarke Avenue. The combined improvement plan for the three schools recommends bicycle and pedestrian improvements including an overcrossing of Highway 101 at Clarke Avenue. The plan also recommends considering bike lanes and filling in gaps in the sidewalk network on Clarke Avenue, among other improvements in the University Square/Weeks neighborhoods. As part of the outreach process, 63 parents from these three schools attended bi-lingual Safe...
Routes information sessions and largely confirmed support for the recommended overcrossing location. Important details from the travel survey information in this report are provided in Section 4.2 of this Feasibility Study.

**Gloria Way Well Feasibility and Water Security Study**

The *Gloria Way Well Feasibility and Water Security Study* was commissioned by the City of East Palo Alto to assess the adequacy of current and future water supplies, and make recommendations for necessary improvements. The City currently receives the majority of its water supply from the San Francisco Public Utilities Commission (SFPUC), and is expected to exceed this supply in the near future due to residential and employment growth.

In addition to recommending improvements to an existing water well at Gloria Way, the report identifies the publicly-owned “Pad D” site at East Bayshore Road and Clarke Avenue as a priority location for future water resources. The study also identifies a critical shortage of emergency water supply, and recommends consideration of a new water storage tank on a vacant parcel at the southeast corner of Newell Road and West Bayshore Road. Both of these recommended sites are at locations identified by the City of East Palo Alto as potential locations for a future pedestrian/bicycle overcrossing of Highway 101.

Additional discussion of the relationship between this plan and the Highway 101 Pedestrian/Bicycle Overcrossing Project is provided in subsequent chapters of this report.

**San Mateo County Comprehensive Bicycle and Pedestrian Plan - CBPP (2011)**

The *San Mateo County Comprehensive Bicycle and Pedestrian Plan* (CBPP) was recently completed by the City/County Association of Governments of San Mateo County (C/CAG), with support from the San Mateo County Transportation Authority (SMCTA). The CBPP was developed to addresses the planning, design, funding, and implementation of bicycle and pedestrian projects of countywide significance. The CBPP updates the prior *San Mateo County Comprehensive Bicycle Route Plan* (2000) and expands the earlier plan by adding a pedestrian component.

In addition to linear bikeways, the CBN includes bicycle and pedestrian crossings of major barriers: freeways, major arterials, and rail lines. Table A-1: *Category A Countywide Bikeway Network Projects* identifies two projects in East Palo Alto: 1) the Highway 101 overcrossing linear bikeway located 300 feet north of Donohoe Street to Woodland Avenue (i.e., improvements to University Avenue bridge), and 2) an overcrossing at Clarke Avenue and Highway 101. The CBPP also identifies the East Palo Alto Highway 101 Overcrossing study area as a priority pedestrian area.

Beyond identifying the specific project and priority area, the CBPP includes a detailed policy framework that strongly supports prioritization of the project. The most relevant policies are listed below:

- **Policy 1.2**: In developing a countywide system of facilities, place special attention on implementing or improving north–south routes (particularly for bicyclists) and reducing barriers to east–west access.
- **Policy 1.3**: Encourage and collaborate with Caltrans and local agencies to implement countywide priority facilities within their jurisdiction. In particular, encourage Caltrans to provide safe bicycle and pedestrian crossings of state highways in San Mateo County and local agencies to include bicycle and pedestrian projects in their capital improvement programs.
Chapter 2 | Existing Conditions

- **Policy 1.4:** Promote cooperation among local agencies and with San Francisco and Santa Clara counties to pursue funding for multi-jurisdictional projects and implement bicycle and pedestrian facilities across jurisdictional lines.
- **Policy 2.3:** Encourage local school districts to implement projects and activities that promote bicycling and walking to school among students and staff.
- **Policy 2.7:** Encourage local agencies to provide safe and convenient bicycle and pedestrian infrastructure for underserved communities.
- **Policy 3.1:** When allocating funds, place an emphasis on projects that address safety deficiencies, especially conflicts with motor vehicles, for bicyclists, pedestrians and people with disabilities.
- **Policy 4.2:** For local transportation projects funded by county or regional agencies, encourage that local implementing agencies incorporate complete streets principles as appropriate; that they provide at least equally safe and convenient alternatives if they result in the degradation of bicycle or pedestrian access; and that they provide temporary accommodations for pedestrians and bicyclists during construction.
- **Policy 5.3:** Involve the public and local agencies meaningfully in making decisions about the planning, design and funding of bicycle and pedestrian projects, and maintain an open and accessible process for providing input and influencing decisions.

**Plan Bay Area / Sustainable Communities Strategy (SB375)**

The Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) - the latter of which is the federally designated Metropolitan Planning Organization (MPO) for the San Francisco Bay Area region – have developed a Sustainable Communities Strategy to guide the update to the Regional Transportation Plan (RTP), now called Plan Bay Area (PBA). PBA is a 25-year plan that defines the vision, strategy, and technical framework (e.g. demographic and travel forecasts) for planning and funding transportation improvements across all modes in the nine-county Bay Area. An outgrowth of the California Sustainable Communities and Climate Protection Act of 2008 (SB375), Plan Bay Area requires a significant focus of investment that serve “Priority Development Areas,” or PDAs to support new walkable and bikeable neighborhoods in close proximity to public transit, schools, jobs, parks, and other amenities.

The Ravenswood Business District/Four Corners sub-area is considered a PDA under Plan Bay Area, while the Woodland community is considered a secondary “Growth Opportunity Area” for urban residential development. Both sub-areas would be served by a non-motorized crossing of Highway 101, which will be a critical factor in helping secure the necessary outside grant funding to complete the project.
2.2 Public Outreach Summary

City staff and consultants presented existing conditions, opportunities, constraints, and draft overcrossing alignment alternatives at several public meetings during preparation of the Feasibility Study. These meetings were part of a larger public outreach strategy aimed at including and engaging the public at key milestones in the planning phase for this project. Outcomes from this public outreach process are detailed below.

**Project Website**

The East Palo Alto Highway 101 Pedestrian/Bicycle Overcrossing website was launched on May 16, 2012. The website provided an explanation of the overcrossing project, background documentation, documentation of the project process, news & updates on the status of the project, and a contact form for community members to provide their input. The website was also used to promote upcoming meetings and share meeting outcomes with members of the public.

The project website has received 1,529 visitors as of 2/4/13. Content from the website has been featured the websites Streetsblog San Francisco, Silicon Valley Bicycle Coalition, and Peninsula Transportation Alternatives. The project website has received 5 comments from members of the community.

**Community Meetings**

The City hosted and promoted a series of community meetings throughout preparation of the Feasibility Study, as identified below. All outreach events included a Spanish translator and/or materials translated in Spanish. In total, approximately 100-120 community members provided in-person feedback to members of the project team on the overcrossing project over the course of the outreach phase.

- **Public Workshop #1 on June 7, 2012 (East Palo Alto Senior Center, 560 Bell Street).** Approximately 30 residents and other interested stakeholders previewed boards showing the potential crossing locations, pros and cons associated with the crossing locations, and potential selection and design criteria. After a summary presentation, workshop attendees were asked to vote on their preferred crossing location and project criteria, and were invited to provide “hands on” design concepts using study area maps with assistance from project designers.
City of East Palo Alto 29th Anniversary Celebration on June 30, 2012 (Bell Street Park). The project team staffed a booth survey boards similar to the first public workshop to gather input on the potential crossing locations and potential selection and design criteria. An additional 37 votes were cast by citizens for a preferred location and potential alignment.

East Palo Alto Children’s Day on August 25, 2012 (Bell Street Park). The project team staffed an information booth that was placed next to a bicycle helmet giveaway sponsored by Lucille Packard Children's Hospital. While standing in line waiting for helmets, a wide range of residents were able to preview a preliminary “short list” of alignment alternatives at the preferred overcrossing location at Clarke Avenue/Newell Road. 49 individuals cast votes on particular landing areas and alignments, with the majority favoring an integrated approach that included public gathering space south of Highway 101.

Woodland Park Neighborhood Meeting on December 11, 2012 (80 Newell Road). The City hosted a bi-lingual “Neighborhood Information Session” to discuss the four alignment alternatives with residents of the Woodland neighborhood (south/west of Highway 101). Approximately 20 community members attended the event, including the Mayor, with half submitting formal comment cards at the end of the meeting.
• Public Workshop #2 on December 16, 2012 (St. Francis of Assisi Church, 1425 Bay Road). The City hosted a community workshop at which the project team and community members previewed photo simulations of, and weighed in on, the four design options for an overcrossing at Newell Road/Clarke Avenue. As part of the advance outreach effort, informational fliers were sent home to over 500 student families from Brentwood Elementary School, and were provided to key parent champions at McNair Academy Middle School. Despite these efforts, the event was lightly attended.

• Gateway 101 Shopping Center Stakeholders Meeting on January 10, 2013 (San Mateo County Credit Union, Gateway 101 Shopping Center). The City and consultant team presented an overview of the project at a regular meeting of Gateway 101 retailers and property managers. Stakeholder representatives indicated strong support for the project and tentative preferred alignments, as well as questions related to ongoing maintenance costs and responsibilities.

Public Works and Transportation Commission

The project team held a study session with the Public Works and Transportation Commission (PWTC) on October 19, 2012. At the study session, the PWTC reviewed initial analysis and community outreach results and pros and cons associated with the draft conceptual alignment and landing alternatives at the preferred location. Issues discussed included potential acquisition of and impacts to private property, preferred uses of public property, integration of complementary City priorities and projects (including water utility services and open space), and overall decisions regarding aesthetics, function, and cost. At this meeting, the PWTC provided the following feedback/recommendations to City staff:

• Do not require users to cross either East or West Bayshore roads.
• Incorporate traffic calming elements, particularly on East Bayshore Road
• Safety and visibility are key elements
Consider additional stairs or ‘split ramps’ at the bridge landings to allow greater accessibility from alternative directions (comment from individual member)

- Consider mixing elements from each proposed alignment to develop a hybrid
- Landing on Clarke Avenue to be preferential to East Bayshore, if feasible
- Concerned about potential removal of parking in some alternatives, particularly on the west side
- Support for proposed 12’ trail width as basis of design for the project
- Minimize potential for motorized vehicles to access the bridge

A second meeting with the Public Works and Transportation Commission took place on February 20, 2013 to review draft evaluation results for a revised set of bridge alternatives, including updated cost estimates and a selection criteria scoring matrix. Consistent with staff’s recommendation, the Commission voted 4-1 in favor of Alignment 1 (see Section 5) as the preferred alignment to forward to City Council for approval and assess as part of the environmental review process. Several members of the public, however, including the property owners of the vacant parcel on Newell Road, did speak out against this alignment citing concerns over property impacts and crime. Based on the discussion from this meeting, a new alignment (Alignment 2A) was added to the analysis in Section 5 of this report to enhance an alignment option that would not require acquisition of private property.

**Planning Commission**

The project team held a study session with the Planning Commission on October 22, 2012. The study session covered the same topics as the October Public Works and Transportation Commission meeting, and allowed the project team to collect the Planning Commission’s input on the alignment alternatives. Commissioner comments and concerns generally mirrored those provided by the PWTC, although the following concerns were also raised for consideration during the project development phase:

- Potential loss/removal of street trees
- Need to acquire private property for sufficient right-of-way
- Exit speeds for bicyclists at the landings and possibility for vehicle conflicts
- Pedestrian and bicycle conflicts more generally on the bridge

A second review session was held on February 25, 2013 to update Commissioners on the revised alignment alternatives as well as the evaluation criteria and preliminary results. No action was requested by the Commission, whose further input on the project will be considered during the environmental review phase.

**City Council**

The project team presented the City Council with a progress report on September 4, 2012 that included a summary of public outreach efforts to date, the preferred location at Newell Road/Clarke Avenue, preliminary overcrossing alignment options, the project timeline, and next steps. The comments from Council members largely mirrored those of from the Planning Commission and PWTC, with strong support for a safe crossing that has minimal potential conflicts with traffic.
2.3 Preferred Bridge Location

Table 2-1: Summary of Location Preference Voting (Community Workshop) provides the sum total votes on placement gathered from the public outreach events. The Option B location received over twice the support as Option A, with Alignment B4 receiving the clear majority of votes.

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Votes</th>
<th>Location</th>
<th>Number of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Preference for Option A</td>
<td>16</td>
<td>General Preference for Option B</td>
<td>12</td>
</tr>
<tr>
<td>Alignment A1</td>
<td>0</td>
<td>Alignment B1</td>
<td>2</td>
</tr>
<tr>
<td>Alignment A2</td>
<td>0</td>
<td>Alignment B2</td>
<td>1</td>
</tr>
<tr>
<td>Alignment A3</td>
<td>0</td>
<td>Alignment B3</td>
<td>6</td>
</tr>
<tr>
<td>Alignment A4</td>
<td>2</td>
<td>Alignment B4</td>
<td>19</td>
</tr>
<tr>
<td>--</td>
<td>--</td>
<td>Alignment B5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total votes for Option A</strong></td>
<td><strong>18</strong></td>
<td><strong>Total Votes for Option B</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

**Manhattan Avenue / Donohoe Street / Euclid Avenue (Option A)**

Location Option A alignments connected Manhattan Avenue just north of University Circle at West Bayshore Road, with Donohoe Street between Euclid Avenue and University Avenue. Due to the presence and configuration of the northbound U.S. 101 on- and off-ramps, most proposed alignments use Caltrans right-of-way to land the bridge structure away from private property at the corner of University Avenue and Donohoe Street. Other alignments proposed crossing over Donohoe Street to land away from the intersection, but adjacent to the Ravenswood City School District administration offices and a potential office development site owned by the Sobrato Company.

Since the intersection of University Avenue and Donohoe Street is currently the access point to the University Avenue bridge crossing, most Option A alignments would not prove to be a useful alternative for many residents. Other potential alignments at Site Option A had similar issues of proximity to the existing bridge overpass, and could have resulted in significant impacts to the existing and potential land uses adjacent.
Clarke Avenue / Newell Road (Option B)

The Clarke Avenue/Newell Road location, known as Option B, is sufficiently distant from the existing University Avenue bridge to provide a useful non-motorized alternative. The site also includes two vacant lots, on either side of Highway 101, that lie within potential ramp landing areas for the proposed structure. The vacant lot to the south of Highway 101 is at the corner of Newell Road at W Bayshore Road, and is privately-owned property. The vacant lot to the north of Highway 101 is at the corner of Clarke Avenue and E Bayshore Road, and is a public parcel owned by the City’s former redevelopment agency. Due to the relative lack of undeveloped land in this area, both parcels have been identified as potentially suitable locations for other projects, including a city water well/water tank (both parcels) and a potential community gathering space/park (Newell Road only). The site also includes several alignment alternatives that would not require additional right-of-way or otherwise appear to impact private property.

Based on the public feedback, technical assessment of potential demand and alignment opportunities, and consideration of related City projects and priorities information, the preferred site option is the southern location in the vicinity of Clarke Avenue and Newell Road.

2.4 Project Development Framework

Bridge Alignment Selection Criteria

Through a second voting exercise, preliminary outreach event attendees were asked to share their opinions on the most important issues to be considered in the bridge design and placement. Event attendees were given three yellow stickers each and asked to vote on the placement issues most important to them. Participants could place more than one sticker in a column if they felt that issue was of particular concern. Table 2-2: Summary of Design Issues Voting provides the design priorities gathered from the public outreach events. Traffic safety was consistently the top-rated concern, followed by bicycle/regional connectivity and accessibility/comfort.
Table 2-2: Summary of Design Issues Voting

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
<th>Number of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Safety</td>
<td>Bridge ramps and approaches avoid/extend over freeway access points and busy local streets</td>
<td>55</td>
</tr>
<tr>
<td>Bicycle/Regional Connectivity</td>
<td>Bridge is located with consideration for travel between cities and to/from regional trails and bikeways</td>
<td>33</td>
</tr>
<tr>
<td>Accessibility and Comfort</td>
<td>Prefer wide bridge with easy grades and slow travel speeds for wheeled devices, kids/seniors</td>
<td>28</td>
</tr>
<tr>
<td>Utility/Demand</td>
<td>Project is located and designed to maximize the number of annual users</td>
<td>12</td>
</tr>
<tr>
<td>Promotes Redevelopment</td>
<td>Bridge is located to serve existing needs but also to help encourage new development and economic growth</td>
<td>10</td>
</tr>
<tr>
<td>Aesthetics/Design</td>
<td>The bridge is a signature (high quality) design that celebrates East Palo Alto</td>
<td>6.5</td>
</tr>
<tr>
<td>Cost/Schedule</td>
<td>Project is built quickly and efficiently to minimize cost and delay</td>
<td>5.5</td>
</tr>
<tr>
<td>Minimal Impacts</td>
<td>Project minimizes impacts to Highway 101, residential properties, existing commercial businesses</td>
<td>Highway 101 (1 vote); Residential properties (3 votes)</td>
</tr>
</tbody>
</table>

Overall Project Goals

Based on current and past planning efforts, and public input documented during the initial project outreach phase, a set of project goals has been developed. These goals are meant to complement and refine the Purpose and Need statement (see Chapter 1), and will be used to guide selection and design of the preferred bridge alignment. These goals are as follows:

- **Goal 1: Provide for a direct route over Hwy 101 at Clarke Avenue and Newell Road.** Provide a direct connection between the south and north sides of Highway 101 near Clarke Avenue and Newell Road, one that limits out-of-direction travel for the majority of users.

- **Goal 2: Maximize protection from vehicular traffic.** Ensure a safe crossing of Highway 101 by maximizing separation from traffic, especially along East and West Bayshore roads.

- **Goal 3. Design for a range of user groups and abilities.** The project should accommodate the widest possible range of users and ability levels by exceeding, whenever feasible, minimum design standards established by Caltrans and the Americans with Disabilities Act (ADA).

- **Goal 4: Improve neighborhood accessibility.** Include bicycle and pedestrian improvements beyond the bridge structure to ensure sufficient access to/from nearby destinations.

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4 Issues that received the majority of votes are in bold.
Goal 5: Increase access to recreational facilities and community gathering space. As part of an overall “healthy communities” initiative, ensure that the bridge improves connections to the Bay Trail, YMCA, and other recreational and open space amenities. If feasible, integrate community gathering or play spaces into the project’s site design.

Goal 6: Design the bridge as a community gateway or civic monument. The overcrossing should enhance the image of the community through high quality design and potential gateway features/elements.

Goal 7: Ensure compatibility with existing and proposed land uses. Seek to minimize negative impacts on private property, residential neighborhoods and area businesses. Design the overcrossing to be compatible with future potential uses as well, including priority water storage and well facilities.

Goal 8: Be cost-effective and sustainable. Design the bridge with a “double bottom line” philosophy, one that achieves cost-effectiveness over the long term with consideration of life-cycle costs, including on-going maintenance, and climate action values/policies.
3. **Project Setting**

This chapter provides a description of existing conditions in the Study Area and the surrounding planning context. Information is based on field visits, existing planning documents, U.S. Census and other available data, aerial photographs, maps, and conversations with City and agency staff.

### 3.1 Population and Demographics

East Palo Alto is a city of 28,155 residents, situated on 2.5 square miles of land in the southeastern corner of San Mateo County. With 12,000 residents/sq. mi, East Palo Alto is the second densest city in San Mateo County behind Daly City. Historically an African-American community, East Palo Alto has become a predominantly Latino community in recent decades, with a significant proportion of Pacific Islanders. Table 3-1 below highlights the racial/ethnic composition of East Palo Alto compared to that of San Mateo County.

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>White, Non-Hispanic</th>
<th>Latino</th>
<th>African American</th>
<th>Asian American</th>
<th>Pacific Islander</th>
<th>Multi-racial</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Palo Alto</td>
<td>28,155</td>
<td>7.3%</td>
<td>62.1%</td>
<td>17.3%</td>
<td>3.0%</td>
<td>9.0%</td>
<td>0.8%</td>
</tr>
<tr>
<td>San Mateo County</td>
<td>718,451</td>
<td>43.1%</td>
<td>24.9%</td>
<td>2.7%</td>
<td>24.3%</td>
<td>1.5%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

All data taken from 2011 American Community Survey 5-year Estimates

East Palo Alto is a historically underserved community, with a legacy of disinvestment before the city incorporated in 1983. That legacy persists today, with significantly lower household incomes and rates of high school graduation than the county at-large. More than half of households in East Palo Alto have children, which is true for only one-third of households countywide. This suggests that opportunities to provide facilities and activities for youth – from parks and trails, to schools and community centers – are especially important in East Palo Alto.

<table>
<thead>
<tr>
<th>Area</th>
<th>Population*</th>
<th>Median Household Income**</th>
<th>% High School Graduates**</th>
<th>% of Households with Children**</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Palo Alto</td>
<td>28,155</td>
<td>$50,137</td>
<td>65%</td>
<td>51%</td>
</tr>
<tr>
<td>San Mateo County</td>
<td>718,451</td>
<td>$87,633</td>
<td>88%</td>
<td>34%</td>
</tr>
</tbody>
</table>

*Data taken from 2010 Census  
**Data taken from 2011 American Community Survey 5-year Estimates
3.2 Zoning & Land Use

The majority of East Palo Alto was developed before the city’s incorporation in 1983, leading to a patchwork of ad hoc land use orientations and limited street connectivity in many areas. Much of the City is currently zoned for single family residential, with the neighborhoods between San Francisquito Creek and Highway 101 zoned as a predominantly multi-family area. On the north side of the highway, former Redevelopment Agency property provides a hub of commercial activities (Gateway 101 Shopping Center, IKEA) and future potential office uses (i.e., University Park). Much further to the north, the collection of current and former industrial areas known as the “Ravenswood Business Park” is expected to incur significant growth as a priority development, mixed-use area.

Figure 3-1 shows zoning designations for properties in the study area. Existing land uses are discussed in further detail below.

![Figure 3-1: Study Area Zoning Designations](image-url)
Residential Neighborhoods
The Woodland neighborhood of East Palo Alto is bounded on the north by Highway 101 and by the San Francisquito Creek on the south. It primarily contains mid-rise multi-family apartment and condominium housing, including the large Woodland Park Apartments complex. A small collection of businesses scattered along West Bayshore Road include a convenience store, restaurant, laundromat, and auto repair services. Northwest of University Avenue, the area transitions to the Willows neighborhood, which includes significant multi-family housing that transitions to single-family toward the city borders and into Menlo Park.

The University Square neighborhood is located immediately north of Highway 101, east of University Avenue. This planned-unit development is a successful single-family residential infill project in East Palo Alto, with a large park and close proximity to three schools. To the east of University Square is the Weeks neighborhood, which backs up to the San Francisco Bay and contains additional multi-family apartments and a large trailer park.

Business / Commercial Centers
Several distinct major business/commercial centers exist within the study area. The Gateway 101 (also called the Ravenswood 101) development is on the northern side of Highway 101, immediately adjacent to University Avenue. Constructed around the year 2000, this shopping center is home to Home Depot, IKEA, Nordstrom’s Rack, Mi Pueblo Grocery (the city’s only full-service grocery store), and many smaller community serving businesses.

The University Plaza project, planned for construction soon just north of Gateway 101, will supply a large amount of new office space and potential ground floor retail uses on Donohoe Street across from Gateway 101. On the opposite side of Highway 101, the University Circle development is a largely self-contained office/hotel complex with a food court. Outside of the these major business centers, University Avenue functions as the main small-business corridor for East Palo Alto, with limited additional commercial activity along East and West Bayshore roads.

Schools and Community Centers
Three public schools are located just north of the University Square residential development. Brentwood Elementary School, Ronald McNair Middle School, and the Ravenswood Child Development Center are all located on the same block bounded by O’Connor Street, Clarke Avenue, and Pulgas Avenue. This block also includes the Boys & Girls Club of East Palo Alto, while immediately north on Myrtle Street are two additional private schools.

Alongside University Avenue, located on Bell Street, is a community-serving YMCA complex as well as the East Palo Alto Senior Center.

Parks
The University Square Park is located in the eastern portion the study area, north of Highway 101. The park is relatively new, and includes turf and play equipment. Bell Street Park is located in the western portion of the study area, just west of University Avenue, and is adjacent to the YMCA and East Palo Alto Senior Center.
The Palo Alto Baylands Preserve, east of the study area, is approximately 1,940 acres in size and is comprised of a series of manmade and natural features. The Palo Alto Baylands Preserve is accessible from East Palo Alto via a bridge over San Francisquito Creek off of O’Connor Street, known as the Friendship Bridge.

### 3.3 Key Roadways

East Palo Alto’s transportation system is largely served by the crossing of two main arterials, University Avenue and Bay Road (see Figure 3-2), and defined by its edges with Highway 101 in the south, CA SR 84 (providing east/west access across the bay to Fremont via the Dumbarton Bridge) in the north, and the San Francisco Bay. University Avenue links Highway 101 to CA SR 84 through the center of East Palo Alto and acts as the primary north/south arterial roadway. Las Pulgas Avenue also provides north/south arterial circulation, with additional local circulation provided by Clarke Avenue. Bay Road and Newbridge Street provide the primary east/west corridors within East Palo Alto, with East Bayshore Road/Donohoe Street and West Bayshore Road also providing important highway access. These connections are further documented and described below.
Figure 3-2: East Palo Alto Roadway and Bikeway Network
Figure 3-3: Site Context Map, Clarke Avenue/Newell Road
Highway 101

Highway 101 within the study area is an eight-lane freeway, consisting of three mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction, spanning approximately 170 feet. Highway 101 experiences significant peak-hour traffic volumes during the AM and PM commute. Table 3-3 presents the existing peak hour volumes on Highway 101 between San Francisquito Creek and Marsh Road.

<table>
<thead>
<tr>
<th>Segment</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northbound</td>
<td>Southbound</td>
</tr>
<tr>
<td>Marsh Road to San Francisquito</td>
<td>8,254</td>
<td>8,505</td>
</tr>
<tr>
<td>Creek</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: California Department of Transportation. July 2009. Highway 101 Auxiliary Lanes from State Route 85 to Embarcadero Road; Santa Clara County, California: District 4 – SCL – 101 (PM 52.17 – 48.97 4A3300 Initial Study with Mitigated Negative Declaration.

University Avenue

University Avenue is a four-lane north/south arterial street between Highway 101 and the Bayfront Expressway. University Avenue is the primary crossing over Highway 101 in the study area and sees high volumes of peak hour traffic. University Avenue is the primary road providing access to homes, offices, and community services within East Palo Alto. Traffic counts indicate that University Road, just to the north of Highway 101, experiences an average daily volume (ADT) of 29,210 vehicles. The posted speed limit is 35 miles per hour (mph) and there is no street parking allowed. University Avenue has bike lanes from the Bayfront Expressway in the north to Donohoe Street in the south. Bike lanes resume in Palo Alto on University Avenue south of Woodland Avenue. North of Bay Road, the majority of University Avenue is without sidewalks, while over Highway 101 the roadway includes pedestrian facilities on the west side only.

Willow Road

Willow Road is four-lane north/south arterial street along the western border of East Palo Alto. Willow Road travels between the Bayfront Expressway and Highway 101, continuing into Menlo Park. Traffic counts indicate that Willow Road, just to the north of Highway 101, experiences an ADT of 32,700 vehicles. The posted speed limit is 35 mph and there is no street parking allowed. South of Highway 101, the speed limit on Willow Road is 25 mph. There are bike lanes on Willow Road from the Bayfront Expressway to Highway 101. Bike lanes begin again immediately south of the Highway 101 overcrossing.

East Bayshore Road

East Bayshore Road is a two-lane collector street that parallels the northern side of Highway 101 between Palo Alto and Menlo Park. Within the study area, this frontage road is signal-controlled at Pulgas Avenue and Clarke Avenue, and expands to four lanes north of Clarke Avenue to provide access to the Gateway 101 Shopping Center. Interrupted by the Highway 101 on- and off-ramps at University Avenue, East Bayshore

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5 C/CAG, California: 2011 – Willow Road and University Avenue – Traffic Study and Recommended Near Term Improvements (ADT)
Road transitions to become Donohoe Street after turning north at IKEA and including a signalized intersection with O’Conner Street. Traffic counts indicate that East Bayshore Road, west of University Avenue, experiences an ADT of 8,400 vehicles. East Bayshore Road has a posted speed limit of 25 mph and has limited street parking on the northern side of the street south of Clarke Avenue only.

**West Bayshore Road**
West Bayshore Road is a two-lane collector street that parallels the southern side of Highway 101. In the study area West Bayshore Road is interrupted at its approaches to University Avenue, and is linked to Woodland Avenue across University Avenue via Manhattan Avenue to the west (at University Circle) and via Capital Avenue/Scofield Avenue to the east (in the Woodland neighborhood). West Bayshore Road has a 25 mph speed limit and has street parking on the southern side of the street. Currently there are no signal- or stop-controlled intersections on West Bayshore Road within the study area.

**Donohoe Street**
Donohoe Street is an east/west roadway bisected by Highway 101 in the vicinity of University Avenue. To the north of Highway 101, Donohoe Street acts as the main connecting street between University Avenue, the Gateway 101 shopping center, and East Bayshore Road, and includes both a northbound off-ramp and on-ramp for Highway 101. East of University Avenue, Donohoe Street expands to five lanes of travel with a landscaped median alternating with dedicated turn pockets, and terminates at Clarke Avenue.

Intersection counts on Donohoe Street at Capitol Avenue (Highway 101 off ramp) indicated more than 800 vehicles per hour during peak times in three of the four directions at the intersection. An intersection count at Donohoe Street at University Avenue indicated more than 1,000 vehicles per hour during peak times in three of the four directions at the intersection. The prima facie speed limit on Donohoe Street is 25 mph.

**Clarke Avenue**
Clarke Avenue is a north/south roadway through eastern East Palo Alto that extends between Bay Road and East Bayshore Road north of Highway 101, and between West Bayshore Road and Woodland Avenue south of the highway. The latter segment is only a block long, fronted by mixed density residential uses, and is used almost exclusively for localized access and on-street parking.

North of Highway 101, Clarke Avenue is also fronted primarily by residential uses, although it is a key access route for the Ravenswood City School District campus at O’Conner Street and includes the backside of the Gateway 101 Shopping Center. The street has a prima facie speed limit of 25 mph and street parking is allowed north of Tinsley Street, where the roadway transitions from a three-lane section with a left turn lane to two travel lanes. Traffic counts indicate that Clarke Avenue experiences an ADT of between 2,100 and 2,600 vehicles. Clarke Avenue is signal-controlled at East Bayshore Road and stop-controlled at O’Conner Street.

**Pulgas Avenue**
Pulgas Avenue is a two-lane north/south collector roadway through eastern East Palo Alto, one block east of Clarke Avenue. Pulgas Avenue also terminates at East Bayshore Road. Sections of Pulgas Avenue either lack sidewalks or include narrow, rolled-curb sidewalk that is often encroached upon by parked vehicles and adjacent landscaping. Street parking is generally allowed the length of the street. The prima facie speed limit is 25 mph. Traffic Counts indicate that Pulgas Avenue experiences an ADT of 5,800 vehicles.
3.4 Bicycle and Pedestrian Facilities

The Study Area includes both north-south and east-west oriented bicycle and pedestrian facilities, as well as planned facilities. Figure 3-2 shows the existing and proposed bikeways within the cities of East Palo Alto, Palo Alto, and Menlo Park. A discussion of the primary corridors and facilities is provided below.

**North-South Facilities**

The primary north-south bicycle facility within the study area is University Avenue. The University Avenue bike lanes are missing from Donohoe Street to Woodland Avenue, the length of the Highway 101 overcrossing, resuming south of Woodland Avenue. The East Palo Alto Bicycle Transportation Plan also designates Pulgas Avenue as a north-south bicycle corridor with Class II bike lanes, although subsequent analysis by the Ravenswood Safe Routes to School program recommends Class III shared facilities on Pulgas Avenue and consideration of Class II bike lanes on Clarke Avenue from East Bayshore Road to Donohoe Street.

Just south of the study area, only two roads provide access over San Francisquito Creek: University Avenue and Newell Road. Both streets have bike lanes once they cross over the Palo Alto city limit, connecting to Palo Alto’s extensive bicycle network.

**Newell Road San Francisquito Creek Crossing**

The current bridge is wide enough to accommodate only two lanes of vehicle traffic, with no dedicated facilities for bicyclists or pedestrians. The City of Palo Alto's Newell Bridge Replacement Project is currently underway to replace the existing substandard bridge over San Francisquito Creek (see ‘San Francisquito Creek’ section for more information).

**University Avenue Overcrossing**

The University Avenue Overcrossing accommodates pedestrians with a five-foot attached sidewalk on the western side. The sidewalk connects to the north at Donohoe Street and to the south at Woodland Avenue. No bicycle facilities exist on the overcrossing, though a narrow two-foot painted shoulder does exist.

The City of East Palo Alto is working with Caltrans to widen the Highway 101 overcrossing as part of ramp access improvement project. The project will create a new dedicated off-ramp for southbound drivers from Highway 101 and will expand the western side of the overcrossing by 13 feet to provide a wider sidewalk for pedestrians and a southbound bike lane. The second phase of the project, currently unfunded, calls for the widening of the eastern side of the overcrossing to accommodate a northbound bike lane. The project, meant primarily to improve the Highway 101 off-ramp, does not fully address multimodal challenges and opportunities, including access to the bridge from nearby intersections and the positive ‘network effects’ of having multiple highway overcrossings.

**Willow Road Overcrossing**

The Willow Road overcrossing accommodates pedestrians with 5-foot attached sidewalks on both sides of the overcrossing. Bike lanes on Willow Road end immediately before the northern end of the overcrossing, and do not begin again until the intersection of Willow Road and Durham Street to the south. The City of East Palo Alto is currently working with Caltrans and City of Menlo Park on significant non-motorized improvements to this overcrossing, including reconfiguration of ramps to reduce exposure to vehicles and inclusion of dedicated pedestrian and bicycle facilities on both sides of the street.
**East-West Facilities**

There are no dedicated east-west facilities for bicyclists within the study area. Portions of Bay Road further north in East Palo Alto have bike lanes, acting as the only continuous east/west corridor for bicyclists south of the trail along the side of the Bayfront Expressway. A single westbound bike lane on O’Conner Street between Clark Avenue and Pulgas Avenue also provides limited priority to bicyclists travelling adjacent to the Ravenswood tri-school campus.

The East Palo Alto Bicycle Transportation Plan designates Runnymede Street, O’Connor Street, and Holland/Garden/Bell Street as east/west shared bike routes. The latter route would provide the most connectivity, with access to Bell Street Park, the YMCA and East Palo Alto Senior Center from Clarke Avenue, and could be a potential long-term candidate as a bicycle priority shared street, or ‘bicycle boulevard,’ similar to Bryant Street in the City of Palo Alto.

Within the Woodland neighborhood south of Highway 101, east-west pedestrian circulation options to/from University Avenue are limited to Woodland Avenue and West Bayshore Road via Scofield Avenue. Both Woodland Avenue and Scofield Avenue have extremely limited pedestrian facilities (i.e. there are no sidewalks).

**Adjacent Regional Bicycle Pedestrian Networks**

Regional bicycle and pedestrian facilities within the Study Area include the San Francisco Bay Trail, the Dumbarton Bridge Bike Path, and the Oregon Expressway bicycle/pedestrian crossing, and the Ringwood Avenue pedestrian overcrossing.

**San Francisco Bay Trail**

The San Francisco Bay Trail is a planned recreational corridor that, when complete, will encircle San Francisco and San Pablo Bays with a continuous 500-mile network of bicycling and hiking trails. The Bay Trail is extensive but not yet complete in the study area, with a gap currently between the Ravenswood Open Space Preserve and the sidepath along the Bayfront Expressway. The alignment traverses the Baylands Nature Preserve south of the study area and provides direct access to the San Francisco Bay. A segment of the Bay Trail runs along San Francisquito Creek and provides access to East Bayshore Road at the southern limit of the study area.

**Dumbarton Bridge Bike Path**

The Dumbarton Bridge Bike Path seamlessly connects with the San Francisco Bay Trail where it parallels the Bayfront Expressway (SR 84). The bike path travels across the bay to Fremont, connecting with the Bay Trail on the eastern side of the bay as well as to the bike network in Fremont.

**Oregon Expressway Bicycle and Pedestrian Overcrossing**

A dedicated bicycle and pedestrian overcrossing of Highway 101 is located 1.4 miles south of the study area, between Embarcadero Road and Oregon Expressway. This overcrossing connects to dedicated facilities along Oregon Avenue, Saint Francis Drive, and East Bayshore Road. The overcrossing, built many decades ago, does not meet today’s standards for bicycle and pedestrian crossing facilities. The overcrossing is narrower than current minimum standards, forcing the placement of signs for bicyclists to walk their bikes, and includes “Z gates” at each end of the overcrossing to ensure slow speeds at ramps that are steeper than currently allowed.
Local bicyclists have expressed frustration with using this crossing. Significant roadway barriers, including sidewalk gaps and high vehicle speeds/volumes, exist between this overcrossing and East Palo Alto to the northwest.

**Ringwood Avenue Bicycle and Pedestrian Overcrossing**

The Ringwood Avenue pedestrian overcrossing is located in Menlo Park, 0.69 miles northwest of the Willow Road overcrossing. As part of the Highway 101 Auxiliary Lane Project\(^6\), Caltrans recently rebuilt the overcrossing as a standard U-shaped bridge with ramps that touch down on the freeway-side of each street. With low anticipated bicycle volumes, the overcrossing is only 10 feet and does not meet Class I shared-use trail standards.

### 3.5 San Francisquito Creek

The San Francisquito Creek acts as the primary barrier between the Woodland neighborhood and the City of Palo Alto. The creek is also the dividing line between San Mateo County and Santa Clara County. There are two bridge crossings over the creek in East Palo Alto, one at Newell Road and one at University Avenue. Additional crossings in Menlo Park are located at Chaucer Street (bicycle/pedestrian only bridge) and Middlefield Road. Woodland Avenue meanders alongside the creek throughout the entirety of East Palo Alto.

With respect to bicycle and pedestrian circulation, San Francisquito Creek and the adjacent Woodland Avenue include both positive and negative attributes. On the one hand, the creek serves to isolate the Woodland neighborhood with limited connectivity to adjacent areas in Palo Alto and East Palo Alto. Woodland Avenue itself does not include sidewalks or dedicated bicycle facilities for much of its length, and the bridge at Newell Road also lacks sidewalks or bike lanes. On the other hand, the creek corridor is a visual resource that provides tree canopy and shade as a respite from the primarily urban development within East Palo Alto. Due to poor arterial connectivity and meandering nature, Woodland Avenue also sees relatively low vehicle volumes and could provide a low-stress shared bikeway with minimal improvements.

The City of Palo Alto, in coordination with the City of East Palo Alto and San Francisquito Creek Joint Powers Authority (SFCJPA), is currently planning a replacement of the Newell Road Bridge. The bridge replacement project will improve unrestricted water flow in the creek during 100-year floods, thereby greatly reducing flood hazards in the surrounding neighborhood. The final design of the replacement bridge has yet to be approved, but may include a wider bridge with sidewalks on both sides of the street, pedestrian-scaled

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\(^6\) [http://www.dot.ca.gov/dist4/101auxunivmarsh/]
lighting, bicycle facilities, and ADA access improvements at the Woodland Avenue/Newell Road intersection. A proposal to realign the bridge with Newell Road in East Palo Alto is being assessed as part of the project Environmental Impact Report (EIR), as are project alternatives that maintain the existing alignment, partially realign the bridge, restrict vehicle access across the bridge (i.e., pedestrian and bicycle only), and one that would remove the bridge crossing altogether.

### 3.6 Utilities

Significant utilities exist within the study area, particularly overhead electrical transmission lines. Transmission lines run along extended lengths of both East Bayshore Road and West Bayshore Road and along the north side of Clarke Avenue. California Public Utilities Commission (CPUC) General Order 95 requires a 12-foot vertical clearance between a walkable surface and the transmission lines for 750V to 22.5kV supply conductors and supply cables. A 6-foot horizontal clearance from the bridge structure is also required. Any bicycle and pedestrian overcrossing would need to comply with the applicable CPUC clearances.

Underground utilities within the study area include water and sanitary sewer lines along W. Bayshore Road, E. Bayshore Road, Newell Road and Clarke Avenue. E. Bayshore Road also includes a storm drain and two high pressure gas mains. Clarke Avenue also includes a storm drain and gas main. Water and sanitary sewer lines exist under Highway 101 on the southeast side of the study area. A high pressure gas main exists under Highway 101 on the northwest side of the study area, north of Newell Road.

The City of East Palo Alto is in the process of securing a site for city water storage. Some of the possible sites for storage are within the study area. More detailed discussion of potential utility impacts and potential integration of water resource priorities is provided in Chapter 5.
4. Demand & Safety Analysis

This chapter provides an overview of the user needs for a pedestrian and bicycle grade-separated crossing of Highway 101 in East Palo Alto. It includes a discussion of user groups, projected use volumes, collision data, and other demand/safety factors that are considered in the siting and design of the proposed overcrossing facility.

4.1 User Group Profiles

A grade-separated bicycle/pedestrian crossing of Highway 101 could serve a variety of users for commute, utilitarian, and recreational trips. The overcrossing would be accessible for bicycles, pedestrians, skaters, strollers, wheelchair users, and persons using power-assisted mobility devices, serving a cross-section of residents from infants to the elderly.

Pedestrian Needs

At some stage in any journey, a person is a pedestrian. All pedestrians have several needs in common, including safety, connectivity, and accessibility to destinations. Pedestrian infrastructure must consider those with special needs, including children, seniors, and people with mobility impairments. The Americans with Disabilities Act (ADA) mandates that reasonable accommodation for access be provided for those who may need such assistance.

The most critical needs of pedestrians that relate to overcrossings include:

Direct, continuous connections. Pedestrians often must walk long distances to cross a barrier. Pedestrians using the new overcrossing need a reasonably direct alignment with unimpeded access to connecting walkways, transit stops and adjacent attractors. The Gateway 101 Shopping Center (including Mi Pueblo Food Center, the city’s only major grocery store) and other local businesses, Ravenswood School District tri-school campus, and the University Square park are locations for recreational, shopping, and commuting trips. Pedestrians should have easy access to these destinations from the overcrossing.

Well-designed bridge walkway and ramps. Narrow or steep walkways detract from the walking environment and can deter pedestrians from using multi-use facilities, especially the mobility-impaired. Design guidelines and specifications for walkways include, but are not limited to, clear path, longitudinal and cross slopes, obstacles and gaps, curb ramp configurations, and detectable wayfinding. Providing for pedestrian safety in a shared use context also requires clear delineation of areas where both pedestrians and bicyclists should exercise caution and/or reduce speeds. The overcrossing design should separate directions of travel and include signage identifying desired user behavior (e.g., slower traffic keep right).

Safe roadway crossings. Crossing facilities, including crosswalks and signage, in the immediate vicinity of the overcrossing should alert both motorists and pedestrians to the presence of the facility.
Bicycle Commuter and Utility Trip Needs

Commuters and utility trip users consist of employed adults and students of all ages. Typically these trips account for about one-third of all weekday trips. This represents a substantial opportunity because of the link to various land uses and neighboring cities. Common commute characteristics include:

- Commuter trips usually range from several blocks to ten miles.
- Commuters typically seek the most direct and fastest route available.
- Commute periods typically coincide with peak traffic volumes and congestion, increasing the exposure to potential conflicts with motor vehicles.
- Major commuter concerns include weather (rain and heavy fog), riding in darkness, personal safety.
- Commuters generally prefer routes with as few stops as possible, thereby minimizing delay.

Highway 101 pedestrian and bicycle crossings within and near the Study Area include the Ringwood pedestrian bridge; the Willow Road, University Avenue, and Embarcadero Road overcrossings and the bicycle/pedestrian overcrossing north of the Oregon Expressway. The Ringwood pedestrian bridge and Willow Road overcrossing are located approximately 1.7 and 1.0 miles north of University Avenue, respectively. The Embarcadero Road overcrossing and bicycle/pedestrian overcrossing north of the Oregon Expressway are located approximately 1.3 and 1.4 miles south of University Avenue, respectively.

Improved east-west bikeway connections in East Palo Alto may encourage commuters to bicycle to work or school. Possible commute connections include routes to and from Facebook, located north of the overcrossing location.

Recreational Bicyclist Needs

Recreational use generally falls into one of three categories: exercise, travel to non-work destinations (such as shopping or parks), and sightseeing. Recreational bicyclists can be a varied user group in and of themselves, since the term encompasses a broad range of skill and fitness levels, from a racer who rides 100-miles each weekend, to a family with young children who are bicycling while on vacation.

Regardless of the skill level of recreational users, directness of route is typically less important than being in scenic surroundings, having amenities like restrooms and water fountains, and being on routes with few traffic conflicts. Visual interest, shade, protection from wind, moderate gradients, and artistic or informational features also have a much higher value to recreational users. Unlike most commuters, recreational bicyclists and joggers can provide a commercial resource to local businesses as they stop for food and drinks and other shopping needs.

The Highway 101 overcrossing would serve bicyclists with different levels of recreational needs. First is the need to provide a dedicated continuous and direct facility that connects east to west for recreational sport bicyclists. The needs for these users are much like commuters. They prefer crossings that are direct and either on-street with traffic or connect with on-street facilities. The other need is providing a facility for slower moving bicyclists and pedestrians, such as families with children or tourists. The Highway 101 overcrossing would meet this need being that it will be separated from traffic and connect with walkways and existing and proposed bikeways.
Student Travel Needs

One of the largest contributors to morning rush-hour congestion is driving trips to and from schools. Reducing the number of students driven to school can significantly reduce congestion in the neighborhoods of East Palo Alto. Increased walking and biking can play a role in improving student health (see Public Health section). Providing separated bicycle and pedestrian facilities for students is especially critical, as young students have not fully developed the cognitive abilities to judge the speed of oncoming traffic. An overcrossing designed for student use should make all efforts to reduce the number of at-grade crossings required to reach the overcrossing.

The Ravenswood City School District commissioned a Safe Routes to School improvement plan for all elementary and middle schools in East Palo Alto that was published in the fall of 2012. The report found that 22% of elementary and middle school students walk to school, and 58% are driven to school by their family. When parents were asked about what barriers held them back from allowing their students to walk or bike to school, 3 of the top 4 reasons given had to do with perceived danger from driving conditions on the roads.

Schools near the Study Area include the Ravenswood ‘tri-school campus,’ consisting of Brentwood Academy, Ronald McNair Academy, and Ravenswood Child Development Center, as well as the Boys & Girls Club of the Peninsula. The Ravenswood tri-school campus is accessed from the study area via Clarke Avenue, approximately one-quarter mile north of Highway 101, or alternatively via Tate Street and O’Conner Street through the University Square neighborhood. These schools had a walking rate of 20%, below the district average. Providing a direct, safe route from south of Highway 101 to these schools could significantly improve the rate of students walking and biking to school.

San Mateo County Safe Routes to Schools projects recommend improved pedestrian and bicycle facilities between the Ravenswood Tri-School Campus and E. Bayshore Road along Clarke Avenue and Pulgas Avenue. Potential improvements include redesign of the school frontage/parking lot to improve loading and non-motorized access, Class II bicycle lanes on Clarke Avenue, a Class III bicycle route sidewalk gap closure on Pulgas Avenue, and school signage.

4.2 Bicycling and Walking Statistics

Travel Mode Share

The 2007-2011 American Community Survey found that 3.8% of work trips are made by bicycle in East Palo Alto and that 3.5% of work trips are made walking (Table 4-1). Nationally, only 0.5% and 2.8% commute by biking or walking; statewide for California they are 1.0% and 2.8% respectively; and for San Mateo County they are 1.2% and 1.7% respectively. In adjacent Palo Alto, the rates of biking and walking to work are at 5.3% and 8.4%.

In comparison to the rest of the state, East Palo Alto has a very high percentage of residents walking and biking to work. The fact that the city has more bike commuters than walkers likely reflects the density of jobs located outside of the City (e.g., in Palo Alto and Menlo Park) that are too far to walk but within easy biking distance. Building out a complete network of bicycle and pedestrian facilities, like in Palo Alto, could also help tap latent demand for walking and biking that is not currently being realized due to barrier effects.
### Table 4-1: Travel Mode Share to Work

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>San Mateo County</th>
<th>Palo Alto</th>
<th>East Palo Alto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike</td>
<td>0.5%</td>
<td>1.2%</td>
<td>5.3%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Walk</td>
<td>2.8%</td>
<td>2.7%</td>
<td>8.4%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

Citywide commute mode share statistics do not include school travel information, which is a significant issue for East Palo Alto and the overcrossing project. To provide a fuller picture of area travel patterns, travel mode share data can be collected from the recent Ravenswood City School District parent and student travel surveys (conducted in 2012).

According to the surveys, 27% of students walk to Ronald McNair Middle School, which indicates strong demand for non-motorized facilities within the study area (Figure 4-1). The data also shows a significant number of students taking the bus, which may be an indicator of barriers to walking and biking and/or a reflection of the school’s wide enrollment boundary. More detailed mode share information by distance from school shows that while over 50% of students walk to school who live within one-quarter mile, nearly 50% of students within one-half mile take the school bus. No significant bicycle mode share was reflected in the survey results.

At Brentwood Elementary School, analysis of parent survey results indicates a lower demand for walking from nearby school families. While this can be partially attributed to the lower age groups, the data also strongly...

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**Figure 4-1: Average Mode Share to/from School, Ronald McNair Elementary**

**Figure 4-2: Travel Mode Share by Distance from School (Brentwood Elementary).** Recent parent survey data from Brentwood Academy reveals that over half of all students being driven to school live within ½ mile of campus.
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signals a major barrier effect due to the inadequacy of adjacent transportation infrastructure. For example, over half of all student families within one-half mile of school drive, while an additional 15-20% takes the school bus (Figure 4-2). These figures, combined with the residential densities that exist within the Woodland neighborhood, suggest that a new overcrossing could provide a major shift in student-family mode share, if properly located and designed.

**Bicycle and Pedestrian Counts**

**Within the Study Area**

The City does not collect bicycle or pedestrian counts with manual intersection counts; however, the City has collected bicycle and pedestrian volume data for projects (e.g., the Willow Road/University Avenue Corridor Study19). Table 4-2 summarizes available pedestrian counts at intersections within the Study Area, organized by direction during the a.m. and p.m. peak hours. The following three intersections on University Avenue have high pedestrian activity:

- University Avenue / Bay Road
- University Avenue / Woodland Road
- University Avenue / Donohoe Street

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Westside (AM Peak Hour / PM Peak Hour)</th>
<th>Eastside (AM Peak Hour / PM Peak Hour)</th>
<th>Southside (AM Peak Hour / PM Peak Hour)</th>
<th>Northside (AM Peak Hour / PM Peak Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Avenue / Donohoe Street</td>
<td>1 / 1</td>
<td>34 / 33</td>
<td>1 / 0</td>
<td>20 / 24</td>
</tr>
<tr>
<td>University Avenue / Bell Street</td>
<td>6 / 1</td>
<td>7 / 10</td>
<td>9 / 9</td>
<td>14 / 36</td>
</tr>
<tr>
<td>Capitol Avenue / Donohoe Street</td>
<td>0 / 1</td>
<td>0 / 0</td>
<td>1 / 4</td>
<td>25 / 22</td>
</tr>
<tr>
<td>University Avenue / US 101 SB Ramps</td>
<td>1 / 0</td>
<td>0 / 0</td>
<td>0 / 0</td>
<td>0 / 0</td>
</tr>
<tr>
<td>University Avenue / Woodland Avenue</td>
<td>9 / 0</td>
<td>34 / 28</td>
<td>45 / 37</td>
<td>4 / 1</td>
</tr>
</tbody>
</table>

Source: Willow Road and University Avenue - Traffic Operations Study and Recommended Near-Term Improvements, Final Report (July 22, 2011)

Adjacent to Study Area

As part of the Ringwood Pedestrian/Bicycle Overcrossing reconstruction project, City of Menlo Park staff conducted a brief study of the number of pedestrians using the overcrossing during morning and afternoon peak school commute periods. The study found that 48 pedestrians and bicyclists used the overcrossing before school and 49 pedestrians and bicyclists used the overcrossing after school. Staff’s workload and Caltrans’ expressed urgency for a response on the location of the overcrossing, limited staff’s ability to conduct a more detailed analysis of the overcrossing. 20

The City of Palo Alto conducted bicycle and pedestrian counts during the p.m. peak hour at the overcrossing north of Oregon Expressway, the Adobe Creek undercrossing, and the San Antonio Road overcrossing in August 2010. As Table 4-3 shows, the overcrossing north of Oregon Expressway and the Adobe Creek undercrossing experienced notably more activity than the San Antonio Road overcrossing. Significantly more bicyclists were observed using these facilities than pedestrians.

<table>
<thead>
<tr>
<th>Facility</th>
<th>P.M. Peak Hour Bicyclists</th>
<th>P.M. Peak Hour Pedestrians</th>
<th>Bicycle Estimated Annual Usage</th>
<th>Pedestrian Estimated Annual Usage</th>
<th>Total Estimated Annual Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcrossing North of Oregon Expressway</td>
<td>49</td>
<td>12</td>
<td>78,932</td>
<td>19,330</td>
<td>98,263</td>
</tr>
<tr>
<td>Adobe Creek Undercrossing</td>
<td>43</td>
<td>3</td>
<td>40,175</td>
<td>2,803</td>
<td>42,978</td>
</tr>
<tr>
<td>San Antonio Road Overcrossing</td>
<td>16</td>
<td>0</td>
<td>25,774</td>
<td>0</td>
<td>25,774</td>
</tr>
</tbody>
</table>

*Counts were conducted on Wednesday, August 18, 2010 from 4:00 – 6:00 P.M.
*The Seamless Traffic Model was used to estimate annual usage based on peak hour count data. The model assumes weekday and weekend usage constitute 64 percent and 36 percent of the weekly usage, respectively. The model estimates year-round use; however, the total estimated annual users for the Adobe Creek undercrossing has been adjusted to reflect that the undercrossing is closed October 15th to April 15th.

Source: City of Palo Alto Highway 101 Over/Undercrossing Feasibility Study (November 2011)

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4.3 Projected User Volumes

One of the priorities of the pedestrian/bicycle overcrossing of Highway 101 in East Palo Alto is to maximize the number and variety of user groups who will benefit from it, including recreational and commuting user groups. The overall anticipated volume of trips, together with the expected mix of user types, will be used to help size and design the bridge.

The Seamless Bicycle and Pedestrian Demand Travel Model (Seamless Travel Model), developed by Alta Planning + Design, was used to develop the annual transportation and recreation activity estimates for the Highway 101 Pedestrian/Bicycle Overcrossing Feasibility Study. The key data sources used in the Seamless Travel Model include:

- Population and employment density derived from the 2010 U.S. Census;
- Major retail land uses obtained from the City of East Palo Alto (pedestrian model); and
- Multi-use paths obtained from the cities of East Palo Alto and Palo Alto.

The Seamless Travel Model is a two part GIS-based model (analysis of pedestrians and bicyclists) that uses demographic, land use, and multi-use path facility data to forecast potential non-motorized activity in any geographic area. This data was gathered and analyzed to estimate pedestrian and bicycle peak hour activity throughout the City (see Figure 4-3 and Figure 4-4).

The Seamless Travel Model projects an annual demand of 130,000 to 230,000 annual users (trips) over a Highway 101 overcrossing near Clarke Avenue. In order to best approximate likely conditions for bicycle facilities, proposed Class I trails are assumed as “existing” along San Francisquito Creek and the Bay Trail. This estimate does not factor in potential future growth in housing and employment, however, and may not fully take into account the specific demand that an overcrossing would have for school-related travel.
Figure 4-4: Pedestrian Travel Demand Heat Map, City of East Palo Alto. The combined pedestrian and bicycle volumes on the Highway 101 overcrossing at Newell Road/Clarke Avenue is projected to be between 130,000-230,000 annual users.
4.4 Additional Demand Considerations

Ravenswood Business Park

The Ravenswood Business Park project, also known as the “4 Corners TOD Specific Plan”, calls for the redevelopment of 350 acres in the northeast corner of the city, roughly bound by Weeks Street on the south, University Avenue in the west, and the railroad right-of-way leading to the Dumbarton Bridge on the north. The project calls for an expansion of commercial uses and residential density, and is projected to create additional vehicle trips throughout East Palo Alto.

In proximity to the study area for the East Palo Alto Highway 101 pedestrian/bicycle overcrossing, the Ravenswood Business Park project anticipates significant impacts at the intersections of University Avenue at Donohoe Street, University Avenue at the Highway 101 off-ramps, University Avenue at Woodland Avenue, and Pulgas Avenue at East Bayshore Road. The project anticipates Pulgas Avenue, in addition to University Avenue, to function as a north/south conduit of through traffic. Non-motorized demand, particularly bicycle commuting, would also be expected to increase within the study area as a result of the redevelopment. Clarke Avenue, with a direct connection across Bay Road into the business park, would likely provide a natural demand corridor in addition to potential demand along the Bay Trail.

Local Development (e.g. University Plaza)

The 2100 block of University Avenue is targeted for new office development totaling over 200,000 square feet of new office space in Phase 1, with an option to build over 250,000 square feet of office space in Phase 2. This development is expected to produce additional traffic impacts on University Avenue, Donohoe Street, and East Bayshore Road, and could become a generator of bicycle commute demand and local bicycle and pedestrian trips.

Facebook Campus Expansion

Facebook recently moved into their new headquarters in Menlo Park along the Bayfront Expressway. The EIR for this campus plan anticipates significant congestion impacts on the Bayfront Expressway, along with Willow Road and Marsh Road. The EIR did not anticipate significant impacts to congestion in proximity to the study area for the East Palo Alto Highway 101 pedestrian/bicycle overcrossing. The Facebook DEIR projects an ADT of over 32,000 vehicles on University Avenue between Bay Road and Highway 101.

As part of their agreement with the City of Menlo Park, Facebook has agreed to complete some of the existing gaps in the San Francisco Bay Trail through East Palo Alto and Menlo Park. This segment will run from the intersection of Bayshore Expressway at University Avenue in the north to the railroad right-of-way in the south that marks the city limits between Menlo Park and East Palo Alto.
4.5 Safety Factors

Collision Data

Figure 4-6 shows pedestrian and bicycle-related collisions that occurred between 2006 and 2010 within the Study Area. Three pedestrian/vehicular collisions and one bicycle/vehicular collision occurred within a quarter-mile of the preferred overcrossing location, including one pedestrian/vehicular collision at the Newell Road/W. Bayshore Road intersection and two collisions along E. Bayshore Road. None of the collisions were fatal. The pedestrian/vehicular collisions along the Bayshore roads occurred on weekends and involved pedestrians within the roadway. Additional non-fatal pedestrian/vehicular collisions occurred at the University Avenue/Woodland Avenue, University Avenue/Donohoe Street, and Donohoe Avenue/Capitol Avenue intersections and along Highway 101 near the University Avenue overcrossing.

A citywide assessment of non-motorized collisions (2004-2009) was also included in the 2010 East Palo Alto Pedestrian Safety Assessment, which was produced with assistance from the University of California-Berkeley Tech Transfer Program. This analysis included reference to data from the California Office of Traffic Safety (OTS) that ranked East Palo Alto the third-worst city in California (out of 97) in terms of average number of pedestrian collisions compared to daily vehicle miles traveled.

Personal Safety and Security

In East Palo Alto, where the violent crime rate is nearly double the statewide average, personal security concerns – much like traffic safety – can be a major factor in one’s decision whether to take a trip by foot, on bike, or in a personal vehicle. Comments have also been raised during the project’s outreach process that a new overcrossing could exacerbate existing public safety issues by attracting criminal activity into the Woodland neighborhood.

In a recent analysis by East Palo Alto Police Department (EPAPD), areas of the City were categorized according to the number of gunshots that were geo-located using ShotSpotter, a gunshot location and detection system deployed throughout the City. Between 2009 and 2011, over 5,200 gunshots were recorded, with the highest concentration of incidents in the southeastern corner of the city and north of Bay Road in the Ravenswood Business District zone. In a coordinated effort with the San Mateo County Public Health system, Office of

Figure 4-5. Shotspotter analysis 2009-2011 with identified Fitness Improvement Training (FIT) zones

Source: Geography & Public Safety, Volume 3 Issue 2, August 2012

21 Safe Transportation Research and Education Center (SafeTREC), 2011
Figure 4-6: Bicycle and Pedestrian Collisions within the Study Area
Figure 4-7: Map of recent crime activity within the study area (Jan – March 2013).  
Source: www.mylocalcrime.com
Community Oriented Policing Services and others, the EPAPD is working to target these areas for increased enforcement and to encourage community participation in outdoor activities that could help locals “regain control and ownership of their neighborhoods.” The overcrossing project is consistent with this initiative, in that it could encourage outdoor activity among residents and add “eyes on the street” to help combat and prevent criminal incidents.

Detected gunshots is but one of several public safety indicators to be considered in the design, placement, and management of the Highway 101 overcrossing. Figure 4-7 depicts recent (2013) criminal activity as reported by EPAPD and geo-coded by the online service www.mylocalcrime.com. This map, as with others referenced online for this feasibility report, does not suggest a trend or ‘hot spot’ in violent or other criminal activity that is relevant to the overcrossing project.

**Planning and Public Health**

The built environment plays a significant role in public health. In highly automobile-dependent society, much time is spent sitting in cars. People now acknowledge that cars contribute greatly to greenhouse gas emissions and have negative impacts on the environment. In recent years, public health professionals and urban planners have started to acknowledge automobiles’ negative impacts not only on environmental health, but human health as well. Asthma and other respiratory diseases can be attributed to poor air quality. A lack of physical activity can result in chronic diseases such as obesity, diabetes and heart disease.

**Air Quality**

Asthma, prevalent throughout the US, is especially common in minority and low-income communities. East Palo Alto, compared to neighboring cities and San Mateo County, suffers disproportionately from asthma. According to a survey in 2005 prepared by the Youth United for Community Action (YUCA) Health Survey Team, 14.2% of people surveyed in East Palo Alto suffer from asthma, while 6.7% suffer from asthma countywide. Of those living in East Palo Alto suffering from asthma, 65% have been living there for 15+ years, while 10% have been living there between one and five years. This illustrates a positive correlation between length of time living in the city and prevalence of asthma.

Among many factors that affect the air quality in East Palo Alto, topography and proximity to high volumes of automobile traffic may play roles. The proximity to Highway 101 and University Avenue makes many residents more vulnerable to poor air quality.

**Physical Inactivity**

The impacts of the built environment on public health extend beyond asthma and other conditions caused by air pollution. There is an increasing understanding of the connection between the lack of physical activity resulting from automobile-oriented community designs and health-related problems such as obesity, diabetes and heart disease. Physical inactivity is now understood to play a role in the most common chronic diseases. A US Surgeon General’s report in 1996, *Physical Activity and Health*, concluded that physical inactivity contributes to increased risk of many chronic diseases and health conditions, and recommended that people get at least 30 minutes of moderate-intensity physical activity per day. Studies have shown that residents of

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high-walkable neighborhoods get one hour more of physical activity each week and are 2.4 times more likely to meet physical activity needs than those in less walkable areas.

Obesity puts people at risk for other diseases, such as diabetes, hypertension, cardiovascular disease, and some cancers. Children are an important group to focus on while considering the effects of the built environment on lack of physical activity and diseases such as obesity. Type 2 diabetes is a major concern due to its increasing rate in recent years. Children are more likely to walk or bike to school if routes are safe and connected.

Children’s weight and physical activity are measured through the California Physical Fitness Test. Figure 4-8 illustrates the 2011-2012 test results in the Body Composition category in the Ravenswood City School District given to 402 5th graders and 373 7th graders.

![Figure 4-8: 2011 Physical Fitness Test for Ravenswood City School District](image)

The results for both grades were approximately the same: most of the students are in the “Needs Improvement- High Risk” category. The results of this fitness test illustrate the need for increased physical activity in East Palo Alto, particularly for children who are at high risk for health issues early in life.
5. Alternatives Analysis

This chapter provides a description, pros/cons analysis, cost estimate, initial environmental impacts summary, and rendering for five alignment alternatives considered at the preferred overcrossing location of Newell Road and Clarke Avenue/East Bayshore Road (Site Option B). Alignments are evaluated (scored) in Section 5.4 based on criteria established and weighted during the initial outreach phase, which is described in Chapter 2. Recommendations for preferred bridge landing areas and limited additional engineering to select a preferred alignment are provided in Section 5.5.

Figure 5-1. Conceptual Alignment Alternatives ‘Short List’ (Fall 2012). A fifth alternative, 2A, was developed in response to public input and is also included in the analysis.

5.1 Summary of Alignment Alternatives

After an initial screening of alignment concepts during the preferred location selection phase, four alignments at Newell Road and Clarke Avenue between West and East Bayshore roads were identified for additional analysis and public outreach. Based on further analysis, a fifth composite alternative was developed to address
concerns and ideas raised by community stakeholders. These alignments are identified by both number and color, as shown in Figure 5-1, and are summarized in detail below.

Alignment 1 (Green Alignment)

Description
Alignment 1 begins adjacent to Newell Road to the south of W Bayshore Road, traverses over Highway 101, and lands adjacent to the western sidewalk of Clarke Avenue at the Home Depot driveway. This alignment minimizes interaction and potential conflicts with vehicles by spanning both frontage roads, and utilizes two off-street parcels (one vacant and private, one City-owned) for ramp touchdown locations. Use of these parcels would also provide natural staging areas and help reduce construction-related traffic impacts.

In an effort to maximize running length and site flexibility for design integration opportunities, such as for potential water supply facilities and ‘pocket park’ open space, the ramp alignments generally wrap around the perimeter of each parcel. To reduce the sharpness of turns and unify the bridge form, a slight curvature is proposed across the main bridge span. As envisioned, both ramps would provide a maximum 7% slope, which requires periodic level landings to comply with ADA, but also result in less structure and cost compared to other options.

Pros
- Avoids at-grade crossings of both W Bayshore Road and E Bayshore Road
- Provides for excellent bicycle connectivity between the Newell Road Bridge/City of Palo Alto and the route toward the Bay Trail/Dumbarton Bridge, with users able to avoid the frontage roads and land away from vehicular intersections.
- Good connectivity to nearby schools via continuous sidewalk on west side of Clarke Avenue, while still providing direct access options to Gateway 101 Shopping Center
- Compatible with various land use/utility scenarios for both Pad “D” and vacant parcel, including potential park space and water tank
- Less residential adjacency/expected need for screening compared to Alignments 3, 4
- Supports development of new amenities at existing shuttle/bus stops
- Does not impact shopping center retail signage
- Generally lower traffic and parking impacts than other alternatives

**Cons**

- Potential for highest cost alignment due to needed civil/site improvements and right-of-way acquisition
- Requires ROW acquisition and coordination with PG&E to relocate overhead utilities, adding complexity and delay to project schedule
- While providing direct access to the bridge, ramps and main span are more circuitous and longer than other options
- Requires screening from residential condominiums off of West Bayshore Road
- May require removal of up to 8 mature street trees along East Bayshore Road, depending on final alignment and construction method details
- Requires the removal of 8 to 10 on-street parking spaces along the southern curb line of West Bayshore Road, and up to 10 parking spaces within the surface lot of Home Depot

**Connections & Site Improvements**

Recommended off-site improvements with this alignment include the establishment of bikeways on Newell Road and Clarke Avenue, and pedestrian crossing improvements to at least four locations, to ensure safety and neighborhood connectivity.

For access to the northern ramp alignment, the existing Home Depot driveway should be upgraded with oversized curb ramps and a new crosswalk. A mid-block crossing with median refuge island on Clarke Avenue should also be considered to provide direct access to the adjacent University Park community, and to assist with on-street to off-street transitions for bicyclists. North of the proposed mid-block crossing on Clarke Avenue, Class II bike lanes should be considered up to O’Conner Street, with additional wayfinding signage and striping on O’Conner Street to the Bay Trail and...
north on Clarke Avenue to various destinations. At Clarke Avenue and East Bayshore Road, curb ramp and crosswalk upgrades are also recommended.

To the south at Newell Road, pedestrian access should be improved at East Bayshore Road by adding curb extensions and new curb ramps to the corners, and upgrading to a high visibility crosswalk. Additional consideration of improvements to the Scofield Avenue and Cooley Avenue intersection may also be warranted to improve pedestrian connectivity and safety to/from University Avenue. Along Newell Road, a Class III shared bicycle route should be implemented with “sharrow” pavement markings, parking delineation, and wayfinding signage. Depending on the final ramp alignment details, a new midblock crossing and/or traffic calming measures should be considered on Newell Road south of the vacant lot, which could provide on-street to off-street transitions for bicycles and a safer, more direct pedestrian connection from nearby housing.

In terms of site design, there is significant potential for refinement at both bridge ramp landing areas within the existing vacant parcels. Opportunities on the north side include coordination with a water well facility and the adjacent Home Depot parking lot, while on the south side opportunities include potential water storage facilities and/or community gathering space. As part of the northern ramp landing area, upgrades to the existing SamTrans bus stop – and relocation of the existing City shuttle stop – should also be considered. These site improvement opportunities are further illustrated in Section 5.5.

Alignment 2 (Blue Alignment)

Description
The southern end of Alignment 2 begins on the north side of W Bayshore Road, between the intersection with Newell Road and the highway. The overcrossing would run parallel to the existing landscaped sound wall, ramping up to the east before crossing over the highway. After crossing East Bayshore Road, the alignment
turns westward and ramps down along the northern side of E Bayshore Road (behind the sidewalk) utilizing a portion of the Home Depot surface parking lot.

**Pros**

- Does not impact private property on the south side of Highway 101
- Furthest alignment from residential housing; least potential for privacy impacts, need for screening
- Most direct access to the Gateway 101 Shopping Center businesses
- Compatible with various land use/utility scenarios for both Pad “D” and vacant parcel, including future potential open space, water facilities, and private development
- Introduces traffic calming measures along West Bayshore Road

**Cons**

- Requires at-grade crossing of West Bayshore Road, which is identified as a major community concern
- Length of approach ramps, which are the longest among the five alignments and result in the highest potential structural costs
- Requires the removal of approximately 18 parking spaces along West Bayshore Road to accommodate the bridge ramp landing within the right-of-way. An additional 33 parking spaces would also be impacted within the Home Depot surface parking lot, although it is unclear whether these impacts would result in partial loss of parking or simply changes to the existing parking aisle width and layout
- Direct impacts to overhead utility lines along West Bayshore Road, which likely adds cost and delay to project schedule
- More construction-related traffic impacts on West Bayshore Road than other alternatives
- Northern terminus of the overcrossing on East Bayshore Road does not create a direct connection for students traveling to school on Clarke Avenue, or recreational users accessing the Bay Trail
- Requires acquisition of or easement through linear strip of Home Depot property in order to maintain existing traffic capacity on East Bayshore Road and minimize impacts to existing sidewalk and mature street trees
- Does not directly complement/cost share with potential water tank and/or community gathering space priorities
- Close proximity at maximum height to large existing Gateway 101 shopping center sign

**Connections & Improvements**

With this alignment, the intersection of Newell Road and West Bayshore would receive curb extensions and a new high-visibility crosswalk on Newell Road, while a new marked crosswalk would be provided across West Bayshore Road to access the overcrossing structure. This crossing would need to be clearly marked with both signage and pavement markings, and would include either a pedestrian-activated flashing beacon or
potential stop control (assuming traffic warrants are met). West Bayshore Road, a street drawing much safety concern from the community, would also be narrowed to account for the width and columns of the overcrossing ramp (see Figure 5-5).

On the northern side of Highway 101, the crosswalk at the intersection of Clarke Avenue at E Bayshore Road could be enhanced to increase visibility and accessibility for those wishing to access the bridge from the Weeks and University Square neighborhoods. Crossing improvements to the Gateway 101 driveway entrance at East Bayshore Road would also be considered near the ramp approach.

For bicycle connectivity, this alternative would be complemented by a shared bikeway with “sharrows” along Newell Road, which is consistent across all alternatives. On Clarke Avenue, Class II bike lanes would also be considered north of the Home Depot driveway to O’Conner Street. Depending on additional design, connections to the bridge ramp approach from Clarke Avenue may rely on informal access through the Home Depot parking lot or would require formal striping of a Class II or Class III bikeway on remaining segments of Clarke Avenue and East Bayshore Road. The latter would include investigation of extending the two-lane segment of East Bayshore Road north of Clarke Avenue, or modifications to the existing landscaped median, in order to make room for bike lanes.

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8 See Alignment 2A for consideration of a fully-signalized intersection at this location.
Alignment 2A (Red Alignment)

![Alignment 2A Diagram]

Figure 5-6: Alignment 2A is a hybrid of Alternatives 2 and 4, and generally improves the accessibility of the northern ramp while maintaining a southern ramp that does not require property acquisition.

Description

As with Alignment 2, the southern ramp of Alignment 2A begins on the northern side of W Bayshore Road and hugs the existing sound wall before crossing over the highway. On the north side opposite East Bayshore Road, however, this alignment performs a reverse “S” curve to land on Clarke Avenue just before the Home Depot driveway. A hybrid of Alignments 2 and 4, this alternative also assumes that the Newell Road/West Bayshore intersection is fully signalized to help limit the potential for conflicts between vehicles and bridge users.

Pros

- Does not impact private property (vacant parcel) on the south side of Highway 101
- Reduced privacy impacts, need for screening compared to other alignments
- Balanced access to both Gateway 101 and the tri-school campus on Clarke Avenue
- Compatible with water well facility on Pad “D” and future potential development of the existing vacant parcel for public or private functions
• Introduces new signal concept to help calm traffic and improve safety of crossing West Bayshore Road at Newell Road

Cons
• Requires at-grade crossing of West Bayshore Road, albeit with a fully signalized intersection
• Includes a number of relatively sharp turns, which can reduce sight distances and user comfort on the bridge
• Requires the removal of approximately 18 parking spaces along West Bayshore Road to accommodate bridge ramp landing within the right-of-way. More construction related-impacts than other alternatives
• Direct impacts to overhead utility lines along West Bayshore Road, which likely adds cost and delay to project schedule
• Does not directly complement/cost share with potential water tank and/or community gathering space priorities
• Close proximity at maximum height to large existing Gateway 101 shopping center sign (potential visual impacts)

Connections & Improvements
This alignment would include similar upgrades to Newell Road and West Bayshore Road as with Alignment 2, and similar improvements to Clarke Avenue and “Pad D” as with Alignments 1 and 4.
Alignment 3 (Yellow Alignment)

Description
Alignment 3 begins on the southern side of West Bayshore Road east of Newell Road, and ramps up to the east before crossing over Highway 101. The overcrossing then touches down on the eastern side of Clarke Avenue, just to the south of Tinsley Avenue. In order to provide space for the columns, on-street parking along West Bayshore Road would be impacted, as would the existing center turn lane on Clarke Avenue. This alignment also requires that raising of existing 4.2kv power lines over Highway 101, significant residential screening, and further feasibility coordination with the East Palo Alto Fire Department.

Pros
- Alignment 3 provides a fairly direct trip across Highway 101 between Clarke Avenue and Newell Road, and may not require acquisition or easement of private property
- The alignment also does not require pedestrians and bicyclists to cross either West or East Bayshore roads, and provides direct access to schools to the north on Clarke Avenue

Cons
- Conflicts with high voltage utility line that spans Highway 101 at Clarke Avenue (requires heightened coordination with PG&E and raising of lines)
- Requires significant landscaping and special bridge treatments to screen the adjacent housing developments from traffic on the overcrossing
- May not be compatible with existing fire lane access driveway to the Mission Palo Alto development complex on West Bayshore Road

Figure 5-8: Rendering of Alignment 3 in Google Earth, looking north toward Home Depot.
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- Requires significant modifications to the existing Clarke Avenue sidewalk and roadway network, including likely removal of up to nine mature street trees and removal of sidewalk gaps toward O’Conner Street
- Requires the potential removal of approximately 16-18 parking spaces along West Bayshore Road to accommodate bridge ramp landing within the right-of-way
- While not anticipated to require private property, the adjacency of the southern ramp alignment may impact development potential of the vacant lot
- Does not directly complement/cost share with potential water tank and/or community gathering space priorities

Connections & Improvements
Significant roadway modifications and sidewalk/landscaping improvements for Alignment 3 are necessary simply for the project to be viable. This includes raising the utility line on the south side of the overcrossing, providing screening from adjacent housing at both ramps, narrowing Clarke Avenue from three lanes to two, and filling in the sidewalk gaps on the east side of Clarke Avenue between the bridge and O’Conner Street. For pedestrian accessibility, this alignment should provide a mid-block crosswalk on Clarke Avenue where the ramp touches down (similar to other alignments), and a crosswalk and curb bulb treatment on Newell Road at West Bayshore Road. This alignment is the least compatible with Class II bike lanes on Clarke Avenue compared than other alternatives

Figure 5-9: Photo simulation of Alignment 3 ramp landing, looking north on Clarke Avenue from East Bayshore Road. This concept would impact the existing width of Clarke Avenue and require substantial screening from adjacent residential properties.
Alignment 4 (Orange Alignment)

Description
Alignment 4 includes very similar ramp landing areas to Alignment 1, and has a northern ramp configuration identical to Alignment 2A. It starts at the southern end of the vacant parcel on Newell Road, but rather than curve westward on West Bayshore Road (as with Alignment 1), the ramp continues straight along the eastern edge of the parcel line and crosses directly over Highway 101. The straight southern ramp alignment is only feasible with a slope that approaches the upper limit of accessibility for ADA and Caltrans (8.33%), but may also provide greater site design flexibility and overall parcel visibility than Alignment 1. Substantial screening from residential uses to the south, and additional analysis of the ramp approach area, are required for this alignment.

Pros
- Alignment 4 contains all the same benefits of Alignment 1, but has the added benefits of being a shorter, more direct trip for pedestrians and bicyclists to cross the highway, and a lower cost bridge structure (as a result of the shorter length)
- Does not require the loss of parking on West Bayshore Road (although 1-2 spaces may be lost for optimal column placement)
- Maintains the most design and programming flexibility for future uses of the vacant parcel on Newell Road
- Compatible with a signature bridge design

Figure 5-10: Rendering of Alignment 4 in Google Earth, looking north toward Home Depot.
Cons

- West ramp is approaching the maximum grade for ADA compliance
- Requires acquisition of private property (vacant parcel)
- Because it hugs the eastern edge of the vacant lot on Newell Road, this alignment would need special bridge treatments and landscape screening to protect the privacy of the adjacent housing development
- Impacts overhead utility lines, which adds cost and delay to project schedule (although less impacts than Alignments 2 and 2A)
- Tight turns on north ramp may limit sight distances for bridge users
- Not compatible with redevelopment of vacant parcels for housing, commercial amenities
- Close proximity at maximum height to large existing Gateway 101 shopping center sign (potential visual impacts)

Connections & Improvements
This alignment would require similar connection and site improvements to Alignment 1, although may require heightened consideration of the mid-block crossing concept on Newell Road due to the increased distance of the ramp landing area from West Bayshore Road.

5.2 Planning-Level Cost Estimates

Table 5-1 identifies planning-level construction and project development costs for each alignment. Right-of-way cost range includes potential acquisition of vacant parcel on Newell Road and potential acquisition or easement for portions of Home Depot parking lot.\(^9\) Cost estimates do not assume potential savings from shared site design/right-of-way costs with co-development opportunities.

\(^9\) Right-of-way cost range is based on $20 per square foot and $40 per square foot assumptions, and may not reflect actual appraised value.
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<th>Alternative 2A</th>
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5.3 Preliminary Assessment of Potential Environmental Impacts

This discussion of potential environmental impacts is based primarily on field examination and limited review of available literature/data. After the preferred alternative has been selected, the City will conduct a California Environmental Quality Act (CEQA) analysis, as well as environmental review under the National Environmental Policy Act (NEPA). The latter process provides eligibility for federal funding, which is an anticipated need for this project. It is assumed that these environmental analyses will consist of a Negative Declaration under CEQA and a Categorical Exemption for NEPA. A list of anticipated approvals or regulatory permits potentially required to complete the environmental review process is provided in Chapter 6.

Aesthetics and Visual Resources

The project is not located in the vicinity of a scenic vista or highway (DOT 2005). Although building a highway overcrossing would represent a visual change from vantage points on Highway 101 and from adjacent local roadways and nearby residences, these changes would not result in significant impacts to existing visual resources. Consistent with the City’s General Plan goals, the bridge would likely contribute to improving and enhancing the unique identity and image of East Palo Alto by providing a gateway structure. It is important to note that potential issues pertaining to residential views and privacy are not considered under Visual Resource, but rather under Land Use and Planning.

Agricultural Resources

The project site is surrounded by urban neighborhoods and a regional shopping center. There will be no impacts to agricultural resources or farmland.

Air Quality

Project-related air quality impacts fall into two categories: impacts due to construction, and impacts due to project operation. First, during project construction, the project could cause a minor increase in regional pollutants of reactive organic gases (ROG) and oxides of nitrogen (NOx) which contribute to greenhouse gases, as well as local particulate concentrations primarily due to fugitive dust sources. Over the long-term, the project would likely result in a decrease in emissions as the bridge encourages a shift away from driving to non-motorized, non-polluting modes of travel for local trips. This bridge project as proposed for environmental review would not include onsite stationary or area sources (such as natural gas boilers for water and space heating, and emissions from landscaping and use of consumer products). Separate environmental review(s) would be required for potential water well and storage tank facilities, and other potential uses not envisioned in the preferred bridge alternative.

Short term impacts from construction vehicles would be expected, but would be mitigated by Best Management Practices and it is expected impacts would not result in conflict with the Bay Area Air Management District air quality plans. Project activities should not result in a considerable net increase of any criteria pollutant (including greenhouse gases) for the City of East Palo Alto or San Mateo County.
Biological Resources

The immediate project area is entirely disturbed and consists primarily of paved surface parking lots and roadways, vacant unimproved parcels, street trees, and low level urban landscaping. No impacts to biological resources are anticipated, although further analysis will be included in the formal environmental review process.

Cultural and Historic Resources

Informal research does not suggest there are any cultural or historic resources that would be impacted by this project. A more formal review of resources and potential impacts will be provided as part of the NEPA process once a preferred alternative is selected. The recent Highway 101 Auxiliary Lane project

Geology and Soils

A preliminary foundation report for the project area has been prepared by Parikh Consultants, Inc. Based on review of the “Geologic Map and Map Database of the Palo Alto 30’x60’ Quadrangle, California” by E.E. Brabb et al, as well as available test log borings, the subsurface soil condition generally consists of “very loose to medium dense silty sand in the upper 14 feet, underlain by medium stiff to very stiff lean clay grading to sandy lean clay with occasional loose to medium dense sand and gravel” (consistent with alluvial flood plain deposits). The groundwater table was estimated to be approximately 10 feet below the grade at Highway 101 at the project site, although this level would be subject to change due to seasonal groundwater fluctuations, variations in yearly rainfall, water elevations in the bay, and other factors.

Located within close proximity (5-7 miles) from several fault lines, the project area is considered seismically active. Although hazards from ground rupture are not anticipated, there is potential for ground shaking and soil liquefaction that must be considered in the design of the bridge. Preliminary foundation recommendations include drilling to a depth beyond 50 feet to account for potential liquefaction, although further testing and analysis is required. There are no soil or geologic conditions thought to affect the feasibility of the bridge structure based on existing civil, geotechnical engineering, or construction best practices.

Hazards and Hazardous Materials

No significant risk to the public or environment is expected from this project. The project site is not included on a list of hazardous materials sites compiled pursuant to Government Code section 65962. Three Leaking Underground Storage Tank (LUST) clean-up sites (1979 Pulgas Avenue, 1800 West Bayshore Boulevard, and 940 O’Connor Street) are located within one-quarter mile of the site. Potential impacts from these sites, and additional studies of potentially hazardous materials, including concentration and extent of aerially deposited lead from historic highway vehicle activity, will be considered during the environmental review phase.

Land Use and Planning

The project would not physically divide an established community or conflict with the City of East Palo Alto General Plan (1999). As documented in Chapter 2, there are a number of other significant planning documents, including the Bicycle Transportation Plan, where the highway overcrossing is explicitly adopted as a high priority project.
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The potential design of the selected preferred alignment may include impacts to existing public and privately-owned parcels that are currently zoned for commercial use. Under the City of East Palo Alto Zoning Ordinance, permitted uses within the Commercial-1 (Neighborhood Commercial) and C-2 (General Commercial) zones include a wide variety of businesses, transportation services, bulk storage facilities, and outdoor advertising. Trail and open space uses are not explicitly called out in the ordinance, and thus may be cause to consider a rezone, but would not otherwise be incompatible or include impacts significantly different than other permissible uses.

General development limits within C-1 and C-2 zones include a floor-to-area (FAR) ratio of 1.5, height limit of 36 feet (near “R” districts only), and side and rear yard setbacks of three feet and six feet, respectively. Additional height exemptions for public uses and structures including “water towers and tanks” are provided in the ordinance in Chapter 22, Article 6, Sections 6402 through 6405.

Mineral Resources

Project activities will occur in an urban area where there are no known valuable mineral resources.

Noise

Project construction could cause a short term temporary increase in ambient noise levels. Final level environmental review would include mitigation to reduce these impacts.

Population and Housing

The project does not provide any services that would induce population growth and does not require the displacement of existing housing or people.

Emergency Access/Public Services

The project is not anticipated to result in significant impacts to the demand for any public services such as fire or police, or other public facilities including schools. To the extent that the project might include development of public open space, these changes would serve to reduce overall demand for existing public facilities, while any changes to (or coordination with) police enforcement strategies would not result in the need for increases service levels. Response to injuries on a potential overcrossing structure could require some degree of non-vehicle access, which should be consistent with existing emergency responder capabilities.

Alignment 3 includes potential impacts to the existing emergency fire access driveway for the Mission Palo Alto condominium development on West Bayshore Road. These impacts would need to be confirmed or mitigated through additional coordination with the Fire Department for this alternative to be feasible.

Recreation

The project is designed to improve access to existing recreational facilities, including the University Square neighborhood park and Ravenswood City School District-owned athletic fields. Additional on-street bikeway improvements, combined with the new overcrossing, would also improve access to regional recreational facilities such as the San Francisco Bay Trail and City of Palo Alto park system, as envisioned in the Baylands Access Master Plan (BAMP). Depending on the final preferred scope and alignment, the project may also result in a net increase in usable park space, further contributing to improved recreational opportunities.
Transportation, Traffic and Parking

The East Palo Alto overcrossing project is not anticipated to generate new automobile trips, and should result in decreased vehicle miles traveled as improved local conditions make it more feasible to walk and bike for short trips. While potential changes to intersection control, roadway channelization, and geometry are possible on Clarke Avenue, Newell Road, and East and West Bayshore roads, these changes are not expected to result in significant impacts to existing vehicle capacity or intersection levels of service.

While the project will not result in permanent significant impacts to transportation and circulation, the project could result in temporary construction impacts to the Highway 101 mainline if a center bridge column is required. As part of the Caltrans encroachment permitting approval process, a temporary traffic control and construction phasing plan will be developed to limit potential impacts to less-than-significant levels. This plan may require that work which impacts capacity of the state highway be limited to night hours (outside of peak travel times), and that truck haul routes be designated to avoid impacting residential streets.

All bridge alternatives may potentially include the development of Class II bike lanes on Clarke Avenue. Striping of these facilities would require restricting parking along the west side of Clarke Avenue (an estimated total of 23 spaces\(^\text{10}\)). On Newell Road, potential bikeway and traffic calming improvements could result in the permanent loss of 3-6 parking spaces, although more engineering and outreach are needed to confirm these potential impacts. Additional temporary construction impacts to local roads, and permanent parking impacts, will vary between alignment alternatives, and are generally described as follows:

- **Alignment 1:** This alternative could result in the permanent loss of 10-12 parking spaces along the south side of West Bayshore Road, and 8-10 parking spaces within the surface parking lot of Home Depot adjacent to East Bayshore Road. Additional temporary parking and traffic capacity impacts are expected, including along West Bayshore Road as the bridge support columns and ramps are being constructed. Temporary closure of Newell Road may also be required.

- **Alignment 2:** This alternative could result in the permanent loss of 18 on-street parking spaces along the southern curb line of West Bayshore Road, in order to provide room for the ramp landing within the existing right-of-way. An additional 33 parking spaces within the Home Depot parking lot would also be impacted on a temporary or permanent basis, although preliminary analysis suggests that all or most of these spaces could be re-established (i.e. maintained) by reducing the width of the adjacent parking lot drive aisle. Temporary traffic capacity impacts are expected along West Bayshore Road, which be reduced to a single vehicle travel lane to accommodate construction of the columns and ramp structure.

- **Alignment 2A:** This alternative would result in the permanent loss of 18 on-street parking spaces along the southern curb line of West Bayshore Road, and 8-10 spaces within the existing Home Depot parking lot. Temporary construction impacts would be similar to Alignment 2, although would not affect as many additional parking stalls in the Home Depot parking lot.

- **Alignment 3:** This alternative would result in the loss of approximately 16-18 on-street parking spaces along the southern curb line of West Bayshore Road, in order to provide room within the existing

\(^{10}\) Estimate based on available curb length of approximately 500 feet and an average stall width of 22 feet.
right-of-way for the ramp landing. On Clarke Avenue, the project would require permanent removal of the northbound left-turn lane into the Home Depot parking lot from East Bayshore Road. As the volume of vehicle turns is extremely light, this impact is not expected to reduce traffic capacity. Temporary traffic capacity impacts, however, would be expected along both Clarke Avenue and West Bayshore Road to accommodate column and ramp construction activities.

- **Alignment 4:** This alternative could result in the permanent loss of 8-10 parking spaces in the Home Depot parking lot, and 1-2 parking spaces along the southern curb of West Bayshore Road to provide room for a single ramp column. Construction-related traffic impacts would be minimized under this alternative, but may still result in partial closure or managed lane scenarios along West Bayshore Road.

### Utilities and Service Systems

From an environmental analysis standpoint, the project is not anticipated to result in significant utility or service system impacts because it would not create a substantial new source of wastewater, solid waste, or energy demand; and impacts to existing utilities will be minimized and/or mitigated through project design. There are several issues and factors with respect to the latter, however, that will be critical to consider in the selection and development of a preferred alternative. These are discussed in greater detail below.

- **Overhead Power Lines:** There is an existing overhead 4.16kV power line that runs along the west side of Clarke Avenue and across Highway 101. CPUC General Ordinance 95 requires a minimum vertical clearance of 12 feet from a walkable surface to the power line, and horizontal clearance of 6 feet from the edge of the bridge structure. While Alignment 3 (yellow alignment) may require raising the overhead power lines in order to meet these clearance standards, all other alignments have been designed to meet CPUC requirements and avoid high-voltage overhead utility impacts. All alignments will impact existing low-voltage overhead utilities that currently run adjacent to the sound wall above West Bayshore Road. Most alternatives will, at minimum, require the raising of one to two (1-2) utility poles to allow the bridge to pass by underneath. Alignment 2 would impact an additional two to four (2-4) poles, at minimum, as it is proposed to run parallel to West Bayshore Road in direct conflict with the existing lines. Relocation and/or undergrounding of these utilities will be considered in all scenarios, with additional modification of overhead utilities on Newell Road to be considered for Alignments 1 and 4. (These lines do not conflict with the proposed bridge alignments, but may be necessary for co-development and/or for aesthetic purposes). Due to insufficient Rule 20A credits, utility undergrounding may add significant cost burdens to the project. Depending on the final extent of utility impacts, design and construction coordination with PG&E will take between 2-5 years to complete, and is a critical ‘long lead item’ that will impact project schedule.

- **Water Lines:** There are significant existing water utility resources within the study area, including 4-inch, 6-inch, and 12-inch East Palo Alto Water District lines under Highway 101 near Clarke Avenue. These lines are critical for distribution of water to residents and customers in the Woodland neighborhood, which includes the University Circle complex north of University Avenue. The presence of these lines, which connect to a 10-inch pipe underneath West Bayshore Road near the
southern curb edge, is one of the primary factors that led to the identification of nearby vacant parcels as priority sites for new water well and storage facilities.

Alignment alternatives 2 and 2A cross over Highway 101 near the collection of water distribution lines south of Clarke Avenue. These alignments have been located to minimize conflicts, but nonetheless would require careful attention to the placement of columns within the Caltrans right-of-way to ensure compatibility. The placement of columns for Alignments 1 and 3, which run along the southern edge of West Bayshore Road, would also require attention to maximize compatibility with the existing 10-inch water line. Since this pipe is in poor condition, and there is an identified need to upgrade and possibly relocate in coordination with related water resource efforts, additional planning and engineering is needed to determine final impacts from these alignments.

5.4 Decision Matrix

The project team developed a scoring matrix to help assess the performance and impacts related to the various alignment alternatives under consideration. The criteria used are those developed and voted on during the preliminary public outreach phase, with the exception of the ‘demand/utility’ criteria that is assumed to be the same for all alignments at the preferred location. Three of the criteria (traffic safety, connectivity, and accessibility) have been given a double-weighted score to reflect the significant level of interest and concern for these issues identified by the public.

Table 5-1 documents the selection/ranking criteria, approach to scoring, weighting factors, and maximum possible score. Table 5-2 shows the results of the scoring for each alignment. Based on the decision matrix scoring, a preferred alignment is identified (Alignment 1) and discussed in further detail in Section 5.5.
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Definition</th>
<th>Scoring</th>
<th>Weighting</th>
<th>Maximum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Safety</td>
<td>Bridge ramps and approaches that avoid/extend over freeway access points and busy local streets receive a higher score</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Bicycle/Regional Connectivity</td>
<td>Bridge ramps and approaches that allow for the most direct travel to/from regional trails and local bikeways receive a higher score</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Accessibility and Comfort</td>
<td>Alignments that include good sight distances and easy grades (minimal slope) for minimal user conflicts receive a higher score (Note: all alignments are assumed to include a 12-foot wide pathway)</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Promotes Redevelopment</td>
<td>Bridge ramps and approaches that serve existing needs but also to help encourage new housing and commercial development receive a higher score</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Minimizes Cost/Schedule</td>
<td>The alignment that allows the project to be built quickly and efficiently to minimize cost and delay receives a higher score</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Aesthetics/Design</td>
<td>The bridge with higher potential for a signature (high quality) design that celebrates East Palo Alto receives a higher score. This criterion is based in large part on configuration of ramps in relation to highway, and opportunities for unique site design of approaches/landings.</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Minimal Impacts</td>
<td>The alignment that minimizes impacts to traffic, parking, residential properties, utilities, and commercial visibility receives a higher score</td>
<td>1-Lowest 2 - Moderate 3-Highest</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Possible Score**  
30
### Table 5-2: Alignment Evaluation Scores

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1 (Green Alignment)</th>
<th>Alternative 2 (Blue Alignment)</th>
<th>Alternative 2A (Red Alignment)</th>
<th>Alternative 3 (Yellow Alignment)</th>
<th>Alternative 4 (Orange Alignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Safety, 6 pts</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Bicycle/Regional</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Connectivity, 6 pts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility and</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Comfort, 6 pts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promotes</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Redevelopment, 3 pts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimizes</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Cost/Schedule, 3 pts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aesthetics/Design, 3 pts</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Minimal Impacts, 3 pts</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total Score</td>
<td>24</td>
<td>17</td>
<td>21</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>(possible 30 pts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.5 Preferred Bridge Landing Areas and Alignment(s)

Based on the criteria scoring exercise outlined in Section 5.4, Alignments 1 and 4 (green and orange alignments) are the highest performing alternatives, with Alignment 2A (red alignment) performing adequately despite the required at-grade crossing of West Bayshore Road. Alignments 2 and 3 are the lowest scoring alternatives and are proposed to be dropped from further consideration. In all cases, the top ranked alignments include a northern ramp landing area on “Pad D” adjacent to Clarke Avenue and the Home Depot parking lot.

Alignments 1 and 4 rank the highest primarily due to the full grade separation over the highway and both frontage roads, safe and direct connections to on-street bicycle facilities, lower parking and utility impacts (compared to other options), and iconic design opportunities for the bridge itself and ramp landing areas. These factors most directly address the goals and purpose of the project documented in Sections 1 and 2 of this report. Although not a part of the decision making scoring matrix, these alignments also maximize the City’s flexibility in locating other needed public facilities for water, public gathering, or other uses. Alignment 1 slightly outperforms Alignment 4 in the analysis due to potentially gentler grades and curves, and reduced concerns of residential privacy impacts. Alignment 4 remains an intriguing option, however, due to the potential lower structural costs and possible refinements during the preliminary engineering phase that could improve accessibility.

Both top performing alignments would require acquisition of the triangular, half-acre vacant parcel on Newell Road and West Bayshore Road. It is possible that this acquisition process could lead to increased project costs and complexity, although these issues could be partially offset by lower potential structural costs (Alignment 4 in particular), shared funding opportunities with co-development, and expected utility (PG&E) coordination issues that will impact the project delivery schedule regardless of alignment. Alignment 2A is the highest performing alignment that does not impact private property.

In order to begin the preliminary engineering and environmental review phases for this project, the consultant team and City staff have developed the following recommendations for City Council deliberation and resolution:

1. **Accept the preferred bridge landing areas as the “Pad D” parcel north of Highway 101 and the vacant private parcel south of the highway.** The feasibility study analysis indicates strong public support and benefits of utilizing off-street parcels to land the bridge structure. Alignments 1 and 4, while containing distinct layouts and profiles, each land in approximately the same area. The on-street ramp landing associated with Alignment 2A, while not impacting private property, still requires an at-grade crossing of West Bayshore Road that is not acceptable to the public. Further consideration of the Alignment 2A landing (in addition to 1 and 4) will add cost to the environmental review and preliminary design phases.

2. **Approve Alignments 1 and 4, and the scope of related proposed bicycle and pedestrian improvements, for environmental evaluation.** While feedback on preferable elements and variations of Alignments 1 and 4 is welcome, the project team proposes to undertake additional engineering and environmental study to refine and select a final preferred bridge alignment. Key issues for investigation include more detailed topographic survey, assessment of potential visual impacts to the Gateway 101 shopping
center sign, approach to overhead utility impacts, and site compatibility with other potential uses. Confirmation of on-street improvements to be included with the bridge overcrossing is also necessary to establish the project area limits for environmental review.

3. **Direct City staff and consultants to further develop site design and project phasing options that incorporate potential water resource and public gathering facilities.** While the proposal is not to integrate potential co-development opportunities into the environmental analysis of the bridge project, City Council direction and confirmation of specific co-development priorities will help maximize the productivity of the preliminary engineering phase and related public stakeholder outreach activities.
Figure 5-11: Priority bicycle and pedestrian improvement opportunities associated with the proposed Highway 101 Overcrossing Project.
All top-ranked alignments would land just south of the Home Depot driveway on Clarke Avenue, and utilize the perimeter of the City-owned parcel “Pad D” to gain elevation before crossing Highway 101. (Photo rendering from Figure 5-2)
Figure 5-12: Conceptual rendering of the proposed southern ramp of Alignment 1, with a narrowed West Bayshore Road and new public parcel that could include a water storage tank (shown), community open space, or other amenities in addition to the bridge landing.
Figure 5-13. Conceptual landing area and roadway layout for Alignment 1 southern ramp. Further exploration of site options and refinements to Alignments 1 and 4 are recommended during the preliminary engineering and environmental review phases.
6. **Implementation & Funding**

6.1 **Next Steps**

The list below summarizes the next steps for project implementation.

1. **Selection of Preferred Landing Areas and Alignments**: Upon presentation, review, and deliberation of the issues documented within the Feasibility Report, the East Palo Alto City Council must make a determination regarding the preferred overcrossing landing areas and/or alignment(s). Pending necessary edits, the City, as implementing agency, needs to formally accept the findings of the Feasibility Study, including the project purpose and need statement, through Council action.

2. **Environmental Review**: Once a preferred alignment or set of alignments is selected, the project team will revise the Initial Checklist and begin preparation and public noticing for a determination of non-significance per CEQA requirements. A Preliminary Environmental Study (PES) form will also be completed and submitted to Caltrans to initiate the NEPA review process, which is anticipated to take 4-6 months to complete.

3. **Preliminary Engineering**: Based on the preferred alignment, a bridge type selection report and technical design memorandum that summarizes design requirements and assumptions will be provided. The project team will further refine the bridge alignment to confirm ADA compliance, prepare stage construction and initial civil improvement plans, and if needed further engage the City and/or public on design preferences and requirements for potential co-development opportunities.

4. **Partnership Agreements**: Agreements need to be resolved, initially at a conceptual level, with the agencies and private parties that would need to participate in the project. This includes development of a cooperative agreement with Caltrans, who is likely needed to be the lead agency for NEPA review, and coordination with PG&E and other private utility providers.

5. **ROW Acquisition/Easements**: The easement acquisition process can be initiated. Acceptance of the Feasibility Study recommendations will require acquisition of land rights via easement or fee acquisition on the privately-owned parcel located at Newell Road and West Bayshore Road, as well as that of Home Depot (parcel adjacent to Pad D).

6. **Caltrans Coordination and Permitting**: The East Palo Alto Highway 101 Bicycle and Pedestrian Overcrossing is within Caltrans right-of-way, and therefore requires an encroachment permit and formal review and approval process. To date, the project has been presented to Caltrans and the agency supports proceeding with next steps. Currently the project is considered by Caltrans to be ‘non-complex’ with a construction cost less than $3,000,000 within state right-of-way; therefore a Permit Engineering Evaluation Report (PEER) is the anticipated Caltrans review process. The PEER process is intended to streamline the processing of projects-funded-by-others by reducing the steps in the project development process. This is not intended to relieve the project sponsor from meeting all other Department policies, standards, and practices. Caltrans may increase the level of documentation and processing for those projects that are deemed complex.

The project sponsor is responsible for preparation of the PEER and providing all supporting documentation. The Caltrans point of contact will ensure that the appropriate district units, such as
Design, Environmental, Right of Way, Utilities, Maintenance, etc., review the project as needed. Other district units will not be involved in the PEER unless requested by the Caltrans point of contact.

7. **Funding:** The City can pursue funding sources immediately. Section 6.4 identifies potential funding sources for project design and construction.

8. **Final Design and Construction:** Once additional funding is secured, the City will be able to advance the bridge project design to 100% construction documents. Final design is anticipated to take one year or more to complete once authorization to proceed and comments on the preliminary engineering plans are provided by the City/Caltrans.

### 6.2 Anticipated Project Schedule

Figure 6-1 provides a conceptual project delivery schedule for the Highway 101 Overcrossing Project. While this schedule is highly subject to change and dependent on funding for construction, the completion of the bridge project

### 6.3 Bridge Design Elements & Standards

This section provides specific design and implementation guidelines and standards to ensure that the Adobe Creek POC is constructed to appropriate standards.

The design of pedestrian and bicycle over crossings of State Highways in California is governed by the Caltrans *Highway Design Manual* in Sections 105.2 (Pedestrian Grade Separations), 105.3 (Accessibility Requirements), 208.6 (Pedestrian Overcrossings and Undercrossings), 208.10 (Bridge Barriers and Railings), 309.2 (Vertical Clearances), the Americans with Disabilities Act (ADA) Design Guidelines, and Chapter 1000 (Bikeway Planning and Design). Signing is governed by the *Manual of Uniform Traffic Control Devices* (Part IX. Traffic Controls for Bicycle Facilities) (California Supplement).

Caltrans has developed specific design guidelines in the *Highway Design Manual* for pedestrian overcrossings and Class I multi-use paths. It is useful to note that while there are bikeway design standards and pedestrian overcrossing design standards, there are no specific bikeway overcrossing standards. Given that East Palo Alto Highway 101 Overcrossing would be used as part of the City's bicycle network, a mixture of pedestrian overcrossing and bikeway standards are included in this section.

In 2010, the City of East Palo Alto Community Development Department recommended consideration of the *Santa Clara Valley Transportation Authority (VTA) Bicycle Technical Guidelines (BTG)* after consultation with non-profit organizations such as the Silicon Valley Bicycle Coalition. In their view, the BTG remains the region's most comprehensive set of bicycle guidelines.

Two of the City's advisory boards concurred with the Planning Division's recommendation to consider its adoption. Recognizing the need to improve the roadway by building road networks that are safer, more livable, and welcoming to everyone including bicyclists, public transportation vehicles and pedestrians of all ages, the Public Works and Transportation and Planning Commissions unanimously voted to recommended adoption of the BTG on April 21, 2010 and May 10, 2010 respectively.
City of East Palo Alto Highway 101 Bicycle & Pedestrian Overcrossing Project
Anticipated Project Schedule (Subject to Change)

2013  3Q  4Q  2014  2Q  3Q  4Q  2015  2Q  3Q  4Q  2016  2Q  3Q  4Q  2017  2Q  3Q  4Q  2018

Initiate Caltrans Review
Environmental Review
Design
Permitting / Utility Coordination
Ad/Award
Construction

Figure 6-1: Anticipated Project Schedule (Subject to Change)
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Except for the Caltrans guidelines, all design guidelines should be considered as design resources for the East Palo Alto overcrossing, to be supplemented by the reasonable judgment of professionals. The following sections establish the basic design parameters as developed by Caltrans.

### 6.3.1 Warrants

The *Highway Design Manual* states that the need for a pedestrian overcrossing should be studied in conjunction with pedestrian generating sources in the area, the type of highway to be crossed, the location of adjacent crossing facilities, land use, sociological and cultural factors and the predominate type and age of persons expected to use the facility. These factors have been addressed in this Feasibility Study Report, which is anticipated to function as the Project Initiation Document (PID) for formalize Caltrans involvement and initial review.

Warrants for traffic control devices, such as new traffic signals and stop signs, are established by the California Manual of Uniform Traffic Control Devices (CAMUTCD, 2012). While emphasizing the need to apply engineering and professional judgment when making decisions regarding traffic control, specific thresholds for various warrant types is described in Chapter 4C of the CAMUTCD.

### 6.3.2 Accessibility Requirements

The conceptual design for the East Palo Alto overcrossing maintains a maximum gradient of 8% for the top-ranked alignments, which will be further minimized if possible during the preliminary design phase of the preferred alignment. Both Caltrans *Chapter 1000 Planning and Design of Bikeways* and AASHTO's *Guide for the Development of Bicycle Facilities* state a maximum grade for shared pathways of 8.33 percent and a recommended grade of 5 percent grade. The State requires that all multi-use paths meet ADA standards under the expectation that they will be used by both bicycles and pedestrians.

### 6.3.3 Overcrossing Travelway Width and Clearances

Caltrans *Highway Design Manual* (HDM) Section 309.2 requires a minimum vertical clearance of 16'-6" for vehicular structures over crossing freeways and expressways. For new construction of pedestrian over crossings and minor structures, the HDM requires that an additional two feet of clearance be provided. Therefore, the design for a pedestrian/bicycle overcrossing over Highway 101 must provide a minimum of 18'-6" of clearance over the freeway. If the ultimate bridge design requires falsework for construction over the freeway, additional design height may be required to meet the minimum falsework clearances.

According to the Caltrans *Highway Design Manual*, the minimum width for paved multi-use paths is eight feet, with two feet of lateral clearance on each side and eight feet of vertical clearance. If the path is projected to have higher volumes of bicyclists and/or pedestrians, or if maintenance vehicles will be using the path on a regular basis, a minimum width of 12 feet is recommended with the same lateral and vertical clearances. Santa Clara County’s *Bicycle Technical Guidelines* (BTG) identify 12 feet as the optimum width for paved trails, although do not specify an optimum width for overcrossing facilities. The VTA *BTG* also specify 2-foot shoulders as part of the optimum trail design, for a total preferred trail width of 16 feet, but do not establish this preferred width for overcrossing facilities.

In contrast to multi-use paths, overcrossings require protective fencing and do not typically include shoulders, and thus a 10-foot travel way should be considered the minimum width for a shared bicycle and pedestrian...
overcrossing facility. The Permanente Creek POC in Mountain View is a local example that is designed to be ten feet wide. To allow bicyclists to ride across a structure with limited potential for user conflicts, a 12-16 foot travel way is considered optimal. The overcrossing of I-80 in Berkeley provides a 14-foot cross section with a 5-foot raised sidewalk, 8-foot two-way bicycle path, and 1-foot striped buffer.

For the purposes of this Feasibility Study and preliminary cost estimates, the total treadway width for the East Palo Alto overcrossing is assumed to be 12 feet. The final trail width will be determined in the preliminary design phase.

### 6.3.4 Path Construction

If the overcrossing includes multi-use path connections between the overcrossing and existing bikeways and/or pedestrian facilities, the multi-use path construction should be conducted in a similar manner as roadway construction, with sub-base thickness to be determined by soils condition and expansive soil types requiring special structural sections. Minimum asphalt thickness should be two inches of Type A or Type B as described by Caltrans Standard Specifications, with a six-inch thick Class 2 aggregate base. In areas on the path where there is expected to have regular use by patrol or maintenance vehicles, the preferred surface material is a four-inch reinforced concrete section with sub-base or six inches of reinforced concrete on compacted native material (if suitable). In other areas where these conditions do not exist, three-inch thick asphalt concrete may be suitable. The Santa Clara County *Uniform Interjurisdictional Trail Design, Use, and Management Guidelines* contain additional guidance, including asphalt paving maximum aggregate size and base course compaction percentages applicable to multi-use path connections.

### 6.3.5 Design Speed / Horizontal Alignment

According to the California *Highway Design Manual*, the de facto design speed for multi-use paths is 25 miles per hour, except on sections where there are long downgrades (steeper than four percent, and longer than 500-feet). It is anticipated that the East Palo Alto overcrossing ramps would each be less than 500 feet in length. Speed bumps or other surface irregularities should never be used to slow bicycles. Caltrans’ *Highway Design Manual* Chapter 1000 includes recommendations concerning curve radii, super elevations, and stopping distances. Design exemptions may be required for either Alignment 1, 2A, or 4 because not all turns meet Caltrans’ design criteria.

### 6.3.6 Drainage

According to Caltrans *Highway Design Manual* Chapter 1000 specifications, the surface of a bike path should have a cross slope of 2 percent for proper drainage. Sloping in one direction usually simplifies longitudinal drainage design and surface construction, and accordingly is the preferred practice. The overcrossing drainage system may include pipe or deck drains that discharge to the adjacent roadway(s) and/or local drainage system via bridge piers.

Under the Municipal Regional Stormwater NPDES Permit (MRP)

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11 More information on MRP is provided online at www.flowstobay.org
the rate of flow. Low Impact Development (LID) or Integrated Best Management Practice (IBMP) measures should be used to minimize imperviousness to the extent feasible, or to infiltrate, store, detain, evapotranspire, and/or bio-treat runoff on-site or at the source. The San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook offers design assistance for LID, including concepts for stormwater planters, bioswales, and green gutters.

6.3.7 Striping and Pavement Markings

A centerline stripe on the overcrossing approach would help to organize path users. According to the CA MUTCD, a solid yellow line may be used to separate the two directions of travel where shared-use paths are of sufficient width to designate two minimum width lanes and passing is not permitted. A broken yellow line may be used where passing is permitted. The VTA Bicycle Technical Guidelines document states that centerline stripes should be used along trails. Solid centerline stripes where there is heavy use and on curves greater than 100 feet long with restricted sight distances. Dashed stripes should be used where there is heavy use but only where sight distances permit. On-street bike lanes should striped for a minimum five (5) feet from edge of curb or adjacent parking lane. Sharrows (shared lane bicycle arrows) should be placed at least 12 feet from the curb if there is parking.

The overcrossing project may include up to six crosswalk stripings, which shall generally consist of high visibility “ladder” style markings and be marked yellow if within 600 feet of a school. The CA MUTCD states that crosswalk markings may be established between intersections (mid-block) in accordance with CVC 21106(a). However, mid-block pedestrian/bicycle crossings are generally unexpected by the motorist and should be discouraged unless there is strong justification in favor of the crossing. Installation of directional or wayfinding signage is recommended to direct overcrossing users to cross adjoining roadways at preferred designated crossings.

6.3.8 Fencing and Barriers

Fencing and barriers along pedestrian and bicycle overcrossings of State Highways in California are governed by the Caltrans Highway Design Manual Section 208.10 (Bridge Barriers and Railings). To reduce the risk of objects being dropped or thrown upon vehicles, protective screening in the form of fence-type railings must be installed along the bicycle and pedestrian overcrossing.

6.3.9 Signage

The types, location, and other criteria for signage, striping, and marking of bicycle and pedestrian facilities are identified in the California Manual on Uniform Traffic Control Devices (CA MUTCD) and the Caltrans Highway Design Manual. Directional or wayfinding signage located at key intersections along the bicycle and/or pedestrian network could direct bicyclists and pedestrians wishing to cross Highway 101 to the new overcrossing. Additional signage placed at the overcrossing entrances/exits could direct users to connecting bicyclist and pedestrian facilities and key destinations, including schools, major businesses within the Gateway 101 Shopping Center, and the Bay Trail.
6.3.10 Lighting

The overcrossing is proposed to have lighting on the structure and at the ramp entrances, at a minimum. Lighting is a key design consideration for public safety, and should be designed to meet proper levels of uniformity and illuminance. Lighting should also have a minimal impact on adjacent properties through careful attention to the light fixture type, focus, and proximity to nearby uses. Due to its urbanized location and desire to be a gateway element, higher impact up lighting and/or artistic colored lighting may also be considered for this overcrossing. In order to minimize operational and maintenance costs, as well as total energy consumption, all lighting fixtures are proposed to be Light-Emitting Diode (LED) except where they might conflict with established City lighting standards or policies.

6.4 Operations and Maintenance

Operations and maintenance of the East Palo Alto Highway 101 overcrossing is of utmost importance for the productive use of the facility. A well-designed program of maintenance and operation can encourage use of the facility and deter problems such as vandalism and littering.

Operations

Operation activities on the overcrossing would consist primarily of monitoring and security. Monitoring accidents, including identifying the primary cause and rectifying any physical deficiencies, must be accomplished by the City. The City would also responsible for closing and opening the overcrossing when conditions warrant, as during periods of major maintenance or for public safety.

Maintenance

Maintenance of the East Palo Alto Highway 101 Overcrossing is recommended to include the following regular activities:

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trash disposal</td>
<td>As needed</td>
</tr>
<tr>
<td>Pavement sweeping</td>
<td>Monthly - annually as needed</td>
</tr>
<tr>
<td>Bridge cleaning</td>
<td>Annually</td>
</tr>
<tr>
<td>Graffiti removal</td>
<td>As Needed</td>
</tr>
<tr>
<td>Maintenance of electrical devices</td>
<td>Annually</td>
</tr>
<tr>
<td>Clean drainage system</td>
<td>Annually</td>
</tr>
<tr>
<td>Biennial inspection</td>
<td>Every 2 years</td>
</tr>
<tr>
<td>“Hands on” special inspection</td>
<td>Every 4 years</td>
</tr>
<tr>
<td>Replace lighting element (bulbs)</td>
<td>Every 4 years, depending on lighting type</td>
</tr>
</tbody>
</table>

12 Analysis and scoping of the bridge and approach lighting will be conducted in the preliminary design phase, but is expected to be between 1-3 foot candles.
Sign replacement/repair  5-15 years
Pavement marking replacement 5-15 years
Pavement sealing/potholes 5-15 years/30-40 years for concrete

Many of these maintenance items are dependent on the type and amount of supporting infrastructure developed along the overcrossing, which have not yet been identified.

**Overcrossing Repairs and Closure**

Overcrossing access must be managed during periodic maintenance and when sections are closed or unavailable to users. Overcrossing users must be warned of impending closures, and given adequate detour information to bypass the closed route. Users must be warned through the use of standard signing at the overcrossing entrances (“Bridge Closed”), including (but not limited to) information on alternate routes and dates of closure. If the overcrossing is closed, it must be gated or otherwise blockaded and clearly signed as closed to public use. Alternate routes are limited, but access to the existing University Avenue overpass should be signed consistently.

**6.5 Funding**

The federal transportation law, MAP-21 (Moving Ahead for Progress in the 21st Century), signed into law in July of 2012 and replacing the longstanding SAFETEA-LU transportation bill, is the largest source of pedestrian and bicycle facility funding in the United States. The federal government funds transportation projects and programs in part through taxes and fees related to use of the transportation system.

The most likely funding sources for the East Palo Alto Highway 101 Pedestrian/Bicycle Overcrossing include: the state Active Transportation Program (ATP), regional OBAG grants administered by MTC, San Mateo County Measure A funds, developer fees from adjacent projects, and the City of East Palo Alto. Most funding sources are competitive and provide funding for up to 80 percent of construction costs.

The level of funding available for the planning, design, and construction phases of projects varies but in general the largest fund sources are available for projects that are considered, “Shelf Ready” with environmental planning and design work complete so that a project can be immediately made available for construction bidding. To ensure competitiveness in securing grant sources, East Palo Alto should fund the design phase of the East Palo Alto Highway 101 Pedestrian/Bicycle Overcrossing to remain competitive. The design phase of the project is estimated to cost up to $1.5 million, depending on the selected design.

**Federal Funding (MAP-21)**

MAP-21 is a newly enacted transportation bill, replacing the repeatedly re-authorized SAFETEA-LU transportation bill, which was established by the Intermodal Surface Transportation Efficiency Act (ISTEA) (1991). MAP-21 authorizes $105 billion over the 2013 and 2014 fiscal years for surface transportation programs. MAP-21 consisted of a significant realignment of funding rules and allocations over previous iterations of the SAFETEA-LU bill. The Transportation Enhancements (TE) program, federal Safe Routes to School (SRTS) program and Recreational Trails account have been consolidated under MAP-21 into a single account: the Transportation Alternatives (TA) account. The total amount of funding allocated to Transportation Alternatives in the two authorized years of MAP-21 is $808 million, a 33% decrease over the combined funding allocated to the previous three programs under SAFETEA-LU.
MAP-21 divides TA funding between statewide and local agencies for allocation to transportation projects. Half of TA funding is to be administered on the local level, with MPO’s controlling distribution of funding. The MPO body administering local TA funding for East Palo Alto is the Metropolitan Transportation Commission (MTC). The other half of TA funding is to be administered by Caltrans. Caltrans, under MAP-21 rules, is empowered to “flex” funding from the TA account to other surface transportation programs. Caltrans has preliminarily agreed not to “flex” away their portion of TA funding. MAP-21 rules also preserve a level of funding for the Recreational Trails account. States must opt into a set-aside for Recreational Trails that matches the previous level of funding for that program, or lose the corresponding amount of funding.

Caltrans administers federal funding and provides project oversight including the issuance of National Environmental Protection Agency (NEPA) clearance for projects. Caltrans works with the local Metropolitan Planning Organization (MPO) to identify projects for funding that are selected through a competitive process. The MPO for the San Francisco Bay Area is the Metropolitan Transportation Commission (MTC) in Oakland, CA. Depending on the fund source, MTC will at times work with a Local-MPO such as the Valley Transportation Authority (VTA) in Santa Clara County to help distribute funding. The use of local-MPOs helps to better identify projects that best benefit a county directly versus looking at projects in relation to a larger region such as the San Francisco Bay Area.

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) was established by ISTEA, and is retained under MAP-21, specifically for projects and programs that will contribute to the attainment of a national ambient air quality standard. CMAQ is jointly administered by FHWA and the Federal Transit Administration (FTA). The funds are available to all ozone, carbon monoxide (CO), and particulate matter (PM) nonattainment and maintenance areas based on population and the degree of severity of pollution. The San Francisco Bay Area is in nonattainment status for ozone 8-hour averaging time, PM$_{10}^{13}$, and PM$_{2.5}^{14}$.

Activities eligible for CMAQ funds include construction of bicycle and pedestrian facilities (paths, bike racks, support facilities, etc.) that are not exclusively recreational and reduce vehicle trips.

**State Funding**

The State of California uses both funds from federal sources that it is responsible for administering and funds from its own budget to implement transportation projects, including bicycle and pedestrian projects and programs. With the passage of MAP-21, the state of California has decided to consolidate state funding with federal funding into a single account: the Active Transportation Program (ATP).

**Active Transportation Program (ATP)**

With the consolidation of federal funding sources in MAP-21, the governor’s office recommended the consolidation of numerous state-funded programs centered on alternative transportation into a single account. The resulting Active Transportation Program (ATP) will be administered by the Business, Housing & Transportation (BTH) Agency within the governor’s office. The BTH will work with Caltrans to administer the ATP.

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13 The notation PM$_{10}$ is used to describe particles of 10 micrometers or less and PM$_{2.5}$ represents particles less than 2.5 micrometers in aerodynamic diameter.

14 hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm
The ATP consolidates funding from the MAP-21 TA program, the statewide Safe Routes to School (SR2S) program, the Bicycle Transportation Account (BTA), the state Recreational Trails Program (RTP), and the Environmental Enhancement and Mitigation Program (EEMP). The funding allocated to the ATP in the 2013 governor’s budget is $134 million. The combined funding of the consolidated federal and state programs (under 2012 levels) would have reached $147 million, meaning the ATP is funded at 91% of previous levels.

The BTH has until the end of the 2012 fiscal year (June 30th, 2013) to establish governing rules for the distribution of funding through the ATP. As of the writing of this feasibility study, the BTH had not yet provided specifics on funding allocation and project prioritization.

**State Highway Operations & Protection Program**

The State Highway Operations and Protection Program (SHOPP) is a Caltrans funding source with the purpose of maintaining and preserving the investment in the State Highway System and supporting infrastructure. Projects typically fall into the following categories: collision reduction, major damage restoration, bridge preservation, roadway preservation, roadside preservation, mobility enhancement and preservation of other transportation facilities related to the state highway system. In the past, SHOPP funds have been used to construct bicycle projects, including curb ramps, overcrossings, bike paths, sidewalks, and signal upgrades to meet ADA requirements. Jurisdictions work with Caltrans’ districts to have projects placed on the SHOPP list.

The total amount available for the four-year SHOPP period between 2010/11 and 2013/14 fiscal years is $6.75 billion, which is a reduction in funding from prior SHOPP programs. Past project awards have ranged from approximately $140,000 to $4.68 million.

The American Recovery and Reinvestment Act (ARRA) granted funding to this program in California. Online resource: [www.dot.ca.gov/hq/transprog/shopp.htm](http://www.dot.ca.gov/hq/transprog/shopp.htm)

**Petroleum Violation Escrow Account (PVEA)**

In the late 1970s, a series of Federal court decisions against selected United States oil companies ordered refunds to the States for price overcharges on crude oil and refined petroleum products during a period of price control regulations. To qualify for PVEA funding, a project must save or reduce energy and provide a direct public benefit within a reasonable time frame. In the past, the PVEA has been used to fund programs based on public transportation, computerized bus routing and ride sharing, home weatherization, energy assistance and building energy audits, highway and bridge maintenance, and reducing airport user fees. In California, Caltrans administers funds for transportation-related PVEA projects. PVEA funds do not require a match and can be used as match for additional Federal funds.

Online resource: [www.dot.ca.gov/hq/LocalPrograms/lam/prog_g/g22state.pdf](http://www.dot.ca.gov/hq/LocalPrograms/lam/prog_g/g22state.pdf)

**Proposition 84 – Urban Greening**

The Urban Greening Grant Program is funded under Proposition 84 and is managed by the Strategic Growth Council and the California Natural Resources Agency. Urban Greening grant funding is eligible for projects and planning efforts that decrease air or water pollution, reduce natural resource consumption, increase the reliability of local water supplies, or increase adaptability to climate change in urban areas. The grant program is entering its third and final round of grant funding for projects, with applications due on April 5, 2013. Solicitation for the third and final round of planning grant awards will take place in the summer of 2013.
In order to be eligible for this grant funding source, the project must include new community green spaces. Due to East Palo Alto low-lying position (vulnerable to climate change) and long history of environmental justice struggles, the city would likely be a high-scoring candidate for such a grant.

Online resource: [http://www.sgc.ca.gov/urban_greening_grants.html](http://www.sgc.ca.gov/urban_greening_grants.html)

**Regional Funding Sources**

**One Bay Area Grant (OBAG)**

The One Bay Area Grant (OBAG) program is run by the Metropolitan Transportation Commission (MTC). OBAG grants are derived from funding drawn from the federal Surface Transportation Program (STP), Transportation Alternatives (TA) program, and Congestion Mitigation and Air Quality Improvement (CMAQ) program. MTC will oversee $320 million of OBAG grant funding over a four year period.

OBAG funding is administered jointly between MTC and the local Congestion Management Agency (CMA) for each county. The CMA for San Mateo County is the City/County Association of Governments (C/CAG). The six following categories of projects are eligible for OBAG funding: Local Street & Road Preservation, Bicycle & Pedestrian Improvements, Transportation for Livable Communities, Safe Routes to School, Priority Conservation Areas, and CMA Planning Activities. The East Palo Alto Highway 101 Pedestrian/Bicycle Overcrossing project should be eligible under both “bicycle & pedestrian improvements” and “safe routes to school” categories.

OBAG funding, in an effort to integrate with the California climate law (SB 375), prioritizes funding in areas that are Priority Development Areas (PDAs) and for communities that accept housing allocations through the Regional Housing Needs Allocation (RHNA). San Mateo County has been allocated $26 million out of the total $320 million OBAG program for the Bay Area. Within San Mateo County, East Palo Alto should score very competitively for OBAG funding projects, as the city is within a PDA and has accepted its RHNA housing allocations.

Online resources: [http://www.mtc.ca.gov/funding/onebayarea/](http://www.mtc.ca.gov/funding/onebayarea/)

**Transportation Fund for Clean Air**

Administered by the Bay Area Air Quality Management District (BAAQMD), the Transportation Fund for Clean Air (TFCA) is a grant program funded by a $4 surcharge on motor vehicles registered in the Bay Area. This surcharge generates approximately $22 million per year in revenue. TFCA’s goal is to implement the most cost-effective projects in the Bay Area that will decrease motor vehicle emissions, and therefore improve air quality. Projects must be consistent with the 1988 California Clean Air Act and the Bay Area Ozone Strategy. Sixty percent (60%) of TFCA funds are awarded directly by the BAAQMD through a competitive grant program known as the Regional Fund. The remaining forty percent (40%) of TFCA funds are forwarded to the designated county congestion management agency (CMA) and distributed by these through the Program Manager program.

TFCA funds covers a wide range of project types, including bicycle facility improvements such as bike lanes, bicycle racks, and lockers; arterial management improvements to speed traffic flow on major arterials; and smart growth.
The San Mateo City/County Association of Governments (C/CAG) is the local CMA that manages TFCA account projects. In recent years, C/CAG has used TFCA funds to fund two programs: a countywide voluntary Transportation Demand Management (TDM) program managed by the Traffic Congestion Alliance, and a San Mateo Transit (SamTrans) shuttle program that connects employers to BART stations. Plans for the 2013/2014 fiscal year include continuance of these programs using available non-competitive TFCA funding.

Online resources:  [www.baaqmd.gov/Divisions/Strategic-Incentives/Funding-Sources/TFCA.aspx](http://www.baaqmd.gov/Divisions/Strategic-Incentives/Funding-Sources/TFCA.aspx)  and  [www.baaqmd.gov/tfca4pm](http://www.baaqmd.gov/tfca4pm)

**TDA Article 3**

TDA Article 3 funds are state block grants awarded annually to local jurisdictions for transit and bicycle projects in California. Funds originate from the Local Transportation Fund (LTF), which is derived from a quarter-cent of the general state sales tax. LTF funds are returned to each county based on sales tax revenues.

Eligible bicycle projects include: construction and engineering for capital projects; maintenance of bikeways; bicycle safety education programs (up to five percent of funds); and development of comprehensive bicycle facilities plans. A city or county may apply for funding to develop or update bicycle plans not more than once every five years. TDA funds may be used to meet local match requirements for federal funding sources. Two percent of the total TDA apportionment is available for bicycle and pedestrian funding.

Online resource:  [www.mtc.ca.gov/funding/STA-TDA/](http://www.mtc.ca.gov/funding/STA-TDA/)

**Local Funding Sources**

**Measure A**

Measure A is a transportation sales tax first authorized by San Mateo County voters in 1998. Measure A was again reauthorized by voters in 2008. Measure A is set to expire in 2033. The measure collects a half-cent sales tax for transportation projects, administered by the San Mateo County Transportation Authority (SMCTA).

Three percent of all sales tax revenue generated by Measure A is dedicated to bicycle and pedestrian projects, primarily used for the purpose of leveraging additional federal and state grant funding. Over the life of the current measure, $45 million is projected to be generated for bicycle and pedestrian projects. SMCTA has expressly indicated that bicycle & pedestrian overcrossings are eligible for pedestrian and bicycle funding.

Measure A Call For Projects are generally held every two years. The previous call for pedestrian & bicycle projects cover FY 2012-FY2013, meaning that a new call should be announced in late 2013.

Online resource:  [http://www.smcta.com/](http://www.smcta.com/)

**General Funds**

One of the local revenue sources of cities, towns, and counties available for use on bicycle improvements are general funds resulting from sales taxes, property taxes and other miscellaneous taxes and fees. There are generally few restrictions on the use of these funds, which are utilized for a large variety of local budget needs. As such, there is typically high demand for these funds for numerous government services. Design and construction of pathways through use of this funding source usually receives limited support from local governments unless their constituents lobby effectively for such use.
In some cases, a component of local general funds can be dedicated to transportation improvements including the construction, maintenance, and repair of bicycle and pedestrian facilities.