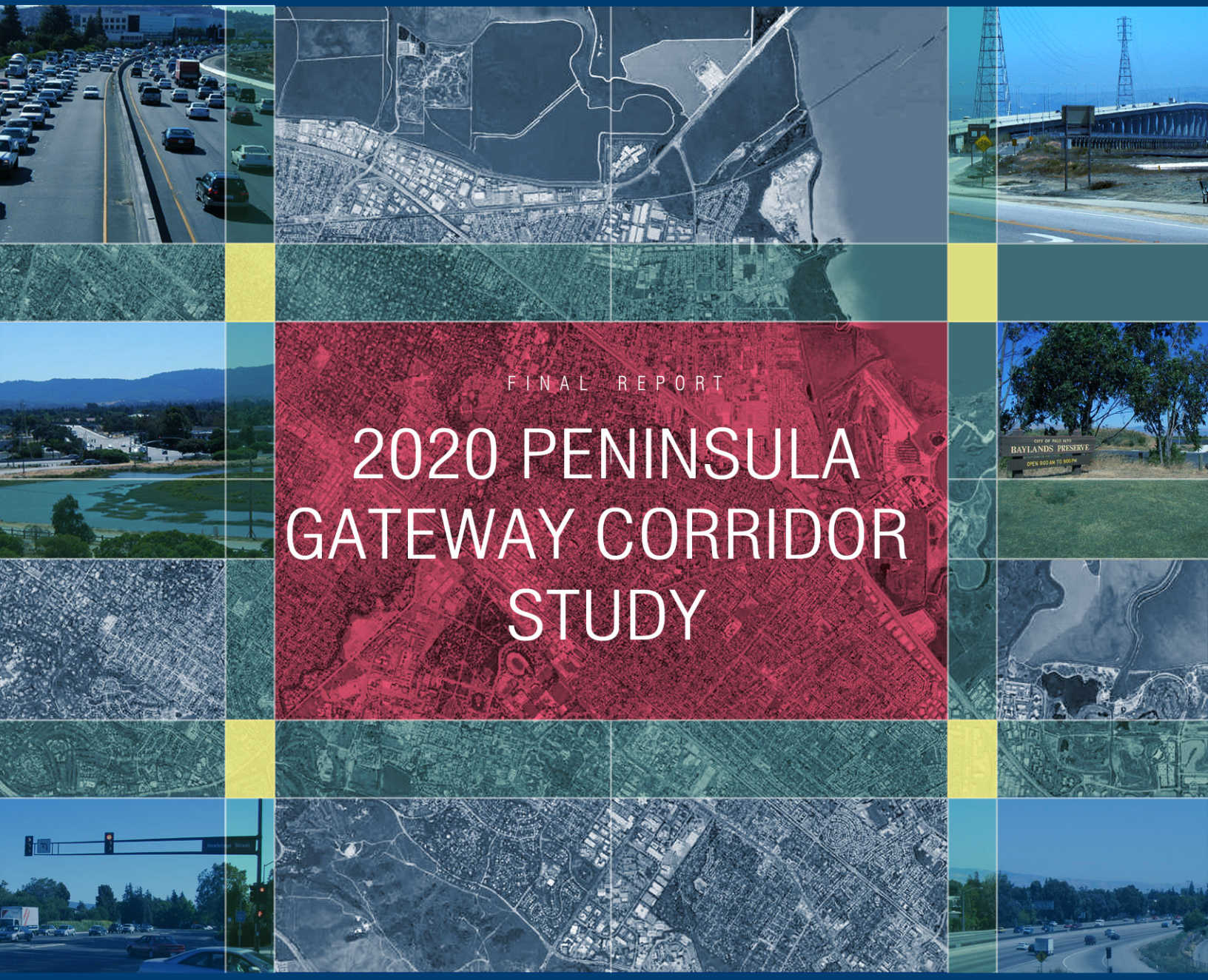
Prepared by:

Kimley-Horn and Associates, Inc.



FINAL REPORT

2020 PENINSULA GATEWAY CORRIDOR STUDY

July 29, 2008

Prepared for

C/CAG
City/County Association of Governments of San Mateo County

VTA
Valley Transportation Authority

SAN MATEO COUNTY
Transportation Authority

2020 Peninsula Gateway Corridor Study

Final Report

Prepared for:

Prepared by:

July 29, 2008

Contents

Illustrations

Tabulations

Acknowledgements

Appendices (On Enclosed CD)

This report presents the procedures and findings of the **2020 Peninsula Gateway Corridor Study,** which was conducted by Kimley-Horn and Associates, Inc. (KHA) under contract to the City/County Association of Governments of San Mateo County (C/CAG) in partnership with the San Mateo County Transportation Authority (SMCTA) and Santa Clara Valley Transportation Authority (VTA). This document is organized as follows.

I. The Problem and Potential Solutions

II. Detailed Evaluation of Certain Solutions

III. Findings and Next Steps

I. The Problem and Potential Solutions

A. *Study Objectives*

The objective of this study was to define and evaluate alternative traffic improvements in the study area that address the *Study Goals*, which are listed below:

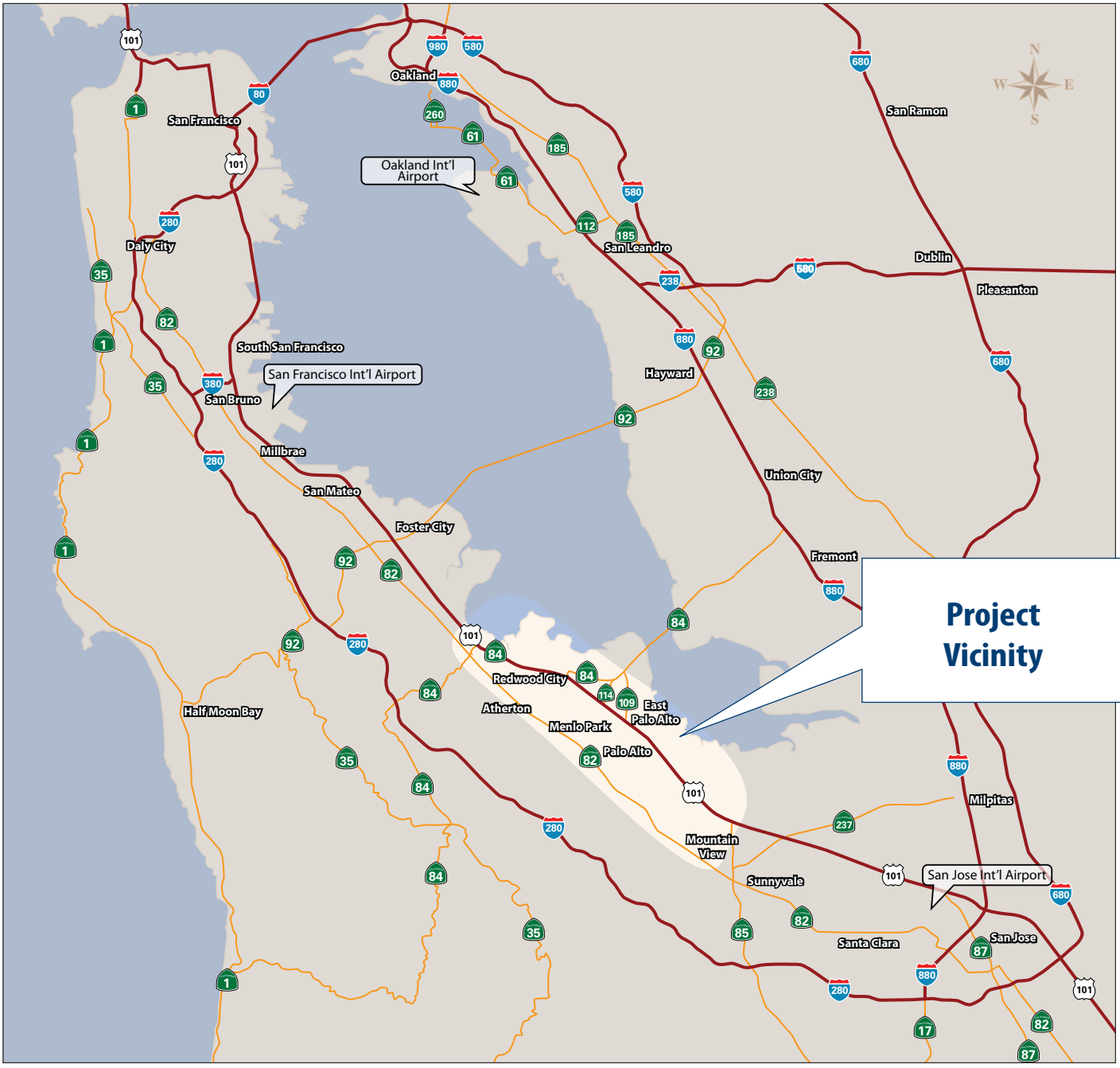
- Facilitate access to communities within the study area;
- Enhance economic opportunities;
- Optimize use of existing infrastructure;
- Reduce congestion and local community impacts caused by commute traffic; and
- Minimize environmental impacts on sensitive resources.

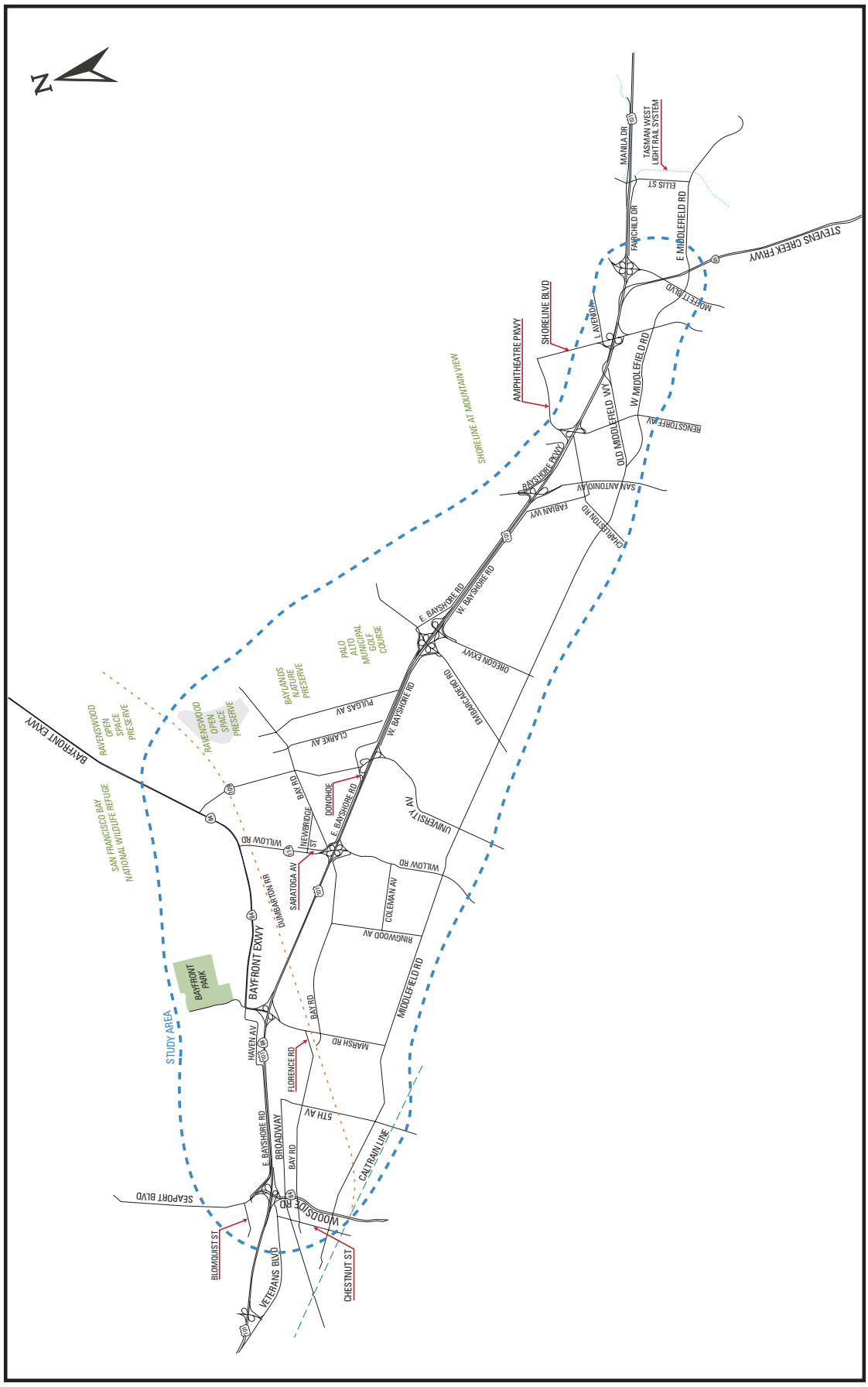
The study area, as defined in **Figures 1 and 2**, encompasses Highway 101 from just north of SR 84 (Woodside Road) to just south of the Route 85 (Stevens Creek Freeway) junction, as well as SR 84 (Bayfront Expressway) from the Dumbarton Bridge landing to Highway 101 and beyond to Middlefield Road including the connecting streets between the Bayfront Expressway and Highway 101.

This study was consciously focused on traffic improvements and did not address transit and multimodal challenges and opportunities. Its findings will be used as appropriate to inform other traffic-oriented efforts addressing the Highway 101 corridor, like the Freeway Performance Initiative Program underway by the Metropolitan Transportation Commission (MTC) and the Corridor System Management Plan (CSMP) sponsored by Caltrans. Sub-regional transit and multimodal issues are being addressed in several current efforts, including the *VTA 2035 Plan* and *Short-Range Transit Plan*, the *Caltrain Strategic Plan* and *Short-Range Transit Plan*, the *Samtrans Short-Range Transit Plan*, the *Strategic Plan for San Mateo County Measure A*, and the *Dumbarton Rail Corridor* project.

B. *Definition of Problem*

The State highways within the study area all experience substantial traffic demand and poor operating conditions during the peak commute periods. Several important findings from the


Project Vicinity
Oakland Int'l Airport
San Francisco Int'l Airport
San Jose Int'l Airport
San Francisco
Oakland
San Ramon
Daly City
South San Francisco
San Bruno
Millbrae
San Mateo
Foster City
San Leandro
Dublin
Pleasanton
Hayward
Union City
Fremont
Redwood City
Atherton
Menlo Park
East Palo Alto
Palo Alto
Half Moon Bay
Mountain View
Sunnyvale
Santa Clara
San Jose
Milpitas


N
STUDY AREA
SHORELINE AT MOUNTAIN VIEW
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
RAVENSWOOD OPEN SPACE PRESERVE
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
BAYFRONT PARK
BAYFRONT EXWY
BAYFRONT EXPY
DUMBARTON RR
CALTRAIN LINE
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
ELLIS ST
FAIRCHILD DR
E MIDDLEFIELD RD
STEVENS CREEK FRWY
MOFFETT BLVD
SHORELINE BLVD
AMPHITHEATRE PKWY
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OREGON EXWY
EMBARCADERO RD
PULGAS AV
CLARE AV
BAY RD
DONOHOE
NEWBRIDGE ST
WILLOW RD
UNIVERSITY AV
SARATOGA AV
COLEMAN AV
RINGWOOD AV
MIDDLEFIELD RD
MARSH RD
HAVEN AV
FLORENCE RD
5TH AV
BROADWAY
SEAPORT BLVD
WOODSIDE RD
BLOMQUIST ST
VETERANS BLVD
CHESTNUT ST

review of existing conditions are summarized below and illustrated in **Figure 3.** Appendix A contains details of the assessment of existing conditions.

- The unconventional connection between the Dumbarton Bridge (SR 84) and Highway 101 creates congestion on arterial highways SR 109 (University Avenue) and SR 114 (Willow Road) and the interchanges with Highway 101.
- Congestion of arterial highways approaching and departing the Dumbarton Bridge creates neighborhood traffic impacts in Menlo Park, Palo Alto and East Palo Alto.
- Older full cloverleaf interchanges without collector-distributor roads create short weave conditions resulting in pockets of congestion, which have upstream effects on traffic flow.
- The beginning point of the High Occupancy Vehicle (HOV) lane north of Whipple Avenue coincides with a mixed-flow lane reduction and these changes in combination create notable weaving on southbound Highway 101, friction and upstream congestion.
- Select high volume freeway ramps with short merge areas create bottlenecks that cause upstream congestion.
- Lack of auxiliary lanes between closely spaced interchange ramps creates merging conflicts throughout the corridor, exacerbating highly congested conditions.
- Accident rates on certain segments of State highways in the study area are significantly higher than the statewide average for similar facilities.
- Poorly configured off-ramp intersections with surface streets, combined with high traffic volumes, create back-ups that extend onto Highway 101.

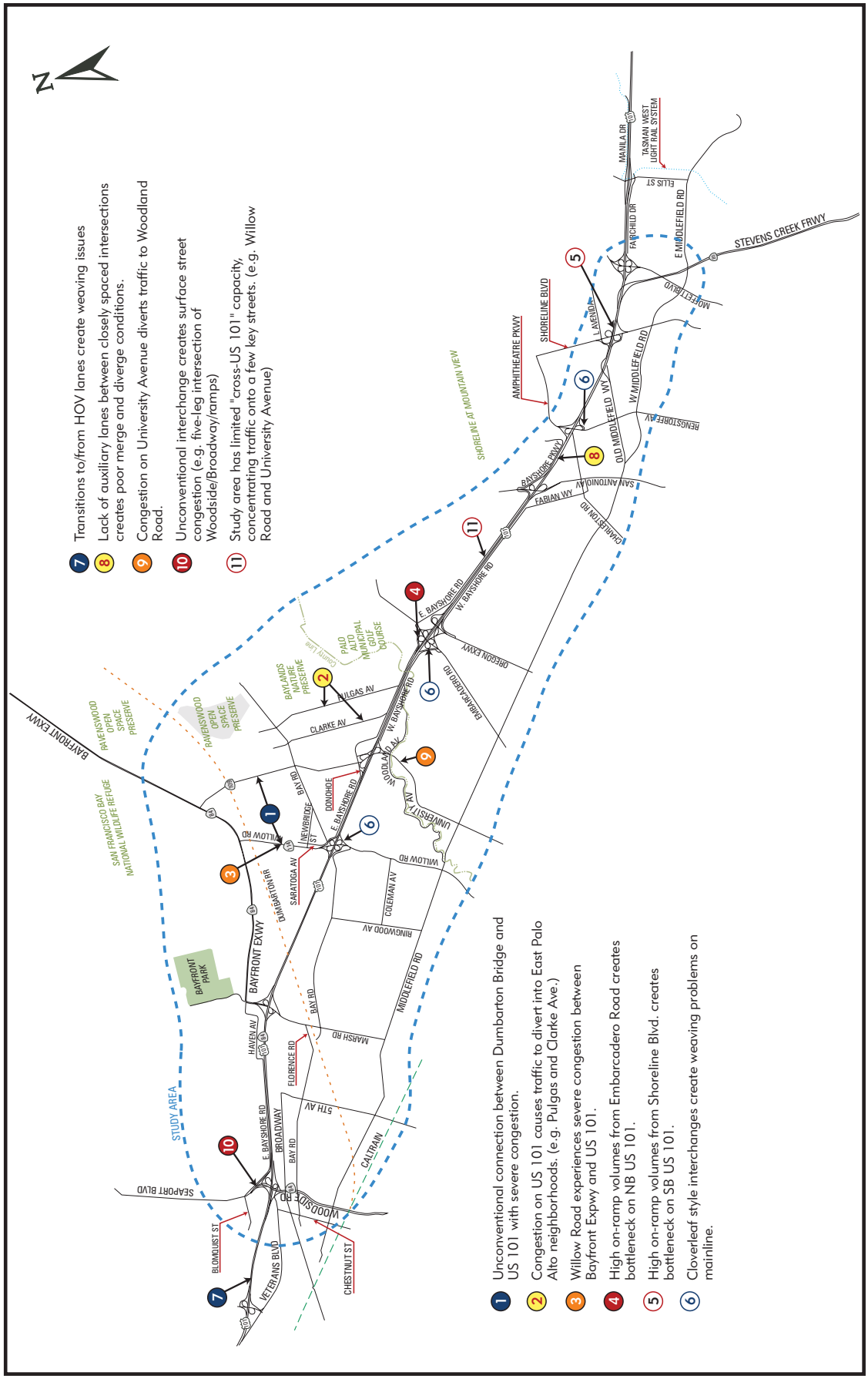
C. *Future "No-Build" Conditions*

After confirming that existing problems were substantial and very few projects were programmed in the short term, the study emphasized future no-build conditions, with only a few improvements slated for completion from the present through 2025 (the Highway 101/Willow Road interchange and Auxiliary Lanes from Marsh Road to the Santa Clara County Line). In other words, it was felt that existing conditions would only worsen and it was more effective to focus on a long-term horizon as the basis to identify needed traffic improvements.

The anticipated congestion levels for 2025 as well as the percentage change in congestion from present day to 2025 are depicted in **Figures 4A** (AM Peak Period) **and 4B** (PM Peak Period)**.** By observation, today's big problem will be tomorrow's bigger problem under a "No-Build" scenario.

D. *Public Outreach*

Feedback was obtained from the public during five formal open meetings and from other sources, including written and electronic correspondence. Staff from C/CAG organized the public forums and received other inputs directly. A PowerPoint presentation and handout were prepared to summarize the study objectives, issues, and potential kinds of improvements that might be considered. The formal meetings involved a 25-minute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STUDY AREA
7 Transitions to/from HOV lanes create weaving issues
8 Lack of auxiliary lanes between closely spaced intersections creates poor merge and diverge conditions.
9 Congestion on University Avenue diverts traffic to Woodland Road.
10 Unconventional interchange creates surface street congestion (e.g. five-leg intersection of Woodside/Broadway/ramps)
11 Study area has limited "cross-US 101" capacity, concentrating traffic onto a few key streets. (e.g. Willow Road and University Avenue)
1 Unconventional connection between Dumbarton Bridge and US 101 with severe congestion.
2 Congestion on US 101 causes traffic to divert into East Palo Alto neighborhoods. (e.g. Pulgas and Clarke Ave.)
3 Willow Road experiences severe congestion between Bayfront Expwy and US 101.
4 High on-ramp volumes from Embarcadero Road creates bottleneck on NB US 101.
5 High on-ramp volumes from Shoreline Blvd. creates bottleneck on SB US 101.
6 Cloverleaf style interchanges create weaving problems on mainline.
BAYFRONT EXWY
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
BAYLANDS NATURE PRESERVE
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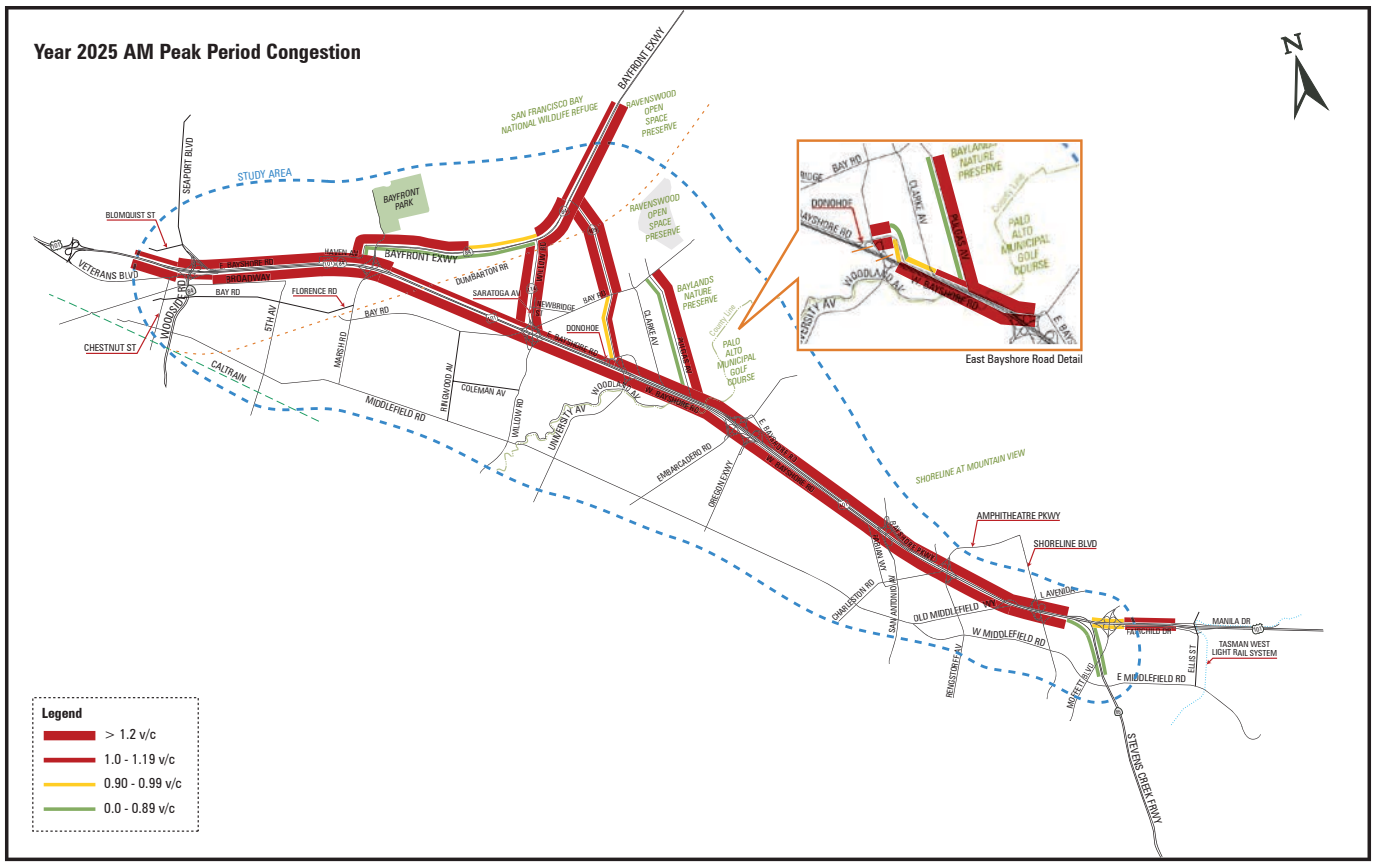
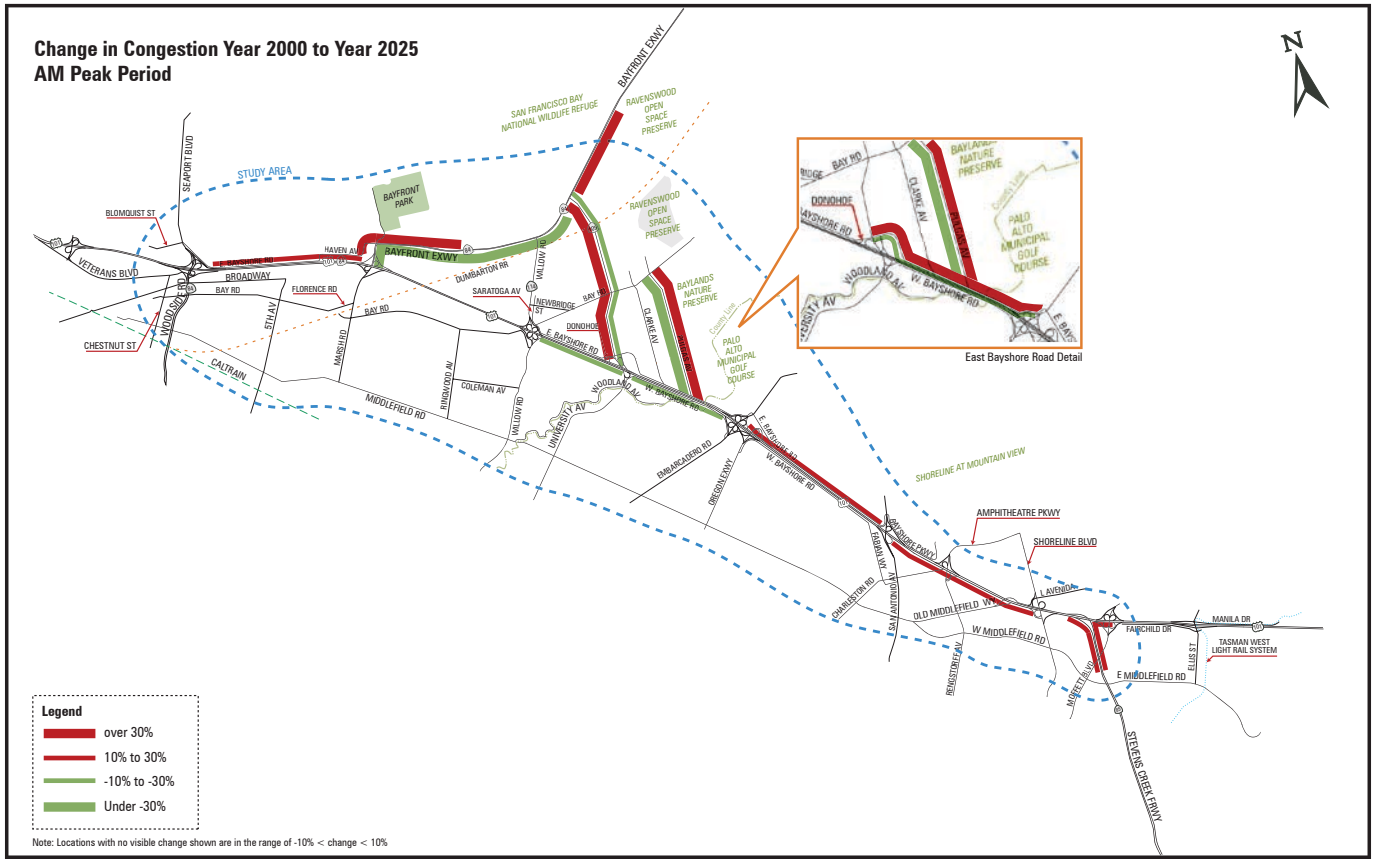
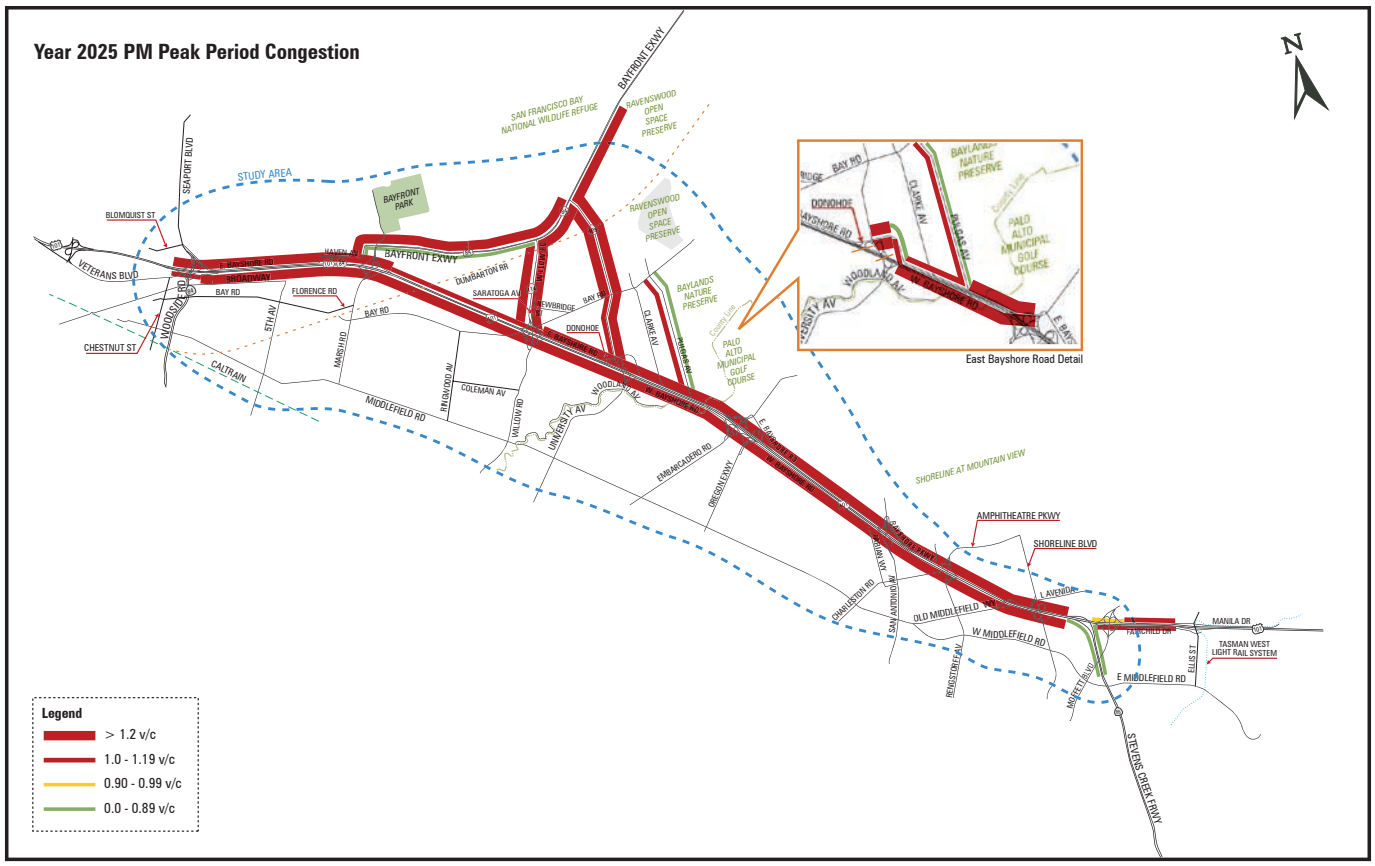
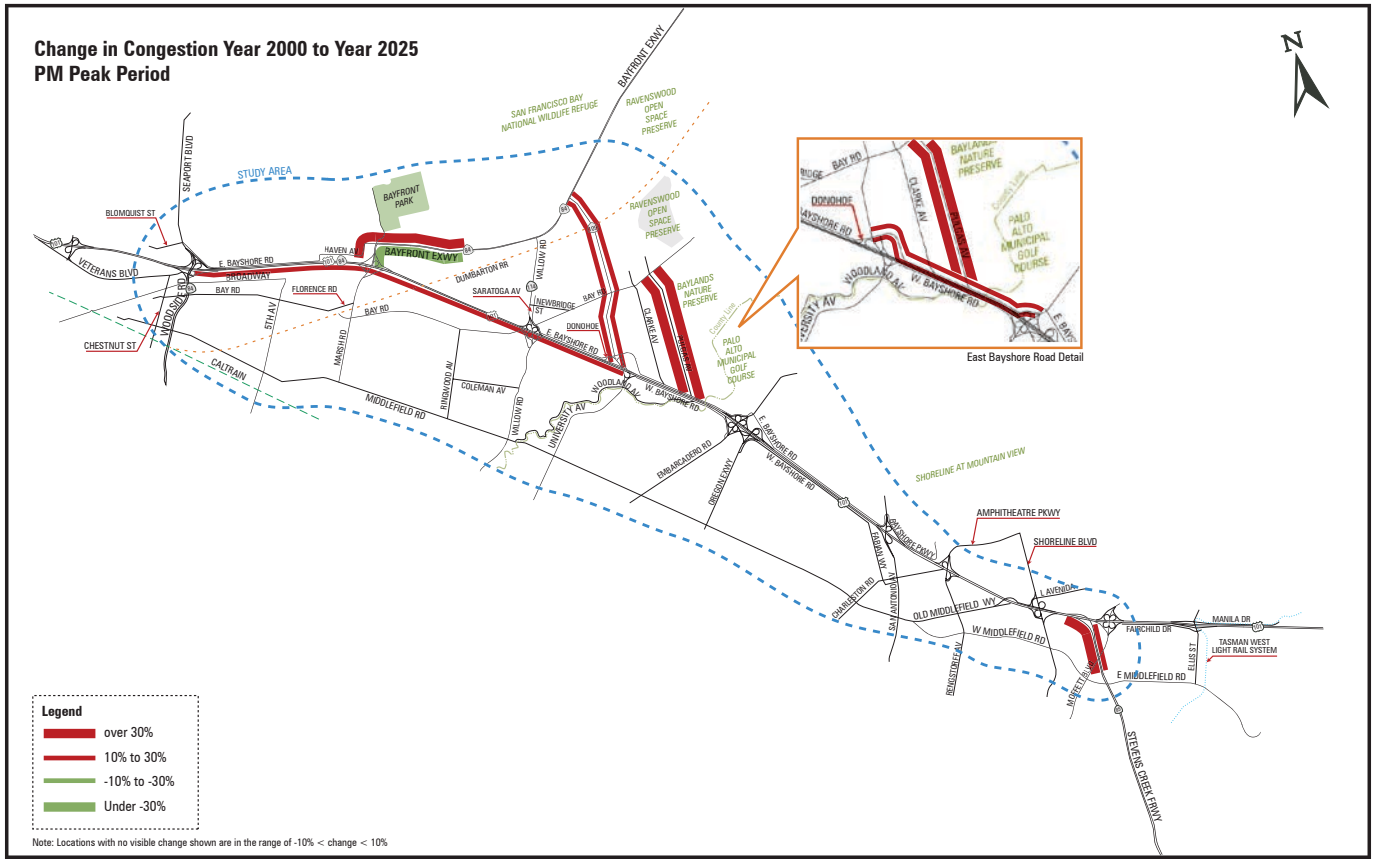




Note: Locations with no visible change shown are in the range of -10% < change < 10%





Note: Locations with no visible change shown are in the range of -10% < change < 10%

presentation. Each meeting lasted approximately two hours. Details of this process are contained in Appendix B.

A separate two-phase effort called the "Dumbarton Dialogue Project" was undertaken with funding from the City of East Palo Alto and Caltrans (Community-Based Transportation Planning). The first phase of work involved the Dumbarton Dialogue team reaching out to East Palo Alto community members to 1) inform them about transportation planning through the "University 101 Traffic Academy," and 2) solicit their participation in the first formal meeting of the series cited above. The second phase of work involved a series of informational meetings, one in each of the communities in the 2020 Peninsula Gateway study area, to discuss local issues and priorities and formulate a collective position for consideration by the 2020 Peninsula Gateway Corridor Study committees and sponsors. This position statement, called the "Dumbarton Dialogue Credo," was presented to the PAC in June 2007 and contained specific criteria supporting overriding objectives including Quality of Life, Reduce Impact of Commuter Traffic upon East Palo Alto and Eastern Menlo Park, Reduce Traffic Through Transit Alternatives, and Environmental Protection. The "Credo" is included in Appendix B. (See www.dumbartondialogue.org for details.)

E. *Development of Universe of Potential Solutions*

The alternatives summarized in this report evolved from a series of interim products describing the possible "universe" of alternatives that could potentially address the traffic issues in the corridor in the context of the Study Goals. These were combined with the evaluation of existing conditions and feedback from the Technical Advisory Committee (TAC) and the Policy Advisory Committee (PAC) into a list of potential solutions. A series of themes and their corresponding issues were developed to describe the corridor characteristics. Potential solutions were then brainstormed relating to each theme. Improvements that would complement the solutions, if applicable, were also generally identified. The themes are summarized below and subsequently described with respect to issues and potential solutions.

1. Improve connection (i.e. increase traffic capacity) between Dumbarton Bridge touchdown and Highway 101 North
2. Improve connection (i.e. increase traffic capacity) between Dumbarton Bridge touchdown and Highway 101 South
3. Expand capacity on Highway 101 South (County line to Shoreline Blvd.)
4. Expand capacity on Highway 101 North (County Line to Woodside Road)
5. Divert commuter traffic from East Palo Alto neighborhoods (east/south of University)
6. Divert commuter traffic from University Avenue
7. Traffic calming on local residential streets
8. Improve freeway access
9. Accommodate traffic impacts of major developments
10. Improve traffic management
11. Improve local access across Highway 101.

THEME 1: Improve connection (i.e. increase traffic capacity) between Dumbarton Bridge touchdown and Highway 101 North

ISSUES:

- Congestion at intersections on Bayfront Expressway with University Ave., Willow Road, and Marsh Road
- Conflicting traffic movements at Marsh Road/Highway 101 interchange
- Willow Road, although a State Highway, is only a four-lane arterial primarily serving local uses and lacks capacity
- University Avenue is a four-lane arterial serving many local uses and lacks capacity

POTENTIAL SOLUTIONS:

- Direct flyover connections between Bayfront/Marsh and Highway 101 (north of Marsh)
- Bayfront Expressway extension to Woodside Road Interchange
- Elevated roadway over Dumbarton RR between University and Highway 101 (south of Marsh)
- Grade separate University/Bayfront Expressway intersection
- Grade separate Willow/Bayfront intersection
- An aerial braided roadway connection leaving southbound Highway 101 downstream of Dumbarton Railroad Bridge, proceeding to Willow Road and merging with the northbound Highway 101 to eastbound Willow Road connection.

COMPLEMENTARY IMPROVEMENTS:

- Intelligent Transportation Systems (ITS) (e.g. closed circuit television (CCTV), changeable message signs (CMS), lane control signalization, upgraded communication and detection elements)
- Congestion pricing
- Combine improvements addressing connection to Highway 101 South

THEME 2: Improve connection (i.e. increase traffic capacity) between Dumbarton Bridge touchdown and Highway 101 South

ISSUES:

- Congestion at intersections on Bayfront Expressway with University Ave. and Willow Road
- Willow Road, although a State Highway, is only a four-lane arterial primarily serving local uses and lacks capacity
- University Avenue is a four-lane arterial serving many local uses and lacks capacity

POTENTIAL SOLUTIONS:

- New south connection (various alignment options)
- Tunnel beneath East Palo Alto between (roughly) the Dumbarton Bridge and Highway 101, beneath the Ravenswood Industrial Area and the residential neighborhoods on East Palo Alto's residential subdivisions.
- Aerial braided roadway connections leaving northbound on Highway 101 upstream of Oregon/Embarcadero, aligned over E. Bayshore Road and crossing University Avenue, proceeding to Willow Road and continuing over Willow Road to Bayfront Expressway, continuing over Bayfront Expressway to touchdown just west of the Dumbarton Bridge;

COMPLEMENTARY IMPROVEMENTS:

- ITS (e.g. closed circuit television (CCTV), changeable message signs (CMS), lane control signalization, upgraded communication and detection elements)
- Congestion pricing
- Combine improvements addressing connection to Highway 101 North

THEME 3: Expand capacity on Highway 101 South (County line to Shoreline Blvd.)

ISSUES:

- Heavy congestion and vehicle delay in both directions of Highway 101 (LOS F)
- Relatively high accident rates on Highway 101
- No southbound on-ramp at San Antonio Rd. forces traffic to Charleston Road on-ramp, which merges to Highway 101 slightly upstream of the Rengstorff Avenue off-ramp and therefore is limited in capacity; also, the increased concentration of traffic at the Rengstorff Avenue southbound on-ramp further worsens the operation on this segment of Highway 101

POTENTIAL SOLUTIONS:

- Auxiliary lanes on Highway 101 from Embarcadero Rd. to Shoreline Blvd.
- Widen Highway 101 to ten through lanes (4 mixed flow, 1 HOV each direction) and reconstruct interchanges at Embarcadero Rd/Oregon Expwy, San Antonio Rd., and Rengstorff Ave., and perhaps Old Middlefield Way
- Widen Highway 101 to 12 lanes (4 mixed flow, 1 auxiliary, 1 HOV each direction)
- Reconstruct Embarcadero/Oregon interchanges to provide room for ultimate 10-12 lanes

COMPLEMENTARY IMPROVEMENTS:

- Convert HOV lanes to High Occupancy Toll (HOT) lanes
- ITS (e.g. closed circuit television (CCTV), changeable message signs (CMS), trailblazer signs for detour directions, upgraded communication and detection elements)

DISCUSSION:

- Complements SR 85/Highway 101 North project and SMCTA Auxiliary Lanes Project (Marsh Rd. to County line)
- SR 85/Highway 101 North project will construct 12 lane cross section at Shoreline Rd. that narrows to 11 lanes at Old Middlefield Way and then to 8 lanes north of Old Middlefield Way

THEME 4: Expand capacity on Highway 101 North (County Line to Woodside Road)

ISSUES:

- Extreme congestion during long a.m. and p.m. peak periods, in both directions

POTENTIAL SOLUTIONS:

- Widen Highway 101 to 12 lanes (4 mixed flow, 1 auxiliary, 1 HOV each direction), which would require reconstruction of interchanges at Woodside Road, Marsh Road, Willow Road, and University Avenue
- Put HOV lanes on structure, use remaining available space for one added through lane each direction; HOV lanes may need to be express to bypass local interchanges; also, this would limit HOV access to University Avenue and Willow Road, which now provide a bridge connection for many HOVs
- Build elevated deck to accommodate 2 (or more) added mixed flow lanes above Highway 101, which could be reversible
- Reversible lanes on Highway 101; it is noted that this solution would be compatible with a condition where there is substantial directional demand that reverses in one peak period versus another, which is not the case on Highway 101 in the corridor
- Reconstruct selected interchanges in phases, to provide clear width for future widening

COMPLEMENTARY IMPROVEMENTS:

- ITS (e.g. closed circuit television (CCTV), changeable message signs (CMS), trailblazer signs for detour directions, upgraded communication and detection elements)
- Congestion pricing

DISCUSSION:

- Limited capacity at study boundaries of Highway 101 corridor would indicate that these improvements may simply “move” an existing bottleneck

THEME 5: Divert commuter traffic from East Palo Alto neighborhoods (east/south of University)

ISSUES:

- Heavy commuter traffic (cut-through) volumes and congestion on East Bayshore, Pulgas, Clarke, and Bay in East Palo Alto

POTENTIAL SOLUTIONS:

- New south connection (various alignment options)
- Increase University Avenue capacity (remove parking, widen or two-level roadway, or tunnel and surface roadway, grade separated intersections, or reversible lanes)
- Increase Willow Road capacity (grade separated intersections, "fast lane," tunnel, reversible lanes, expressway)
- Traffic calming (prohibit movements, prohibit non-resident traffic, etc.) on affected streets;

COMPLEMENTARY IMPROVEMENTS:

- Close neighborhood streets to through traffic in combination with above capacity increases
- Pricing/tolls on new connection
- ITS (e.g. closed circuit television (CCTV), changeable message signs (CMS), lane control signalization, traffic signal coordination, upgraded communication and detection elements)

THEME 6: Divert commuter traffic from University Avenue

ISSUES:

- Heavy congestion on University Avenue due to through traffic
- Street is essentially a barrier that divides the community resulting in safety and quality of life challenges

POTENTIAL SOLUTIONS:

- New south connection (various alignment options)
- Increase Willow Road capacity
- Streetscape and traffic calming improvements on University Avenue
- Roundabouts at Donohoe, Bay, other intersections

COMPLEMENTARY IMPROVEMENTS:

- Close neighborhood streets (Pulgas, Clarke, Bay) to through traffic
- Pricing/tolls on new connection
- ITS (e.g. closed circuit television (CCTV), changeable message signs (CMS), lane control signalization, traffic signal coordination, upgraded communication and detection elements)

THEME 7: Traffic calming on local residential streets

ISSUES:

- Congestion on University Avenue west of Highway 101 induces diversion to Woodland Avenue in Menlo Park

- Heavy commuter cut-through traffic in East Palo Alto (E. Bayshore to Pulgas or Clarke to Bay to University)

POTENTIAL SOLUTIONS:

- Modify Woodland Avenue to maintain access to University Palms/Four Seasons Hotel and impede commuter cut-through traffic
- Close Pulgas, Clarke, and Bay to cut-through traffic using traffic calming improvements

COMPLEMENTARY IMPROVEMENTS:

- ITS (e.g. CMS, CCTV, traffic speed detection)

THEME 8: Improve freeway access

ISSUES:

- No southbound Highway 101 on-ramp at San Antonio Avenue puts pressure on low-capacity on-ramp at Charleston Road
- Southbound connections at Woodside Road create congestion, limit access to Highway 101

POTENTIAL SOLUTIONS:

- Add southbound on-ramp at San Antonio Avenue and remove on-ramp at Charleston Road
- Reconstruct Highway 101/Woodside Road interchange

THEME 9: Accommodate traffic impacts of major developments

ISSUES:

- Planned development projects in Redwood City (e.g. Abbott Labs and Peninsula Park) will add peak hour vehicle trips to the Seaport Boulevard/Woodside Road/Highway 101 interchange

POTENTIAL SOLUTIONS:

- Reduce parking supply and increase transit service at new developments
- Widen the planned Blomquist Street Extension from 2 to 4 lanes, creating a 4-lane parallel arterial between Seaport Boulevard and Whipple Road
- Reconstruct Woodside Road interchange
- Widen Woodside Road

THEME10: Improve traffic management

ISSUES:

- The lack of traffic management elements in the study area results in poor driving habits and reactionary driving create unnecessary friction, congestion, and incidents

- Without management, traffic flows to fill available capacity regardless of size or nature of street systems

POTENTIAL SOLUTIONS:

- Metering westbound traffic at the west touchdown of the Dumbarton Bridge to introduce more orderly flow on University Avenue, Willow Road, Bayfront Expressway, and vehicle input at Highway 101
- Active traffic management throughout the corridor

COMPLEMENTARY IMPROVEMENTS:

- ITS (e.g. incident management system/protocol, closed circuit television (CCTV), changeable message signs (CMS), trailblazer signs for detour directions, upgraded communication and detection elements)
- Pricing/tolls

THEME 11: Improve local access across Highway 101

ISSUES:

- Highway 101 interchanges, especially those at Marsh, Willow, and University, act as bottlenecks and therefore barriers to local traffic desiring to cross Highway 101

POTENTIAL SOLUTIONS:

- Restricted-access, limited capacity tunnel or aerial connections across Highway 101 corridor that would serve only crossing traffic, not traffic entering/leaving Highway 101

COMPLEMENTARY IMPROVEMENTS:

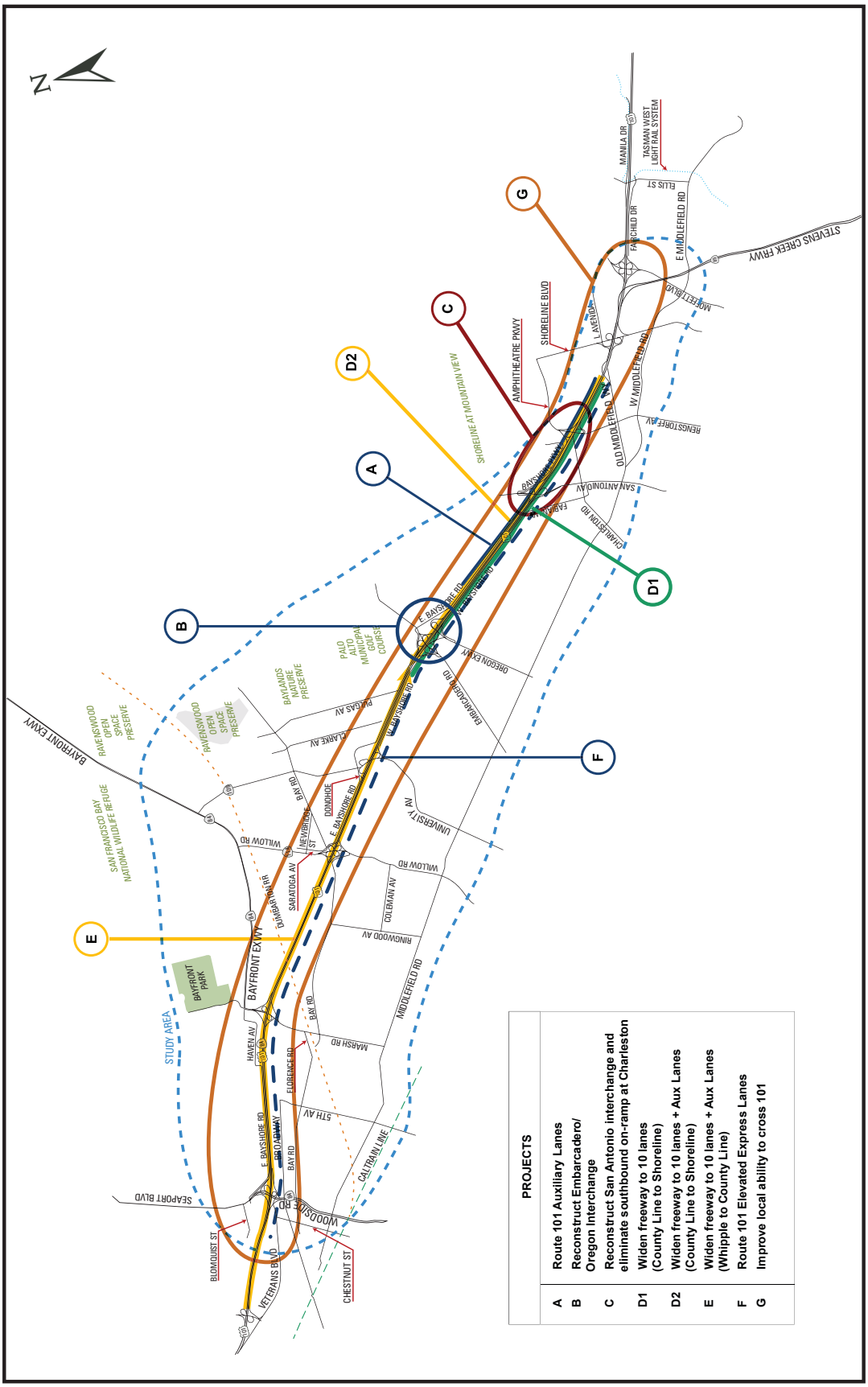
- ITS (e.g. signage, CMS, CCTV, lane control signalization, possibly electronic Fastrak-like access control systems that would be programmed to recognize local vehicles and identify (and cite) vehicles not technically permitted to use the restricted-access facilities)

F. *Assessment of Universe of Potential Solutions*

The potential themes were reviewed in several meetings with the Technical Advisory Committee (TAC) and the Policy Advisory Committee (PAC). This culminated in a list of 71 alternative improvements. These were compiled in a chart with respect to pros and cons, potential fatal flaws, relative costs, and implementation horizons, which were in turn reviewed with the TAC and the PAC. These alternatives are shown in **Figures 5A** through **5E** and are grouped geographically.

Once the list of all possible alternatives was brainstormed, an assessment of relative benefits, costs, and impacts was conducted. The following tables summarize the assessment that utilized a simple “high-medium-low” approach.

- **Table 1A**: Highway 101
  - Projects A and D1:
    - Both have 10-lane mainline cross-section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PROJECTS
A Route 101 Auxiliary Lanes
B Reconstruct Embarcadero/ Oregon Interchange
C Reconstruct San Antonio interchange and eliminate southbound on-ramp at Charleston
D1 Widen freeway to 10 lanes (County Line to Shoreline)
D2 Widen freeway to 10 lanes + Aux Lanes (County Line to Shoreline)
E Widen freeway to 10 lanes + Aux Lanes (Whipple to County Line)
F Route 101 Elevated Express Lanes
G Improve local ability to cross 101
STUDY AREA
BAYFRONT EXWY
BAYFRONT PARK
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
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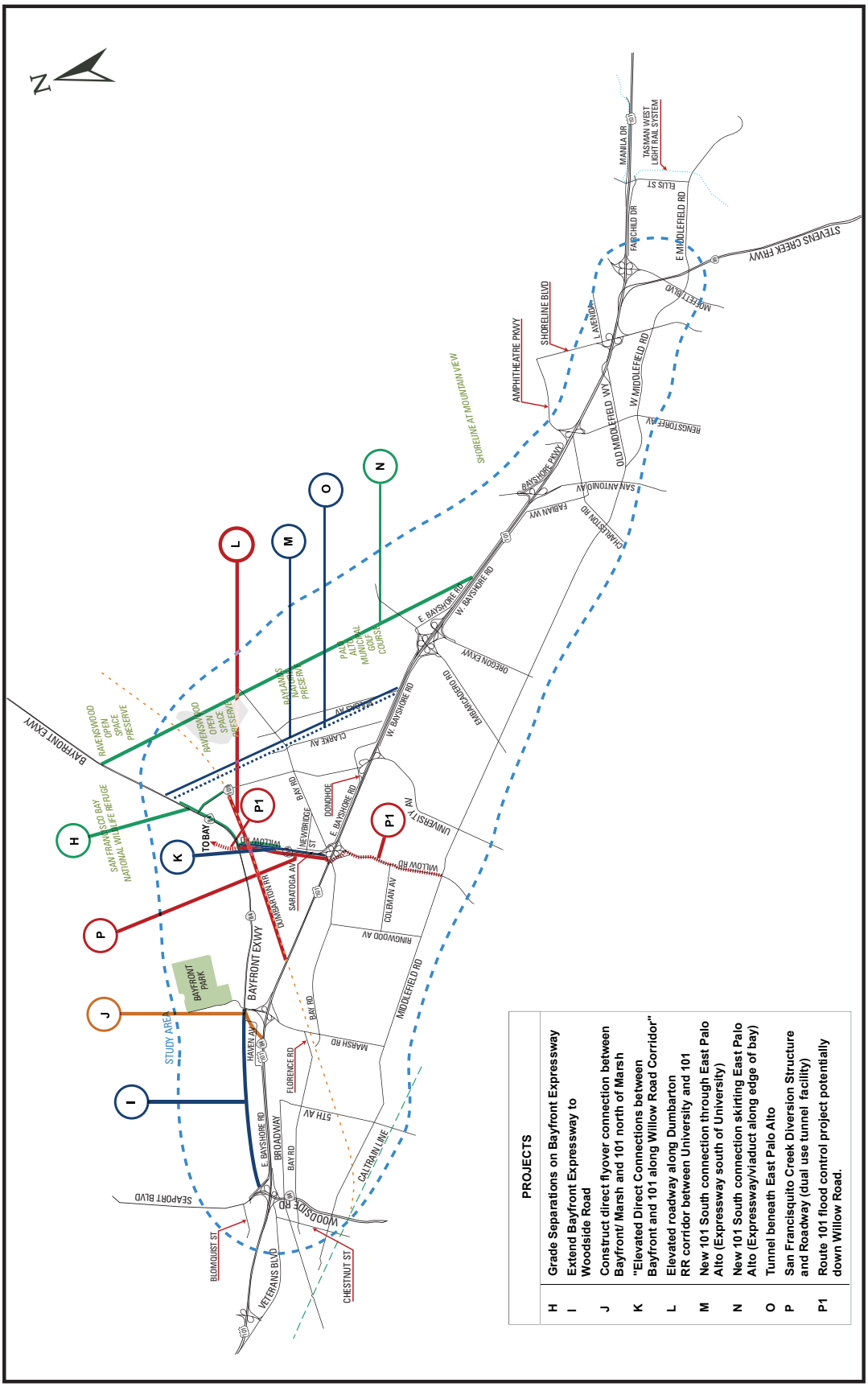
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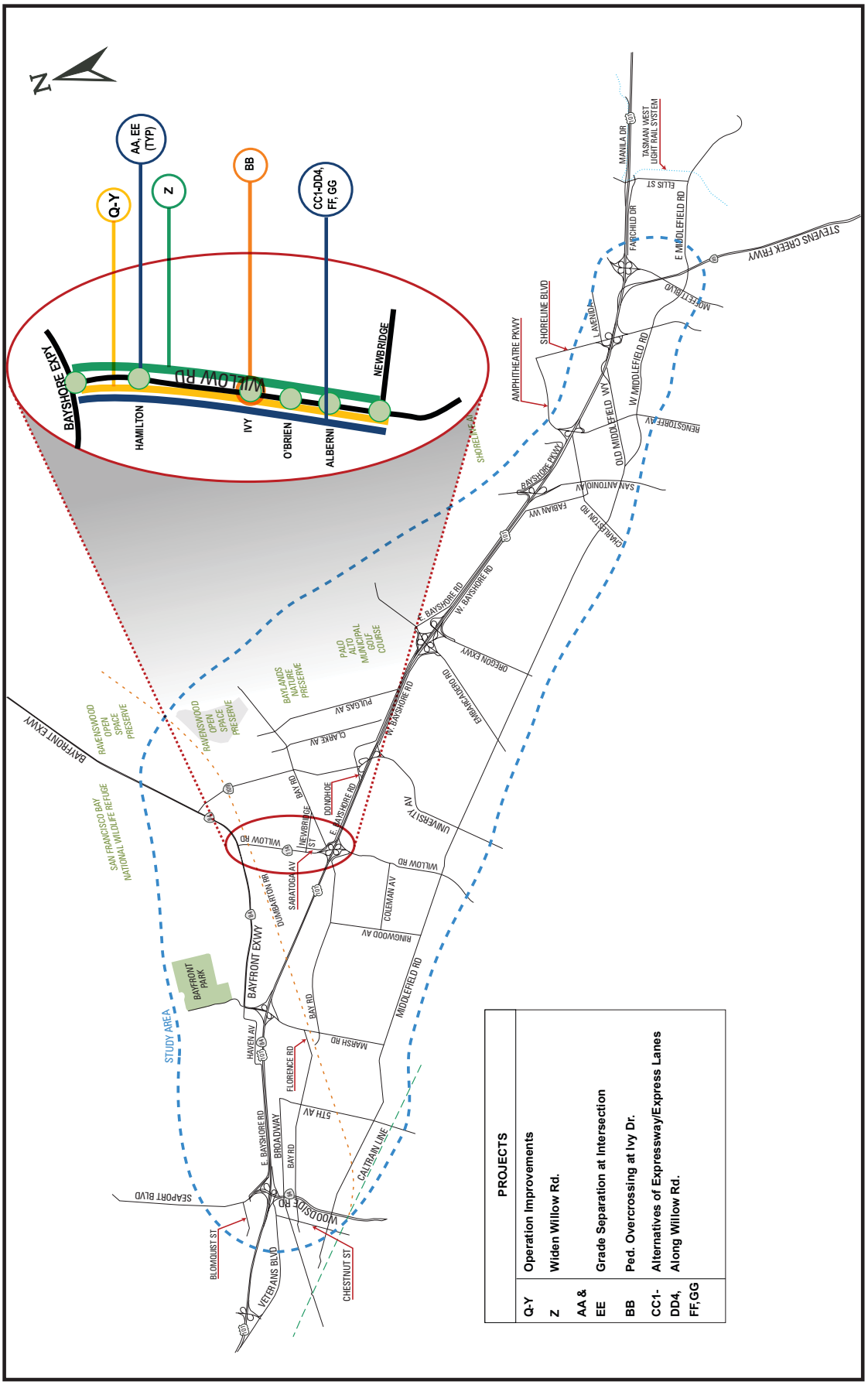
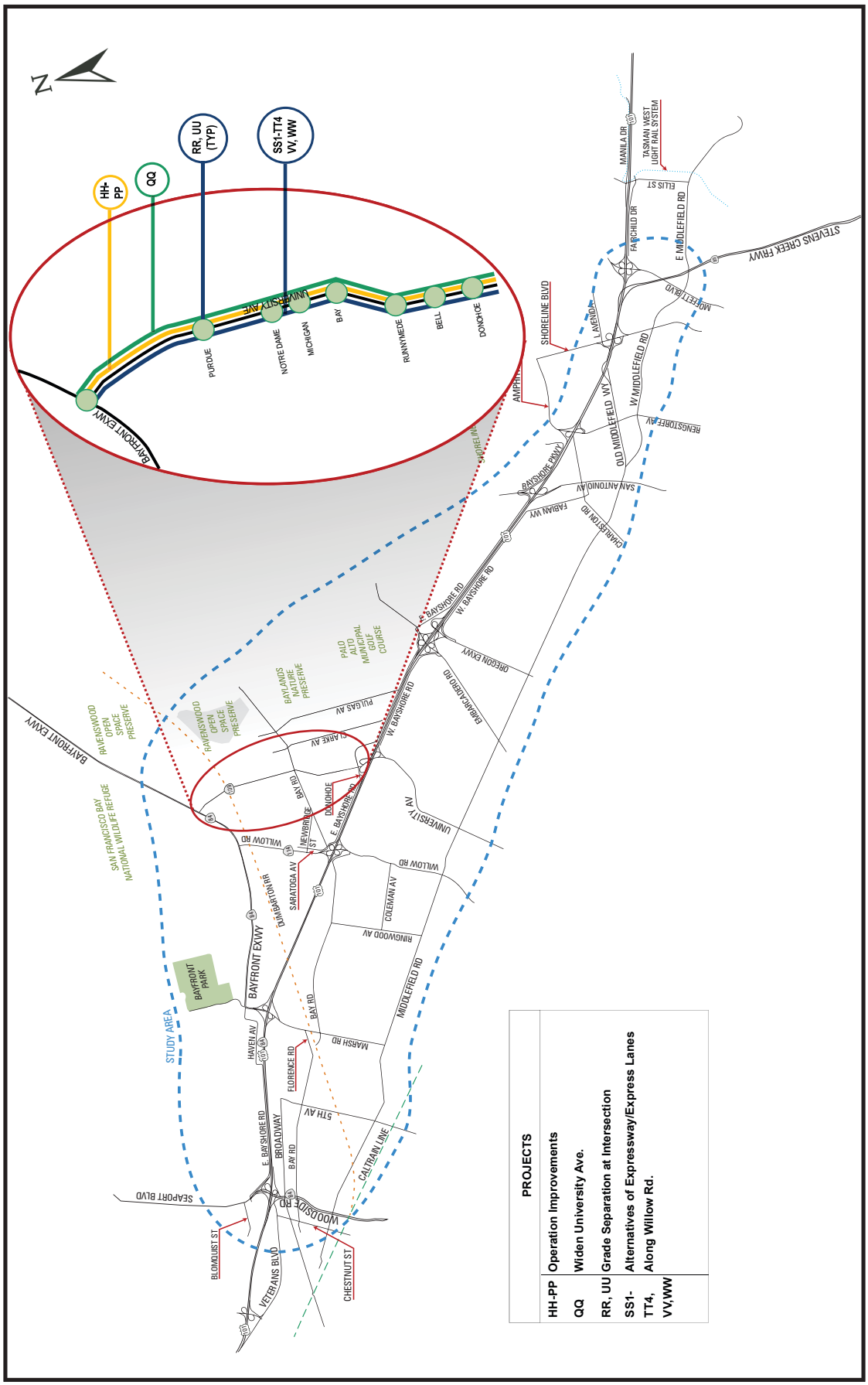
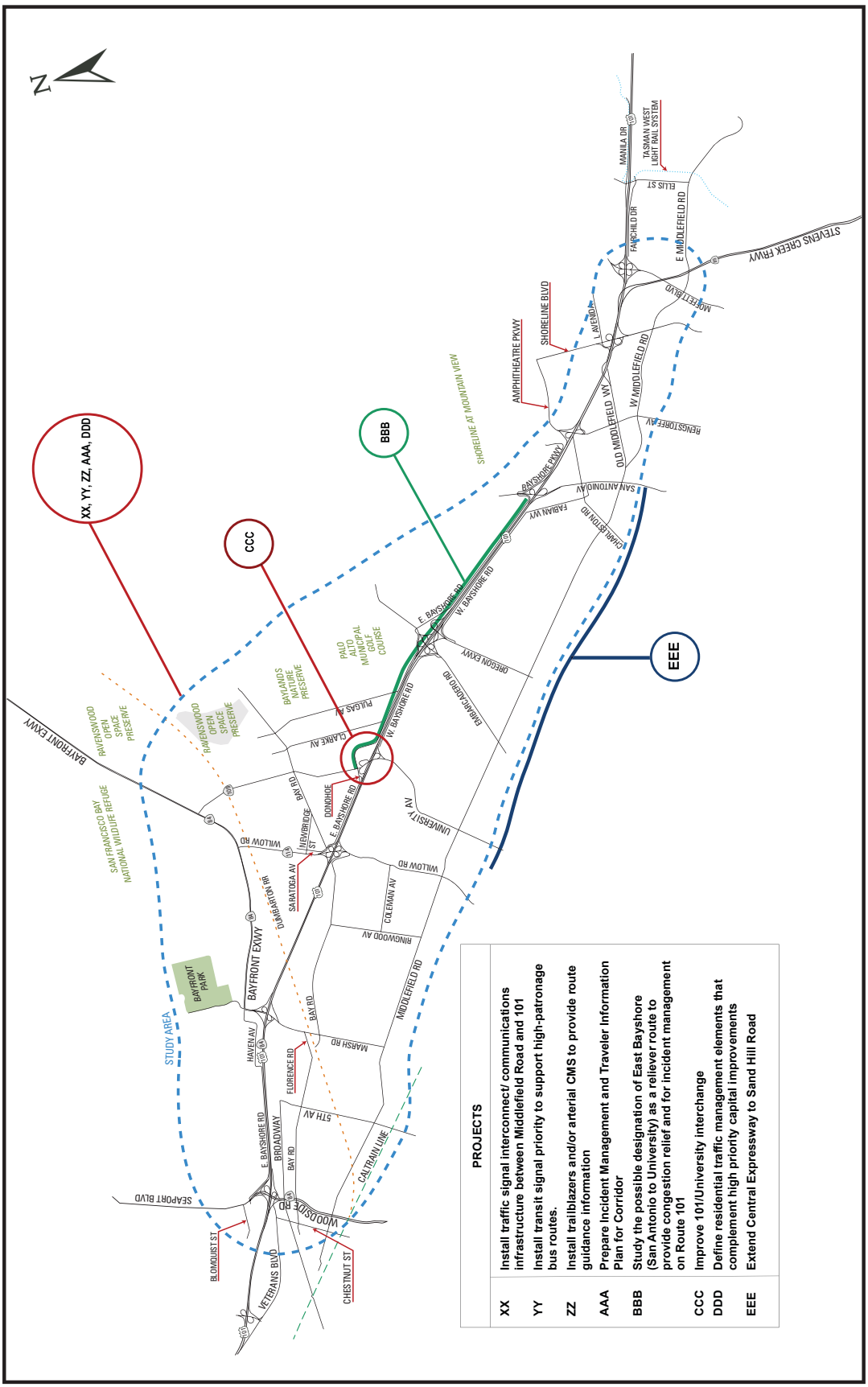
P1
PROJECTS
H Grade Separations on Bayfront Expressway
I Extend Bayfront Expressway to Woodside Road
J Construct direct flyover connection between Bayfront/ Marsh and 101 north of Marsh
K "Elevated Direct Connections between Bayfront and 101 along Willow Road Corridor"
L Elevated roadway along Dumbarton RR corridor between University and 101
M New 101 South connection through East Palo Alto (Expressway south of University)
N New 101 South connection skirting East Palo Alto (Expressway/viaduct along edge of bay)
O Tunnel beneath East Palo Alto
P San Francisquito Creek Diversion Structure and Roadway (dual use tunnel facility)
P1 Route 101 flood control project potentially down Willow Road.


N
AA, EE (TYP)
Q-Y
Z
BB
CC1-DD4, FF, GG
BAYSHORE EXPY
WILLOW RD
NEWBRIDGE
HAMILTON
IVY
O'BRIEN
ALBERNI
PROJECTS
Q-Y Operation Improvements
Z Widen Willow Rd.
AA & EE Grade Separation at Intersection
BB Ped. Overcrossing at Ivy Dr.
CC1-DD4, FF, GG Alternatives of Expressway/Express Lanes Along Willow Rd.
STUDY AREA
BAYFRONT EXWY
BAYFRONT PARK
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
E BAYSHORE RD
W BAYSHORE RD
EMBARCADERO RD
OREGON EXPY
PULGAS AV
CLARE AV
DONOHOE ST
UNIVERSITY AV
WILLOW RD
DUMBARTON RR
SARATOGA AV
COLEMAN AV
RINGWOOD AV
MIDDLEFIELD RD
MARSH RD
HAVEN AV
FLORENCE RD
STH AV
BROADWAY
BAY RD
WOODSIDE RD
SEAPORT BLVD
BLOMQUIST ST
VETERANS BLVD
CHESTNUT ST
CALTRAIN LINE
AMPHITHEATRE PKWY
SHORELINE BLVD
LAWRENCE EXPY
OLD MIDDLEFIELD WAY
W MIDDLEFIELD RD
REGNSTORFF AV
SAN ANTONIO AV
FABIAN WY
CHARLESTON RD
MOFFETT BLVD
E MIDDLEFIELD RD
FAIRCHILD DR
ELLIS ST
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
STEVENS CREEK PKWY


N
HH-PP
QQ
RR, UU (TYP)
SS1-TT4 VV, WW
PURDUE
NOTRE DAME
MICHIGAN
BAY
RUNNYMEDE
BELL
DONOHOE
UNIVERSITY AVE
BAYFRONT EXWY
SHORELINE
AMPHITHEATER
SHORELINE BLVD
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
ELLIS ST
FAIRCHILD DR
E MIDDLEFIELD RD
STEVENS CREEK FRWY
MOFFETT BLVD
W MIDDLEFIELD RD
OLD MIDDLEFIELD WY
LAVENDER
BENGSTORFF AV
SAN ANTONIO AV
FABIAN WY
CHARLESTON RD
BAYSHORE FWY
W. BAYSHORE RD
E. BAYSHORE RD
OREGON EXWY
EMBARCADERO RD
PALO ALTO MUNICIPAL GOLF COURSE
BAYLANDS NATURE PRESERVE
RAVENSWOOD OPEN SPACE PRESERVE
PULGAS AV
O'CARR AV
BAY RD
DONOHOE ST
UNIVERSITY AV
WILLOW RD
SARATOGA AV
DUMBARTON RR
COLEMAN AV
RINGWOOD AV
MIDDLEFIELD RD
MARSH RD
HAVEN AV
FLORENCE RD
5TH AV
BAYFRONT PARK
STUDY AREA
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
E. BAYSHORE RD
BROADWAY
BAY RD
CALTRAIN LINE
WOODSIDE RD
SEAPORT BLVD
BLOMQUIST ST
VETERANS BLVD
CHESTNUT ST
PROJECTS
HH-PP Operation Improvements
QQ Widen University Ave.
RR, UU Grade Separation at Intersection
SS1-TT4, VV,WW Alternatives of Expressway/Express Lanes Along Willow Rd.


N
XX, YY, ZZ, AAA, DDD
CCC
BBB
EEE
STUDY AREA
BAYFRONT EXWY
BAYFRONT PARK
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
RAVENSWOOD OPEN SPACE PRESERVE
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
SHORELINE AT MOUNTAIN VIEW
AMPHITHEATRE PKWY
SHORELINE BLVD
STEVENS CREEK PRWY
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
ELLIS ST
FAIRCHILD DR
E. MIDDLEFIELD RD
MOFFETT BLVD
W. MIDDLEFIELD RD
OLD MIDDLEFIELD WY
RENGSTORFF AV
SAN ANTONIO AV
CHARLESTON RD
FABIAN WY
BAYSHORE PKWY
E. BAYSHORE RD
W. BAYSHORE RD
OREGON EXWY
EMBARCADERO RD
PULGAS AV
CLARK AV
UNIVERSITY AV
DONOHOE
BAY RD
INNERBRIDGE ST
WILLOW RD
SARATOGA AV
DUMBARTON HR
COLEMAN AV
RINGWOOD AV
MIDDLEFIELD RD
MARSH RD
BAY RD
HAVEN AV
FLORENCE RD
5TH AV
BROADWAY
E. BAYSHORE RD
BAY RD
CALTRAIN LINE
WOODSIDE RD
SEAPORT BLVD
BLOMQUIST ST
VETERANS BLVD
CHESTNUT ST
PROJECTS
XX Install traffic signal interconnect/ communications infrastructure between Middlefield Road and 101
YY Install transit signal priority to support high-patronage bus routes.
ZZ Install trailblazers and/or arterial CMS to provide route guidance information
AAA Prepare Incident Management and Traveler Information Plan for Corridor
BBB Study the possible designation of East Bayshore (San Antonio to University) as a reliever route to provide congestion relief and for incident management on Route 101
CCC Improve 101/University interchange
DDD Define residential traffic management elements that complement high priority capital improvements
EEE Extend Central Expressway to Sand Hill Road

HIGHWAY 101

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environment	Right-of-Way
A	Route 101 Auxiliary Lanes	MV, PA	See "Comparison" Chart (ALT 1)						
B	Reconstruct Embarcadero/Oregon Interchange	MV, PA	⊙	⊙	$$$	⊙	⊙	⊙	⊙
C	Reconstruct San Antonio interchange and eliminate southbound on ramp at Charleston	MV, PA	●	-	$$$	⊙	⊙	⊙	⊙
D1	Widen freeway to 10 lanes (County Line to Shoreline)	MV, PA	●	-	$$$$$	⊙	⊙	⊙	⊙
D2	Widen freeway to 10 lanes + Aux Lanes (County Line to Shoreline)	MV, PA	●	-	$$$$$	○	⊙	○	○
E	Widen freeway to 10 lanes + Aux Lanes (Whipple to County Line)	RC, MP, EPA, PA	●	-	$$$$$	○	⊙	○	○
F	Route 101 Elevated Express Lanes	MV, PA, EPA, MP, RC	See "Comparison" Chart (ALT 2)						
G	Improve local ability to cross 101	MV, PA, EPA, MP, RC	-	-	$$	-	-	⊙	⊙

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	**$$$$**	$200M-$500M	**$$$**	$50M-$200M	**$$**	$1M-$50M	**$**	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

- D1 requires reconstruction of interchanges
- Projects D2 and E require substantial right-of-way, disruption
- Project F may require right-of-way at conform locations

- **Table 1B**: Connection between Dumbarton Bridge and Highway 101
  - Project H would have visual impact
  - Projects I and J would have similar benefits
  - Projects M and N would have significant impacts
  - Project P1 is not a traffic project so no traffic benefits are shown
- **Table 1C:** Willow Road
  - Several projects have small benefits and significant Environment impact
  - Widening and grade-separations, while beneficial, have significant impacts
  - Difference between CC and GG (express lanes) is primarily visual
- **Table 1D:** University Avenue
  - Several projects have small benefits and significant Environment impacts
  - Widening and grade-separations, while beneficial, have significant impacts
  - Difference between SS and WW (express lanes) is primarily visual
- **Table 1E**: Intelligent Transportation Systems (ITS)
  - Complementary to physical expansion projects
  - Incident Management Study is nearing completion (sponsored by C/CAG).
- **Table 1F**: Other
  - Two projects are studies
  - Central Expressway extension, while beneficial, would have significant impacts

CONNECTING BRIDGE AND HIGHWAY 101

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environment	Right-of-Way
H	Grade Separations on Bayfront Expressway	EPA, MP	See "Comparison" Chart (ALT 3)						
I	Extend Bayfront Expressway to Woodside Road	MP, RC	●	⊙	$$$	⊙	⊙	○	○
J	Construct direct flyover connection between Bayfront/ Marsh and 101 north of Marsh	MP, RC	⊙	⊙	$$$	○	⊙	⊙	○
K	Elevated Direct Connections between Bayfront and 101 along Willow Road Corridor	EPA, MP	**This project has been replaced by improvement CC**						
L	Elevated roadway along Dumbarton RR corridor between University and 101	EPA, MP	●	⊙	$$$$	○	⊙	○	⊙
M	New 101 South connection through East Palo Alto (Expressway south of University)	EPA, MP	●	●	$$$$$	○	○	○	○
N	New 101 South connection skirting East Palo Alto (Expressway/viaduct along edge of bay)	EPA, PA	●	●	$$$$$	○	⊙	○	○
O	Tunnel beneath East Palo Alto	EPA	●	●	$$$$$	●	●	●	⊙
P	San Francisquito Creek Diversion Structure and Roadway (dual use tunnel facility)	EPA, PA	⊙	⊙	$$$$	⊙	⊙	○	⊙
P1	Route 101 flood control project potentially down Willow Road.	EPA, MP	-	-	$$$$	⊙	⊙	○	⊙

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	**$$$$**	$200M-$500M	**$$$**	$50M-$200M	**$$**	$1M-$50M	**$**	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

WILLOW ROAD

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environment	Right-of-Way
Q	Short-term operational improvements on Willow Road	EPA, MP	See "Comparison" Chart (ALT 4)						
R	Prohibit left turns during peak travel periods	EPA, MP	⊙	⊙	$	-	-	⊙	-
S	Prohibit local cross traffic during peak travel periods	EPA, MP	⊙	⊙	$	-	-	○	-
T	Exit/Entrance Right Turn pockets on Willow	EPA, MP	⊙	⊙	$	-	-	-	⊙
U	Set back curb line one lane width from traveled way at driveways	EPA, MP	⊙	⊙	$	-	-	○	○
V	Eliminate driveway access on Willow	EPA, MP	⊙	⊙	$	-	-	○	-
W	Eliminate selected signalized intersections: · Newbridge St · Ivy Dr · Hamilton Ave	EPA, MP	⊙	⊙	$	-	-	○	-
X	Eliminate signalized intersections and allow right turns only on/off Willow	EPA, MP	⊙	⊙	$	-	-	○	-
Y	Eliminate signalized intersections and prohibit any access from local streets	EPA, MP	⊙	⊙	$	-	-	○	-
Z	Widen Willow one lane each direction	EPA, MP	●	●	$$$	○	⊙	○	○
AA	Grade separations at selected intersections: · Newbridge St · Ivy Dr · Hamilton Ave	EPA, MP	●	●	$$$$	○	⊙	○	○
BB	Pedestrian over crossing at Ivy Dr (near Mid-Peninsula High School)	EPA, MP	-	-	$$	○	-	-	⊙

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	$$$$	$200M-$500M	$$$	$50M-$200M	$$	$1M-$50M	$	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

WILLOW ROAD (CONT'D)

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion (Expressed in ranges of travel time savings (min))	Decrease commute traffic on residential streets? (Expressed in ranges of peak period traffic volume)		Visual/ Aesthetics	Noise	Environment	Right-of-Way
CC1	Elevated viaduct expressway structure • 2 lanes in each direction	EPA, MP	●	⊙	$$$$	○	⊙	⊙	○
CC2 (Alt 6)	Elevated viaduct expressway structure • 1 lane in each direction	EPA, MP	See "Comparison" Chart (ALT 6)						
CC3	Elevated viaduct expressway structure • Reversible 2 lanes	EPA, MP	●	⊙	$$$$	○	⊙	⊙	⊙
CC4	Elevated viaduct expressway structure • 3 lanes with reversible middle lane	EPA, MP	●	⊙	$$$$	○	⊙	⊙	⊙
DD1	Depressed expressway • 2 lanes in each direction	EPA, MP	●	⊙	$$$$	⊙	⊙	⊙	○
DD2	Depressed expressway • 1 lane in each direction	EPA, MP	●	⊙	$$$$	⊙	⊙	⊙	⊙
DD3	Depressed expressway • Reversible 2 lanes	EPA, MP	●	⊙	$$$$	⊙	⊙	⊙	⊙
DD4	Depressed expressway • 3 lanes with reversible middle lane	EPA, MP	●	⊙	$$$$	⊙	⊙	⊙	⊙
EE	Grade separations at all intersections (over crossings or under crossings)	EPA, MP	●	●	$$$$$	○	⊙	○	○
FF	Tunnel Expressway (maintaining existing facility at grade)	EPA, MP	●	●	$$$$	⊙	⊙	⊙	⊙
GG	Willow Road Depressed/Cantilevered Express Lanes	EPA, MP	See "Comparison" Chart (ALT 7)						

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	$$$$	$200M-$500M	$$$	$50M-$200M	$$	$1M-$50M	$	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

UNIVERSITY AVENUE

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environment	Right-of-Way
HH	Short-term operational improvements on University Avenue	EPA	See "Comparison" Chart (ALT 8)						
II	Prohibit left turns during peak travel periods	EPA	⊙	⊙	$	-	-	⊙	-
JJ	Prohibit local cross traffic during peak travel periods	EPA	⊙	⊙	$	-	-	○	-
KK	Entrance/Exit Right Turn pockets on University	EPA	⊙	⊙	$	-	-	-	⊙
LL	Set back curb line one lane width from traveled way at driveways	EPA	⊙	⊙	$	-	-	○	○
MM	Eliminate driveway access on University	EPA	⊙	⊙	$	-	-	○	-
NN	Eliminate selected signalized intersections: · Bell · Runnymeade · Kavanaugh	EPA	⊙	⊙	$	-	-	○	-
OO	Eliminate signalized intersections and allow right turns only on/off University	EPA	⊙	⊙	$	-	-	○	-
PP	Eliminate signalized intersections and prohibit any access from local streets	EPA	⊙	⊙	$	-	-	○	-
QQ	Widen University one lane each direction	EPA	●	●	$$$	○	⊙	○	○
RR	Grade separations at selected intersections: · Donohoe · Bay	EPA	●	●	$$$$	○	⊙	○	○

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	$$$$	$200M-$500M	$$$	$50M-$200M	$$	$1M-$50M	$	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

UNIVERSITY AVENUE (CONT'D)

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environ-ment	Right-of-Way
SS1	Elevated expressway/viaduct along University corridor · 2 lanes each direction	EPA	⊙	●	$$$$	○	⊙	⊙	○
SS2	Elevated viaduct expressway structure · 1 lane in each direction	EPA	○	●	$$$$	○	⊙	⊙	⊙
SS3	Elevated viaduct expressway structure · Reversible 2 lanes	EPA	⊙	●	$$$$	○	⊙	⊙	⊙
SS4	Elevated viaduct expressway structure · 3 lanes with reversible middle lane	EPA	●	●	$$$$	○	⊙	⊙	○
TT1	Depressed expressway · 2 lanes each direction	EPA	⊙	●	$$$$$	⊙	⊙	⊙	○
TT2	Depressed expressway · 1 lane in each direction	EPA	○	●	$$$$$	⊙	⊙	⊙	⊙
TT3	Depressed expressway · Reversible 2 lanes	EPA	⊙	●	$$$$$	⊙	⊙	⊙	⊙
TT4	Depressed expressway · 3 lanes with reversible middle lane	EPA	●	●	$$$$$	⊙	⊙	⊙	○
UU	Grade separations at all intersections (over crossings or under crossings)	EPA	●	●	$$$$$	○	⊙	○	○
VV	Tunnel Expressway, (maintain existing facility at grade)	EPA	●	●	$$$$$	●	●	●	⊙
WW	University Avenue Depressed/ Cantilevered Express Lanes	EPA	See "Comparison" Chart (ALT 9)						

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	$$$$	$200M-$500M	$$$	$50M-$200M	$$	$1M-$50M	$	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environ-ment	Right-of-Way
XX	Install traffic signal interconnect/ communications infrastructure on arterials between Middlefield Road and 101	ALL	⊙	⊙	$$	-	-	-	-
YY	Install transit signal priority to support high-patronage bus routes.	ALL	⊙	⊙	$$	-	-	-	-
ZZ	Install trailblazers and/or arterial CMS to provide route guidance information	ALL	⊙	⊙	$$	-	-	-	-
AAA	Prepare Incident Management and Traveler Information Plan for Corridor	ALL	⊙	⊙	$	-	-	-	-

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	$$$$	$200M-$500M	$$$	$50M-$200M	$$	$1M-$50M	$	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

OTHER

ID Code	Alternative	Location	Traffic Benefits		Construction Cost (2006$)	Potential Impacts			
			Change in Roadway Congestion *(Expressed in ranges of travel time savings (min))*	Decrease commute traffic on residential streets? *(Expressed in ranges of peak period traffic volume)*		Visual/ Aesthetics	Noise	Environment	Right-of-Way
BBB	Study the possible designation of East Bayshore (San Antonio to University) as a reliever route to provide congestion relief and for incident management on Route 101 · Improve operations at intersections · Install directional signage to help keep commuters off residential streets	PA, EPA	-	-	$	-	-	-	-
CCC1	Improve 101/University interchange · Construct Phase 2 improvements (Part A = SB direct connect off-ramp, Part B = Bike access)	PA, EPA	⊙	⊙	$$	●	●	●	●
CCC2	Improve 101/University interchange · Improve on-off connections for northbound traffic	PA, EPA	⊙	⊙	$$$	⊙	⊙	⊙	⊙
DDD	Define residential traffic management elements that complement high priority capital improvements	ALL	-	●	$	-	-	●	-
EEE	Extend Central Expressway to Sand Hill Road	PA	●	●	$$$$$	○	○	○	○

Location Key

EPA	East Palo Alto	MP	Menlo Park	MV	Mountain View	PA	Palo Alto	RC	Redwood City

Construction Cost Key

$$$$$	>$500M	$$$$	$200M-$500M	$$$	$50M-$200M	$$	$1M-$50M	$	<$1M

ASSESSMENT KEY

	TRAFFIC BENEFITS	POTENTIAL IMPACTS
●	Improvement	Less-Than-Significant
⊙	Small Improvement	Less-Than-Significant (w/ MITIGATION)
○	Degrade	Significant
-	No Change	None

II. Detailed Evaluation of Certain Solutions

A. Definition and Engineering of Solutions

Eight specific improvements were defined by consensus of the TAC and the PAC as representative of the range of improvements that would address the study goals and should therefore be studied in more detail. These are summarized below. Appendix C contains conceptual sketches of most of the alternatives.

[Note: This study defines Highway 101 as north-south and intersecting streets as east-west. Bayfront Expressway is also defined as east-west.]

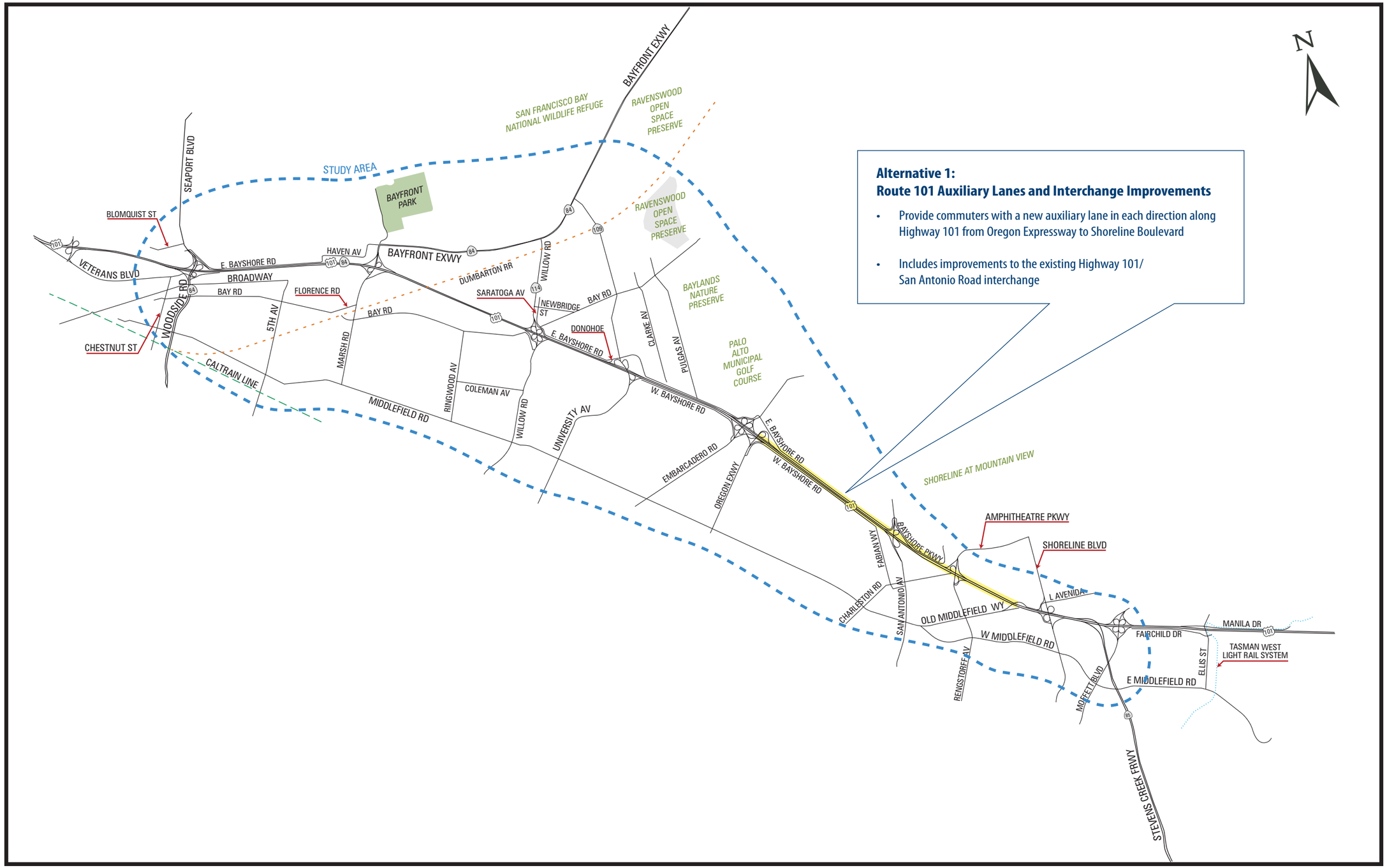
Alternative 1: Highway 101 Auxiliary Lanes and Interchange Improvements – This proposed alternative would provide commuters with a new auxiliary lane in each direction along Highway 101 from Oregon Expressway to Shoreline Boulevard. **Figure 6** illustrates the location of this improvement and Appendix C includes a conceptual sketch of the layout and cross section of this option. The roadway widening would require ramp modifications at existing interchanges, soundwalls, and the installation of longitudinal storm drainpipes on both sides of the highway to accommodate runoffs. These improvements would succeed the newly constructed auxiliary lanes from Hillsdale Boulevard to Marsh Avenue and also the future extension of the auxiliary lanes to Embarcadero Road proposed by the San Mateo County Transportation Authority.

This alternative will include improvements to the existing Highway 101/San Antonio Road interchange. Currently there are no on-ramps to Highway 101 for commuters to San Jose. Commuters are forced to use Charleston Road, a local road that connects to Highway 101 at the Rengstorff Interchange.

One option is to remove the existing southbound loop off-ramp to provide room for a new southbound diagonal on-ramp onto Highway 101. A “T” intersection/ramp connection to San Antonio Road would accommodate a left turn movement for westbound commuters wanting to exit onto the highway. The impacts of this option will include the widening of the existing bridge crossing to allow for the left-turn lane. The addition of new storage lanes would require eastbound commuters on San Antonio Road to merge sooner prior to connecting to the southbound diagonal on-ramp to avoid backing up through traffic. Right-of-way would also be required along the west side of Highway 101 to allow room for the diagonal on-ramp connection.

In addition, the existing diagonal off-ramp from Highway 101 would be modified to also have a “T” intersection/ramp connection to the local road to provide left- and right-turn movements onto San Antonio Road.

Alternative 2: Highway 101 Elevated Express Lanes – This alternative would provide commuters with elevated express lanes through the Highway 101 corridor from Woodside Road Interchange to Old Middlefield Way. **Figure 7** illustrates the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RAVENSWOOD OPEN SPACE PRESERVE
RAVENSWOOD OPEN SPACE PRESERVE
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
SHORELINE AT MOUNTAIN VIEW
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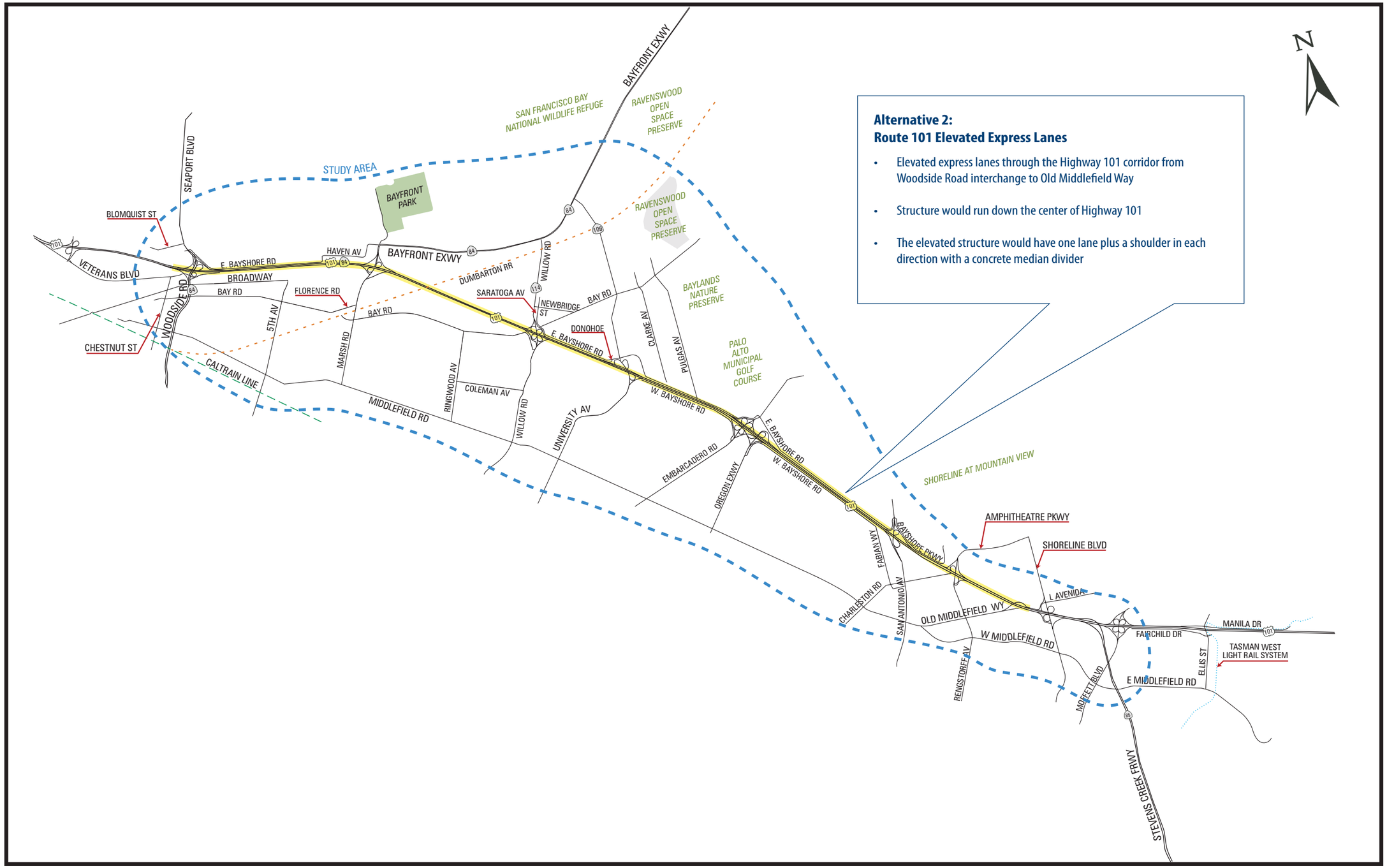
OLD MIDDLEFIELD WY
W MIDDLEFIELD RD
RENGSTORFF AV
MOFFETT BLVD
FAIRCHILD DR
MANILA DR
ELLIS ST
TASMAN WEST LIGHT RAIL SYSTEM
E MIDDLEFIELD RD
STEVENS CREEK FRWY
Alternative 1:
Route 101 Auxiliary Lanes and Interchange Improvements
• Provide commuters with a new auxiliary lane in each direction along Highway 101 from Oregon Expressway to Shoreline Boulevard
• Includes improvements to the existing Highway 101/ San Antonio Road interchange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Alternative 2:
Route 101 Elevated Express Lanes
• Elevated express lanes through the Highway 101 corridor from Woodside Road interchange to Old Middlefield Way
• Structure would run down the center of Highway 101
• The elevated structure would have one lane plus a shoulder in each direction with a concrete median divider
STUDY AREA
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
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AMPHITHEATRE PKWY
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FAIRCHILD DR
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
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MOFFETT BLVD
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SAN ANTONIO AV
CHARLESTON RD
FABIAN WY
OLD MIDDLEFIELD WY
W MIDDLEFIELD RD
L AVENIDA
STEVENS CREEK FRWY

location of this improvement, which is shown in more detail in Appendix C. The elevated structure would run down the center of Highway 101, about 6 meters above grade at stretches between the interchanges, and would raise above all existing interchanges and railroad overcrossing to an approximated grade of 12 meters. The elevated structure would have one lane plus a shoulder in each direction with a concrete median divider.

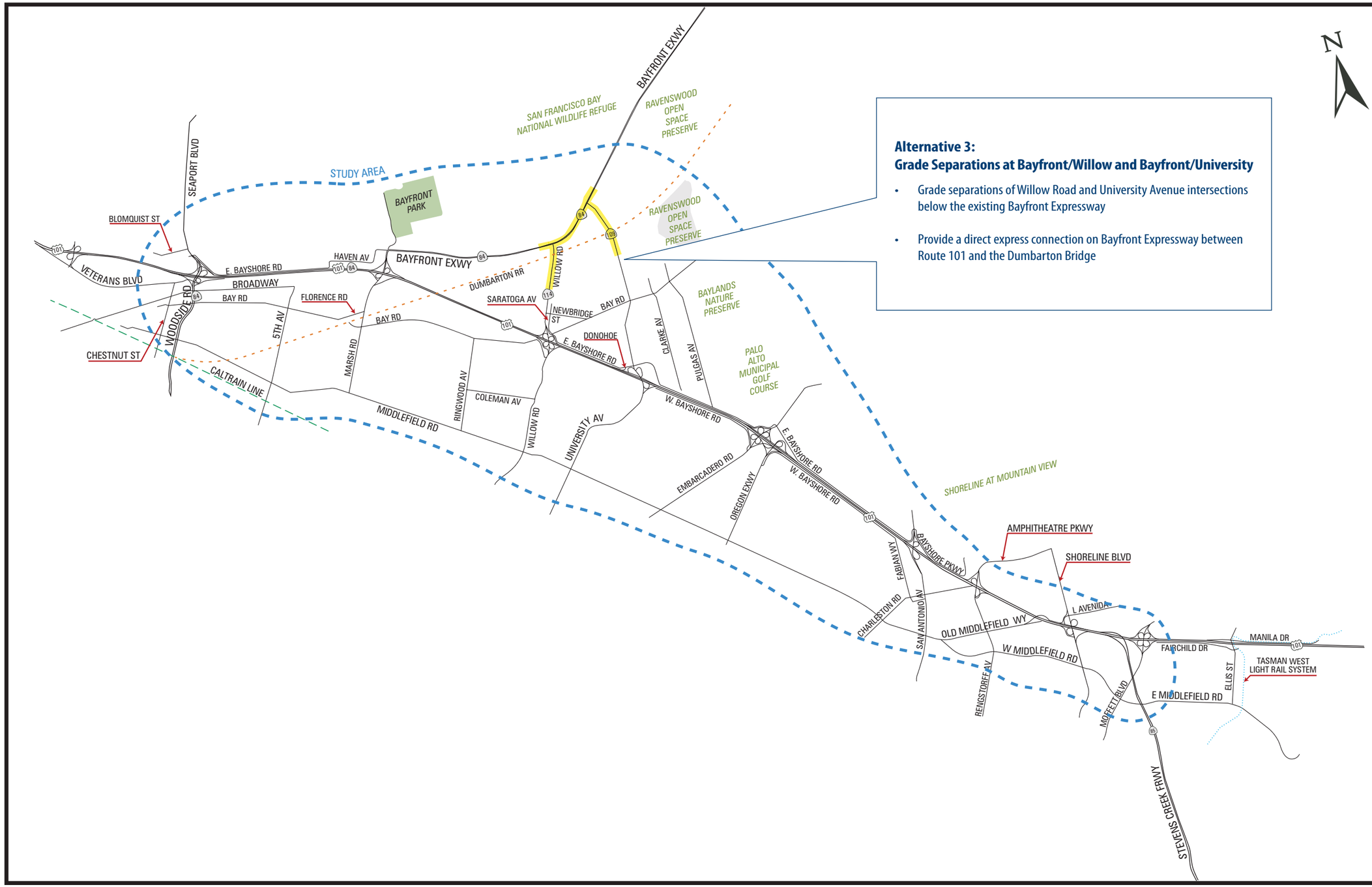
At the north end connection, commuters going southbound would enter a widened Highway 101 off ramp to Woodside Road and connect via flyover ramp to the elevated structure. Commuters going northbound on the elevated structure would touch down via flyover ramp to Highway 101 just after the Woodside Road Interchange, merging into the existing auxiliary lane.

At the south end, commuters going northbound would connect via flyover ramp from the Old Middlefield Way Overcrossing to the elevated structure. Commuters going southbound on the elevated structure would touch down via flyover ramp to Highway 101, below the Old Middlefield Way Overcrossing and merging to an existing auxiliary lane.

Additional right-of-way would be required where the flyover ramps touch down and merge to Highway 101.

Alternative 3: Grade Separations at Bayfront/Willow and Bayfront/University. This alternative would grade separate both Willow Road and University Avenue intersections below the existing expressway, essentially creating a freeway segment with full control of access that would benefit regional traffic connecting between the Dumbarton Bridge and Highway 101 in both directions. The location of this improvement is shown in **Figure 8**. Additional details are available in a sketch in Appendix C. The alternative would provide a direct express connection on Bayfront Expressway between Highway 101 and the Dumbarton Bridge, with uninterrupted traffic flow on the stretches of highway that would normally be delayed by signalized intersections at Willow Road and University Avenue. Also, this alternative would provide a direct connection from westbound Bayfront Expressway to Willow Road and Bayfront to University Avenue via flyover ramps. Although this alternative only includes a railroad grade separation on Willow Road at the Union Pacific/Dumbarton Rail tracks, a similar facility could be included at University. All other traffic would utilize the depressed intersections to make similar movements as they would now.

Alternative 4: Short-term Operational Improvements on Willow Road – An evaluation of existing peak hour traffic conditions confirmed that Willow Road traffic operates satisfactorily (LOS D or better) between Newbridge Street and the Bayfront Expressway, although cross-street traffic experiences significant delays at all intersections. However, traffic conditions at Newbridge Street are poor (LOS E) during a.m. and p.m. peak hours, and at Bayfront Expressway are poor (LOS F) during the p.m. peak hour. Traffic signals are coordinated, which provides some benefit in both directions during both peak hours.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Alternative 3:
Grade Separations at Bayfront/Willow and Bayfront/University
• Grade separations of Willow Road and University Avenue intersections below the existing Bayfront Expressway
• Provide a direct express connection on Bayfront Expressway between Route 101 and the Dumbarton Bridge
STUDY AREA
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
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BAYFRONT PARK
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VETERANS BLVD
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DUMBARTON RR
WILLOW RD
SARATOGA AV
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FLORENCE RD
WOODSIDE RD
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COLEMAN AV
UNIVERSITY AV
EMBARCADERO RD
OREGON EXWY
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CLARKE AV
PULGAS AV
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
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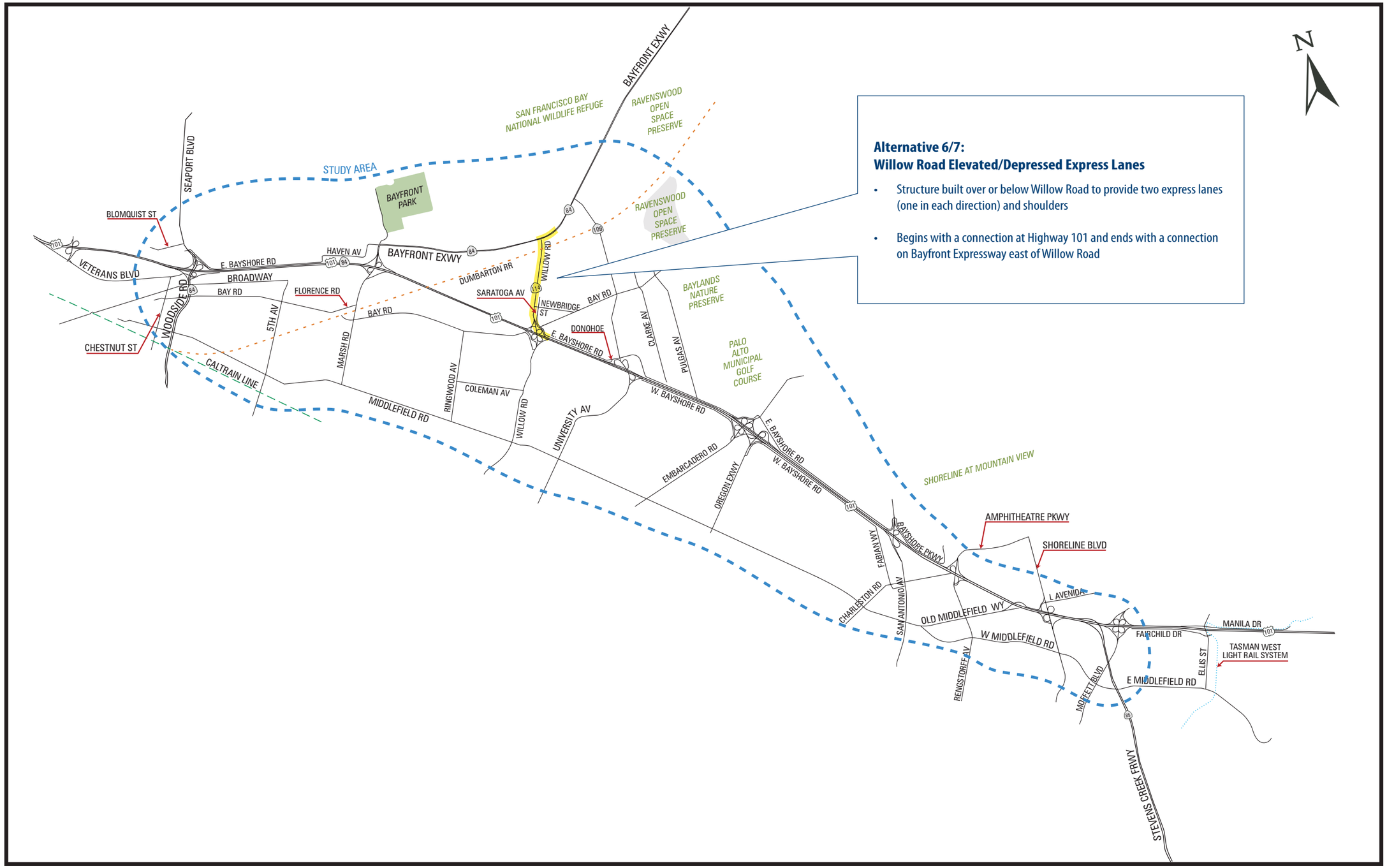
FAIRCHILD DR
MANILA DR
ELLIS ST
TASMAN WEST LIGHT RAIL SYSTEM
E MIDDLEFIELD RD
STEVENS CREEK FRWY

Additional operational analysis indicated that signal timing could be modified to reduce delay to certain critical movements at all signalized intersections, thereby improving traffic conditions during the peak periods. Most of the benefit would come from reducing cycle length from 130 seconds to 100 seconds at four intersections (Hamilton, Ivy, O'Brien, and Newbridge). In addition, allowing Willow left turns to operate in permitted mode (i.e. not protected as current) at Hamilton would reduce delay for these movements. Also, restriping and minor widening on the southbound Ivy approach to Willow and implementing overlap phasing would reduce delay for this movement and the Willow left turn movements.

Alternative 6: Willow Road Elevated Express Lanes – This alternative would include an aerial structure over Willow Road to provide two express lanes (one each direction) and shoulders, beginning with an aerial connection at Highway 101 and ending with an aerial connection on Bayfront Expressway east of Willow Road. It is noted that the capacity of the express lanes was defined for testing purposes, and future analyses would be necessary to evaluate whether additional express lane capacity would be required. **Figure 9** shows the location of this improvement and the sketch in Appendix C provides more details. The intent of this improvement is to remove some bridge traffic from Willow Road, which would enhance local traffic access and operations as well as improve travel time for bridge traffic by reducing delay at intersections. The initial definition has the existing Willow Road remaining much the same as it is now (four lanes with turn lanes), which is conservative given that four lanes at-grade may not be needed to serve local traffic.

Right-of-way acquisition for this alternative would be minimal along Willow Road, although some property will be required near the Highway 101 and Bayfront Expressway conforms to provide for the aerial connections.

Alternative 7: Willow Road Depressed Express Lanes - This alternative, a variation of Alternative 6, would include a depressed trench structure below Willow Road to provide two express lanes (one each direction) and shoulders, beginning with underground portals at Highway 101 and ending with underground portals on Bayfront Expressway east of Willow Road. It is noted that the capacity of the express lanes was defined for testing purposes, and future analyses would be necessary to evaluate whether additional express lane capacity would be required. The intent of this improvement is to remove some bridge traffic from Willow Road, which would enhance local traffic access and operations as well as improve travel time for bridge traffic by reducing delay at intersections. The initial definition has the existing Willow Road remaining much the same as it is now (four lanes with turn lanes), which is conservative given that four lanes at-grade may not be needed to serve local traffic. This cross-section will require acquisition of right-of-way strips on each side of Willow Road, and near Highway 101 and Bayfront Expressway conforms to provide for the underground connections.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Alternative 6/7:
Willow Road Elevated/Depressed Express Lanes
• Structure built over or below Willow Road to provide two express lanes (one in each direction) and shoulders
• Begins with a connection at Highway 101 and ends with a connection on Bayfront Expressway east of Willow Road
STUDY AREA
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
BAYFRONT PARK
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
SHORELINE AT MOUNTAIN VIEW
BAYFRONT EXWY
SEAPORT BLVD
BLOMQUIST ST
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NEWBRIDGE ST
WILLOW RD
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CLARKE AV
PULGAS AV
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MARSH RD
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MIDDLEFIELD RD
RINGWOOD AV
COLEMAN AV
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RENGSTORFF AV
MOFFETT BLVD
FAIRCHILD DR
ELLIS ST
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
E MIDDLEFIELD RD
STEVENS CREEK FRWY
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114

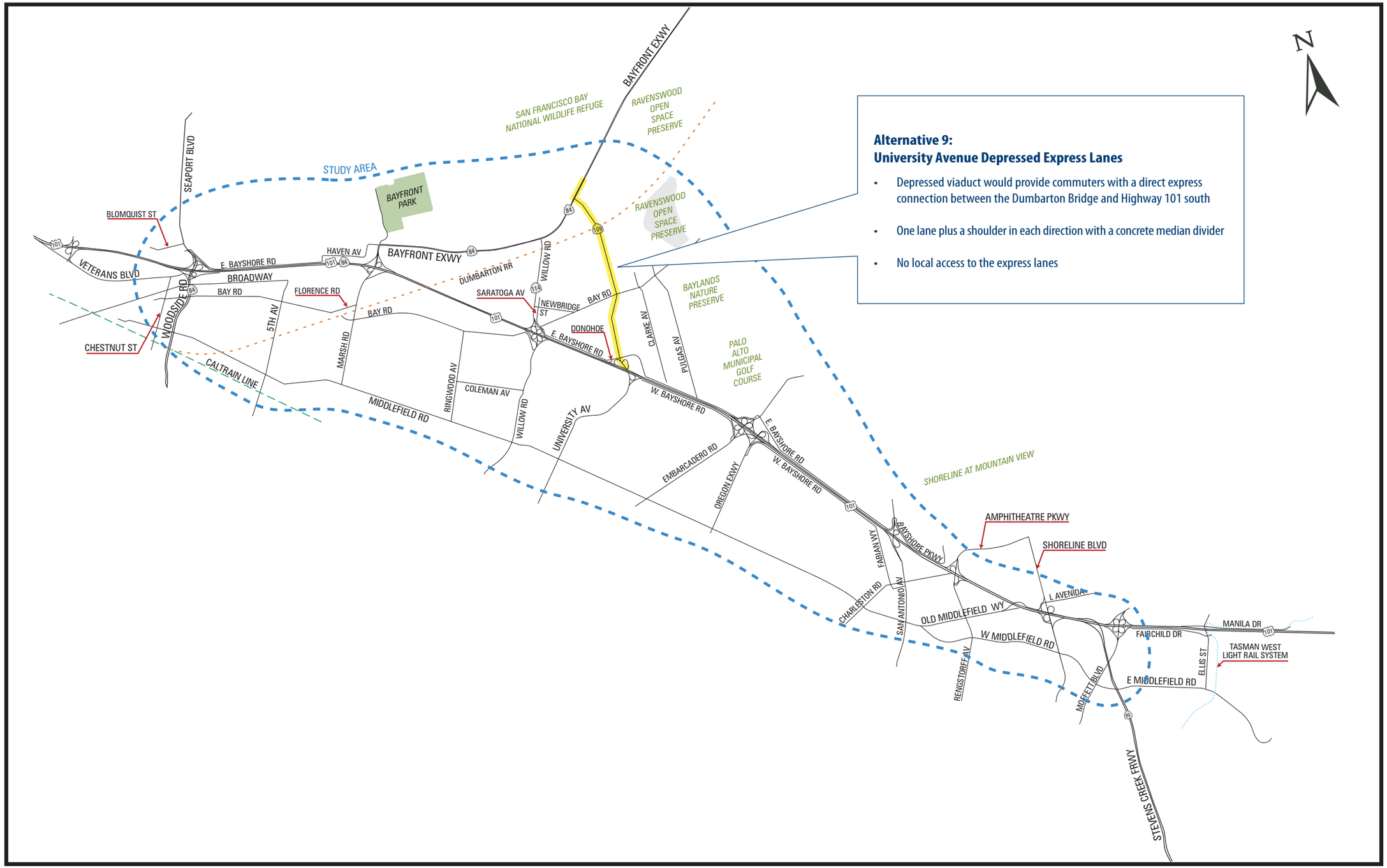
A second option, aimed at reducing right-of-way acquisition, would slide the surface lanes on each side of the viaduct partly over the viaduct via a cantilevered concrete "shelf" atop each retaining wall.

Alternative 8: Short-term Operational Improvements on University Avenue – The City of East Palo Alto received a grant from MTC under the Regional Signal Timing Program (RTSP) to evaluate the University Avenue corridor. The preliminary findings of this study indicate coordination of all signals on University Avenue is desirable and should be implemented (TY LIN International/CCS, University Avenue Signal Timing Project, Draft Recommendations Report, December 28, 2004). Therefore, signal coordination will be included in this alternative.

KHA focused additional inspection of the a.m. and p.m. peak period traffic analysis on University Avenue between Donohoe Street and O'Brien Drive, where peak hour traffic conditions are generally satisfactory (LOS C or better), with the exception of the Bay Road intersection, which exhibits LOS F in the a.m. peak hour. It was noted that cross-street movements and left turn movements from University Avenue were generally poor (LOS E or worse).

Additional operational analysis indicated that signal timing could be modified to reduce delay to certain critical movements at all signalized intersections, thereby improving traffic conditions during the peak periods. Most of the benefit would come from reducing cycle length from 120 seconds to 60 seconds at all intersections except Bay Road, and leaving Bay Road at its current cycle length of 120 seconds. This practice of "half-cycling" some of the intersections is a customary way to improve traffic conditions where long cycles are not necessary to serve relatively small critical traffic movements. In addition, modifying the signal phasing to allow eastbound left turns at O'Brien, Notre Dame, and Kavanaugh to operate in permitted mode would reduce delay for these movements. Finally, at Bay Road, changing the configuration for northbound Bay Road to eliminate the shared through/left lane (replace with a through lane) would reduce delay for westbound movements.

Alternative 9: University Avenue Depressed Express Lanes – This alternative would include a depressed viaduct through the University Avenue corridor would provide commuters with a direct express connection (one lane each direction) between the Dumbarton Bridge and Highway 101 south. It is noted that the capacity of the express lanes was defined for testing purposes, and future analyses would be necessary to evaluate whether additional express lane capacity would be required. The location of this alternative is shown in **Figure 10**, and additional details are contained in a sketch in Appendix C. The depressed viaduct would run down the center of University Avenue, about 6 meters below grade, from the Dumbarton Rail Corridor in the north to Bell Street in the south. At the north end, the depressed viaduct would rise up to grade between the railroad tracks and Bayfront Expressway and connect to Bayfront east via on and off direct-connect flyover ramps. At the south end, the viaduct would rise up to grade between Bell Street and Donohoe Street and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Alternative 9:
University Avenue Depressed Express Lanes
• Depressed viaduct would provide commuters with a direct express connection between the Dumbarton Bridge and Highway 101 south
• One lane plus a shoulder in each direction with a concrete median divider
• No local access to the express lanes
STUDY AREA
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
BAYFRONT EXWY
BAYFRONT PARK
SEAPORT BLVD
BLOMQUIST ST
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PULGAS AV
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AMPHITHEATRE PKWY
SHORELINE BLVD
FAIRCHILD DR
MANILA DR
TASMAN WEST LIGHT RAIL SYSTEM
ELLIS ST
E MIDDLEFIELD RD
MOFFETT BLVD
RENGSTORFF AV
CHARLESTON RD
SAN ANTONIO AV
FABIAN WY
BAYSHORE PKWY
L AVENIDA
OLD MIDDLEFIELD WY
W MIDDLEFIELD RD
STEVENS CREEK FRWY

connect to Highway 101 south via on and off direct-connect flyover ramps. Local streets would cross over the viaduct on at-grade bridges.

The viaduct would have one lane plus a shoulder in each direction with a concrete median divider. No local access would be provided to the viaduct. Due to the narrow public right-of-way along the University Avenue corridor, the depressed viaduct would require vertical retaining walls on each side. At the surface there would be a second lane in each direction, immediately adjacent to the top of each retaining wall, with shoulder and sidewalk for local traffic traveling along the University Avenue corridor. The local lanes would still connect directly to Bayfront Expressway and Donohoe Street to allow for local access to the Dumbarton Bridge and Highway 101 as currently exists today.

With this configuration, a narrow strip of additional right-of-way would be required on each side of the existing University Avenue corridor. Right of way would also be required along the West Bayshore frontage road just south of the Highway 101/University Avenue interchange to allow room for the southbound flyover ramp to touch down. East Bayshore Road on the opposite side of Highway 101 would have to be narrowed to allow room for the northbound flyover ramp to exit Highway 101 on its way to the viaduct. At the north end of the viaduct, additional right-of-way would be required in the southeast quadrant of the University/Bayfront intersection for the flyover ramps. Some minor impacts would be expected on property that may be wetland where the flyover ramps touch down on either side of Bayfront Expressway.

A second option, evaluated to eliminate right-of-way take on University Avenue, would slide the surface lane on each side of the viaduct partly over the viaduct via a cantilevered concrete “shelf” atop each retaining wall. With this option, the right-of-way takes along University Avenue could be eliminated, but the right-of-way takes at each end would still be required.

B. Concept Level Cost Estimates

The Cost Estimate Summary Table summarizes the concept level cost estimates for the alternative projects in Year 2006 dollars. The cost estimate is broken down into three primary categories: (1) construction cost, (2) right of way cost, and (3) engineering support cost. Details of the cost estimating procedures and findings are included in Appendix D.

Cost Estimate Summary Table

Alternative Name	Construction Cost	R/W Cost	Support Cost	Total Project Cost 2006 $
1. Route 101 Auxiliary Lanes	$57 M	$20 M	$28 M	$105 M
2. Route 101 Elevated	$900 M	$80 M	$230 M	$1,210 M
3. Bayfront Expressway Grade Separations	$180 M	$67 M	$86 M	$333 M
4. Willow Rd. Short Term	$0.09 M	$0 M	$0.03 M	$0.12 M
6. Willow Rd. Elevated Express Lanes	$96 M	$33 M	$46 M	$175 M
7. Willow Rd. Depressed w/ Cantilever	$230 M	$33 M	$110 M	$373 M
8. University Ave. Short Term	$0.18 M	$ 0 M	$0.09 M	$0.27 M
9. University Ave. Depressed w/ Cantilever	$440 M	$64 M	$200 M	$704 M

C. Future Traffic Forecasts

A series of traffic forecasts, prepared by C/CAG through its Consultant, Hexagon Transportation Consultants, were conducted to establish no-build and build peak period traffic volumes and volume-to-capacity ratios for year 2025. The intent was to provide enough data to help evaluate the relative differences between alternatives and not provide all the details of the travel model network that Caltrans, for example, would need to evaluate no-build and build conditions for specific improvements in a formal Project Study Report (PSR) or Project Approval/ Environmental Document (PA/ED) process. For reference, Appendix E includes details of the travel model results and a summary of the validation of base year conditions and future year 2025 results.

D. Traffic Benefits

The traffic forecasts were analyzed and reviewed with the TAC. The following points highlight the forecasted volumes and volume/capacity ratio changes under each “Build” alternative relative to “No-Build” conditions.

- **Alternative 1** would increase traffic volumes on Highway 101 where the auxiliary lanes are added and the net increase in capacity there would result in small reductions in v/c ratios. On balance, this indicates a net benefit.
- **Alternative 2** would increase Highway 101 traffic demand by 8,000 to 9,000 peak period vehicles in each direction -- in the express lanes -- and draw additional traffic demand to

Highway 101. Like in the at-grade lanes, volumes would exceed capacity in the express lanes. Small changes in volumes and v/c ratios are shown for the at-grade lanes on Highway 101. The increase in throughput would be a benefit, but the v/c ratios indicate continued delay for all vehicles. There is evidence that the model diverted some traffic from cross streets to the express lanes, which is to be expected given the express lanes provide enhanced travel time through a long segment of Highway 101 (see University Avenue, Embarcadero Road, and Oregon Expressway). One concern that would have to be addressed in future project development activities is the potential for this kind of project to move a bottleneck to a point downstream of the express lane touchdown.

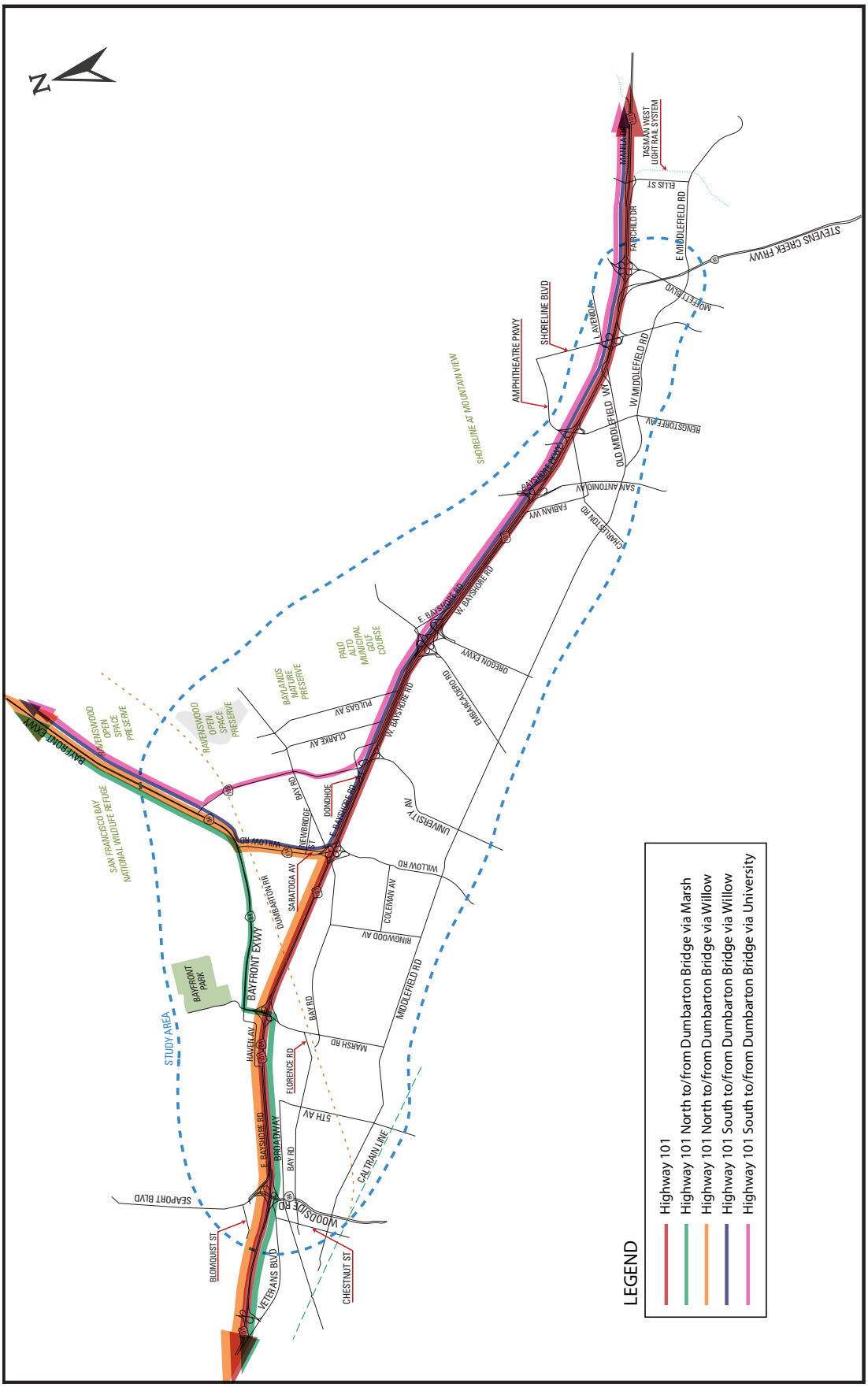
- **Alternative 3** would increase in peak period traffic on Bayfront Expressway east of University, on Willow Road during both peak periods, and on University Avenue in the a.m. peak period. The model also projected increases in peak period traffic on Clarke and Pulgas, which is evidence that additional capacity at the Bayfront Expressway intersections will draw traffic through residential streets as well as University Avenue. Corresponding changes in v/c ratios were noted.
- **Alternative 6 or 7** would result in a net increase in traffic on Willow Road due to the express lanes but decreases or small increases in at-grade traffic. Corresponding improvements are shown in v/c ratios for the at-grade facility. The express lanes do generate strong peak direction demands that exceed capacity, which suggests that additional capacity should be considered in the peak direction. Also noted are the reductions in peak period traffic and v/c ratios on University under these alternatives, which would be beneficial. Also notable are some small decreases in peak period traffic on Clarke and Pulgas.
- **Alternative 9** shows similar impacts on University as found for Willow under Alternatives 6/7 – net increases in total peak period traffic due to the express lanes and reductions in peak period traffic for the at-grade facility. Also noted are the reductions in traffic volumes and v/c ratios on Willow, which also are seen as beneficial, and more important to East Palo Alto, reductions in peak period traffic on Clarke and Pulgas.

Generally, each alternative shows beneficial impacts compared to the no-build condition.

To further understand the potential impacts and benefits of these alternatives, a special traffic analysis tool called ALPS2000, which was developed by KHA, was used to evaluate typical performance measures, such as travel times, speeds, and delay, for key travel paths in the Study Area for a 24-hour period. **Figure 11** illustrates the travel paths that were evaluated, which reflect the key movements that this Study is addressing.

The preliminary results of this operational analysis indicated that travel time was the most important and easily understood measure. The following points summarize preliminary observations drawn from the travel time comparisons. Appendix F provides additional information and details of this analysis.

- Alternatives 1 and 2 show benefits on Highway 101.
- Alternative 3 shows benefits for movements to and from the bridge.
- Alternatives 6 & 7 show benefits for Willow Road traffic using the bridge.
- Alternative 9 shows benefits for University Avenue traffic using the bridge.


N
LEGEND
Highway 101
Highway 101 North to/from Dumbarton Bridge via Marsh
Highway 101 North to/from Dumbarton Bridge via Willow
Highway 101 South to/from Dumbarton Bridge via Willow
Highway 101 South to/from Dumbarton Bridge via University
STUDY AREA
BAYFRONT EXWY
BAYFRONT PARK
SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE
RAVENSWOOD OPEN SPACE PRESERVE
BAYLANDS NATURE PRESERVE
PALO ALTO MUNICIPAL GOLF COURSE
SHORELINE AT MOUNTAIN VIEW
AMPHITHEATRE PKWY
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FAIRCHILD DR
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EMBARCADERO RD
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PLUGAS AV
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VETERANS BLVD
CHESTNUT ST

E. Potential Environmental and Social Impacts

This section discusses the potential environmental and social impacts of each alternative and **Table 2** summarizes these issues in a matrix form for easy comparison.

Alternative 1: Highway 101 Auxiliary Lanes. This alternative would construct auxiliary lanes on Highway 101 between Embarcadero Road in Palo Alto and Shoreline Boulevard in Mountain View. It would include modifications to the existing Highway 101/San Antonio Road interchange to allow access to southbound Highway 101 from San Antonio Road. Except at the San Antonio Road interchange, the work would occur within the existing freeway and adjacent frontage road rights-of-way.

Auxiliary lane projects of this type are quite common and typically result in non-significant environmental impacts or impacts that can be readily mitigated. Noise impacts are typically minimal. Existing soundwalls may be reconstructed or, where no soundwalls are present to protect sensitive receptors (e.g., residences), new soundwalls would be built.

Visual impacts would be negligible because no new structures would be constructed.

Additional right-of-way would be required to construct the new on-ramp to southbound Highway 101 at San Antonio Road. This right-of-way *may* impact an existing commercial building on Transport Street in Palo Alto.

This alternative *may* require the widening of the existing Highway 101 bridges over Adobe Creek and Matadero Creek. Depending upon the scope of the widening and the degree of impact existing vegetation, some replacement habitat may be required. Such mitigation is a standard requirement on many bridge widening projects and should not pose a significant constraint to this alternative.

Alternative 2: Highway 101 Elevated Express Lanes. This alternative would construct elevated express lanes on Highway 101 between Woodside Road in Redwood City and Old Middlefield Way in Mountain View. The elevated express lanes would be located above the median of the freeway, with an approximate height of 20 feet above existing grade between interchanges, rising to an approximate height of 40 feet above existing grade at interchanges and railroad crossings. Flyover ramps would be required at each end of the express lanes to provide a transition to/from the lanes. Except where the flyover ramps touch down and merge onto the Highway 101 freeway, the work would occur within the existing freeway and adjacent frontage road rights-of-way.

Construction of an elevated structure, roughly eight miles in length, with heights ranging from 20 to 40 feet, would create a significant and unmitigable visual impact. The visual impact would occur, not only for thousands of people who live and work along the Highway 101 corridor, but also for the users of the existing lanes on the freeway. The elevated structure would be visible well above the tops of existing

Table 2
Comparison of Environmental Impacts By Alternative
2020 PENINSULA GATEWAY CORRIDOR STUDY

ID Code	Alternative	Visual and Aesthetic	Noise	Biological Resources	Right-of- Way	Other Issues/Note(s)
1	Route 101 Auxiliary Lanes	Negligible impact	Minimal impact	Possible impact at crossing of Adobe & Matadero Creeks	One building may be impacted at 101/San Antonio interchange	Would likely qualify for a Mitigated Negative Declaration.
2	Route 101 Elevated Express Lanes	Significant and unmitigable impact	Significant impact; would require sound-walls on elevated structure	Possible impact at crossing of Adobe & Matadero Creeks	Minimal impact; no acquisition of businesses or residences	Major environmental issues; strong opposition likely; full EIR required.
3	Grade Separations on Bayfront Expressway	Less-than-significant impact	Less-than-significant impact	Impacts to wetlands at edge of Bay	Reconfiguration of access and parking at Sun Microsystems	Would impact recreational trail along Bayfront; BCDC permit needed; full EIR likely required.
4	Short-term operational improvements on Willow Road	None	None	None	None	Would likely qualify for a Categorical Exemption
6	Willow Road Elevated Express Lanes	Significant and unmitigable impact	Significant impact; would require sound-walls on elevated structure	Less-than-significant impact	Minimal impact; no acquisition of businesses or residences	Major environmental issues; strong opposition likely; full EIR required.
7	Willow Road Depressed/ Cantilevered Express Lanes	Less-than-significant impact	Less-than-significant impact	Less-than-significant impact	Minimal impact; no acquisition of businesses or residences	Would impact Hetch-Hetchy pipelines; presence of Bay mud will affect trench design/cost; trench will need a system for dewatering of stormwater & groundwater; full EIR may be required.
8	Short-term operational improvements on University Avenue	None	None	None	None	Would likely qualify for a Categorical Exemption
9	University Avenue Depressed/ Cantilevered Express Lanes	Less-than-significant impact	Less-than-significant impact	Some impact to wetlands at edge of Bay	Minimal impact; no acquisition of businesses or residences	Would impact Hetch-Hetchy pipelines; presence of Bay mud will affect trench design/cost; trench will need a system for dewatering of stormwater & groundwater; full EIR may be required.

soundwalls (maximum soundwall heights are 16 feet), and would block or interfere with views from numerous locations. The elevated structure, in combination with the existing freeway, soundwalls, and overpasses, would constitute a significant visual and aesthetic barrier in the portions of Redwood City, Menlo Park, East Palo Alto, Palo Alto, and Mountain View through which the Highway 101 freeway passes. Signs and lighting on the structure would increase this impact, as would soundwalls, which are discussed in the following paragraph.

This alternative would likely result in significant noise impacts along the entire length of the express lanes because the lanes would be elevated substantially above the tops of existing soundwalls. Noise from traffic using these high-speed lanes would have a direct and generally unobstructed path into adjacent areas, such areas that include thousands of residences, as well as schools and parks. Soundwalls with heights of up to 12 feet could be constructed on the elevated structure, but such walls would exacerbate the above-described significant visual and aesthetic impacts of this alternative.

The additional right-of-way necessary at the two ends of the express lanes is not expected to require the acquisition of any residences or businesses.

This alternative *may* require the widening of the existing Highway 101 bridges over Adobe Creek and Matadero Creek. Depending upon the scope of the widening and the degree to which any existing vegetation may be impacted, some replacement habitat may be required. Such mitigation is a standard requirement on many bridge widening projects and should not pose a significant constraint to this alternative.

Alternative 3: Grade Separations on Bayfront Expressway. Alternative 3 would grade-separate the Bayfront Expressway intersections with Willow Road and University Avenue. The two intersections would be depressed below the existing expressway. Connections between the expressway and the local streets would be made with a combination of flyover ramps, ramps, and frontage roads. The entrances to the Sun Microsystems campus would be reconfigured to improve access to/from that facility. The existing crossing of the UPRR on Willow Road would be grade-separated.

The improvements contemplated under this alternative would occur in a non-residential area where the existing uses are industrial and open space/wetlands/parks. Right-of-way needed for the improvements would, as noted above, require a reconfiguration of access and parking at Sun Microsystems. Right-of-way required to grade-separate the University Avenue/Bayfront Expressway intersection and construct the necessary flyover ramps would most likely affect the adjacent wetlands. Given the ecological importance of these wetlands along the edge of San Francisco Bay, including the presence of several threatened/ endangered species, such impacts would be significant. Mitigation, typically in the form of replacement habitat, would be required. Wetlands impacts will require permits from and/or coordination with the Army Corps of Engineers (ACOE), U.S. Fish & Wildlife

Service (USFWS), California Department of Fish & Game (CDFG), and the Regional Water Quality Control Board (RWQCB).

The noise impacts of this alternative are not likely to be significant. This statement is based on 1) the lack of sensitive receptors adjacent to the improvements, and 2) the fact that portions of Willow Road and University Avenue will be depressed, which tends to reduce noise impacts.

Visual impacts will occur due to the need to construct flyover ramps at both Willow Road and University Avenue. However, such impacts would not likely be significant due to the lack of public vantage points in the area. For example, there are no adjacent residential areas where scenic views would be blocked by the elevated ramps.

The inclusion of pump stations at the depressed intersections will prevent roadway flooding.

There are existing paved recreational paths along both side of Bayfront Expressway in the vicinity of Willow Road and University Avenues. These paths would be impacted by the proposed improvements. Replacement paths will be required.

Portions of the improvements that are part of this alternative appear to be within the jurisdiction of the Bay Conservation and Development Commission (BCDC). BCDC jurisdiction includes all areas within 100 feet of the shoreline of San Francisco Bay. Therefore, a BCDC permit may be required in order to construct this alternative.

Alternative 4: Short-Term Improvements on Willow Road. Alternative 4 would consist of minor improvements on Willow Road between Route 101 and the Bayfront Expressway to improve traffic operations. Improvements would include modification of traffic signal timing, restriping of lanes, and minor widening at one approach to the Willow/Ivy intersection.

The environmental effects of these improvements would be negligible because the improvements can be categorized as minor modifications to existing facilities. The only physical component of the project would be minor widening within the existing right-of-way at the Willow/Ivy intersection. Such widening would not adversely affect adjacent land uses. The only impact of the other components of this alternative (i.e., signal timing and restriping) would be a beneficial effect on traffic operations.

Alternative 4 improvements would likely qualify for a Class 1 (Existing Facilities) Categorical Exemption (CE) under CEQA.

Alternative 6: Willow Road Elevated Express Lanes. This alternative would construct elevated express lanes on Willow Road between Highway 101 and the Bayfront Expressway. The elevated express lanes would be located on a structure above the median of Willow Road. The height of the structure would be approximately 20 feet above existing grade, except at the Highway 101/Willow interchange where a greater height would be required. Flyover ramps would be required at each end of the express lanes to provide a transition to/from the lanes. With the exception of where

the flyover ramps touch down and merge onto Highway 101 and the Bayfront Expressway, the work would require only minimal right-of-way.

Similar to Alternative 2, construction of an elevated structure along Willow Road, roughly one mile in length, would create a significant and immitigable visual impact. The visual impact would occur, not only for people who live and work along the Willow Road corridor, but also for the users of the existing lanes on Willow Road. The elevated structure would be visible from the residences in Menlo Park and East Palo Alto that are located along Willow Road. The elevated structure would also be visible from the residences in Menlo Park and East Palo Alto that are located along Highway 101 near the Highway 101/Willow Road interchange. In addition to the visual effect, such structures tend to exacerbate the "divided feeling" that occurs when major transportation facilities transect local communities. Signs and lighting on the structure would increase this impact, as would soundwalls, which are discussed in the following paragraph.

This alternative would likely result in significant noise impacts along the entire length of the express lanes because the lanes would be elevated substantially above existing grade. Noise from traffic using these high-speed lanes would have a direct and generally unobstructed path into adjacent areas, such areas which include hundreds of residences. Soundwalls with heights of up to 12 feet could be constructed on the elevated structure, but such walls would emphasize the above-described significant visual and aesthetic impacts of this alternative.

The additional right-of-way necessary at the two ends of the express lanes is not expected to require the acquisition of any residences or businesses.

Alternative 7: Willow Road Depressed Express Lanes with Cantilevered Frontage. This alternative would construct depressed express lanes on Willow Road, partly sliding the surface lanes over the top of the trench containing the express lanes, which is presently the median of Willow Road. The cantilevering of the lanes partially over the trench would reduce the cross-section, which in turn, would reduce right-of-way requirements.

A substantial loss of parking along both sides of Willow Road would be largely avoided with this alternative given the cantilever design. Further, impacts to existing trees and landscaping would also be reduced.

Noise impacts would be largely self-mitigating because the walls of the trench would function like soundwalls. This is based also on the fact that the lanes carrying local traffic would not be as close to the adjacent land uses.

By depressing the express lanes, there would be no significant visual and aesthetic impact. However, the depressed express lanes would conflict with the Hetch-Hetchy Water Lines, which cross under Willow Road at Ivy Drive. The water lines would need to be relocated. A trench would require a system of drains and pump stations for the removal of stormwater, as well as to mitigate for the effects of high groundwater.

The presence of Bay muds along the alignment, soils that are relatively unstable, means that additional measures will need to be considered for the purpose of engineering a safe facility. Although this condition would not preclude the construction of this alternative, the engineering solutions could be costly.

Any archaeological sites located along this corridor would likely sustain greater impacts with a depressed alternative than with an elevated design. According to the regional clearinghouse located at Sonoma State University, there are such sites located in the area. However, the importance of these sites, as well as any impacts to them, cannot be ascertained without further study.

Alternative 8: Short-Term Improvements on University Avenue. For the purpose of improving traffic operations, Alternative 8 would consist of minor improvements on University Avenue between Route 101 and the Bayfront Expressway. Improvements would include the interconnection of traffic signals, signal timing modifications, and the restriping of various turning lanes at intersections.

The environmental effects of these improvements would be negligible because the improvements can be categorized as minor modifications to existing facilities. There are no physical components of this alternative (e.g., street widening). The only impact of this alternative would be a beneficial effect on traffic operations.

Alternative 8 improvements would qualify for a Class 1 (Existing Facilities) Categorical Exemption (CE) under CEQA.

Alternative 9: University Avenue Depressed Express Lanes with Cantilevered Frontage. This alternative would construct depressed express lanes on University Avenue, partly sliding the surface lanes over the top of the trench containing the express lanes. The cantilevering of the lanes partially over the trench would reduce the cross-section, which in turn, would reduce right-of-way requirements.

Noise impacts would be largely self-mitigating because the walls of the trench would function like soundwalls. This is based also on the fact that the lanes carrying local traffic would not be as close to the adjacent land uses.

By depressing the express lanes, there would be no significant visual and aesthetic impact. However, the depressed express lanes would conflict with the Hetch-Hetchy Water Lines, which cross under University Avenue east of Bay Road. The water lines would need to be relocated. A trench would require a system of drains and pump stations for the removal of stormwater, as well as to mitigate for the effects of high groundwater.

Depending upon the footprint and design of the new ramps that will connect the express lanes to Bayfront Expressway, some impacts to adjacent wetlands may occur. Although such impacts would not likely be extensive, the filling of any wetlands at this location would be significant and mitigation would be required. Wetlands impacts will require permits and/or coordination with the ACOE, USFWS, CDFG, and the RWQCB.

The presence of Bay muds along the alignment, soils that are relatively unstable, means that additional measures will need to be considered for the purpose of engineering a safe facility. Although this condition would not preclude the construction of this alternative, the engineering solutions could be costly.

Any archaeological sites located along this corridor would likely sustain greater impacts with a depressed alternative than with an elevated design. According to the regional clearinghouse located at Sonoma State University, there are such sites located in the area. However, the importance of these sites, as well as any impacts to them, cannot be ascertained without further study.

The eastern portion of this alternative appears to be within 100 feet of the shoreline of the Bay. Therefore, a BCDC permit will likely be required.

F. Comparison of Solutions

Having completed assessments of traffic benefits, cost estimates, and potential environmental impacts, a comparison chart was created to show contrast between the alternatives. This comparison is summarized in **Table 3**.

The following points summarize observations drawn from this effort.

- Highway 101 Auxiliary lanes show benefit in the northbound direction and with respect to commute traffic on residential streets, and minimal environment impacts.
- Highway 101 Express Lanes show significant travel time benefits, high costs and some significant visual/aesthetic impacts.
- Grade separations on Bayfront Expressway show benefits for traffic using Bayfront Expressway but some disbenefit relative to commute traffic on residential streets.
- Short-term improvements on Willow and University show minor traffic benefits, low cost, and no environmental impacts.
- Willow Road Express Lanes show travel time benefits and residential commute traffic benefits; the depressed variation shows minimal environment impacts but does indicate some potential sub-grade issues.
- University Avenue Depressed Express Lanes show benefits relative to travel time and commute traffic on residential streets, minimal environmental impacts but some potential sub-grade impacts. Travel time benefits were found to be substantially lower than for the Willow Road Express lanes, apparently due to the combined effect of longer arterial length and overall surface (local access) capacity reduction.

ID Code	Alternative	Location	Traffic Benefits			Cost Estimate Summary (2006$)				Potential Environmental Impacts by Alternative				
			Change in Vehicle Hours of Travel (*Typical weekday, 6 a.m. to 6 p.m.*)	Decrease commute traffic on residential streets? (*Expressed change in peak period traffic volume*)		Construction Cost	Right-of-Way Cost	Support Cost	Total Project Cost	Visual/ Aesthetics	Noise	Biological Resources	Right-of-Way	Other Issues
				Clarke	Pulgas									
1	Route 101 Auxiliary Lanes	MV, PA	-4,135	-200 (-10%)	-100 (-10%)	$57 M	$20 M	$28 M	$105 M	Negligible Impacts	Minimal Impact	Possible impact at crossing of Adobe & Matadero Creeks	One building may be impacted at 101/San Antonio interchange	Would likely qualify for an Mitigated Negative Declaration
2	Route 101 Elevated Express Lanes	MV, PA, EPA, MP, RC	-18,472	0	0	$900 M	$80 M	$230 M	$1,210 M	Significant and unmitigable impact	Less than significant impact given soundwalls would be built on elevated structure	Possible impact at crossing of Adobe & Matadero Creeks	Minimal impact; no acquisition of businessess or residences	Major environmental issues; strong opposition likely; full EIR required
3	Grade Separations on Bayfront Expressway	EPA, MP	-7,811	+200 (+10%)	+100 (+10%)	$180 M	$67 M	$86 M	$333 M	Less-than-significant impact	Less-than-significant impact	Impacts to wetlands at edge of Bay	Reconfiguration of access and parking at Sun Microsystems	Would impact recreational trail along Bayfront; BCDC permit needed; full EIR likely required
4	Short-term operational improvements on Willow Road	EPA, MP	minor	minor	minor	$0.09 M	$0 M	$0.03 M	$0.12 M	None	None	None	None	Would likely qualify for a Categorical Exemption
6	Willow Road Elevated Express Lanes	EPA, MP	-4,945	-100 (-5%)	-100 (-10%)	$96 M	$33 M	$46 M	$175 M	Significant and unmitigable impact	Significant impact; would require soundwalls on elevated structure	Less-than-significant impact	Minimal impact; no acquisition of businessess or residences	Major environmental issues; strong opposition likely; full EIR required
7	Willow Road Depressed/ Cantilevered Express Lanes	EPA, MP	Same as Alt 6	Same as Alt 6	Same as Alt 6	$230 M	$33 M	$110 M	$373 M	Less-than-significant impact	Less-than-significant impact	Less-than-significant impact	Minimal impact; no acquisition of businessess or residences	Would impact Hetch- Hetchy pipelines; presence of Bay mud will affect trench design/cost; trench will need a system for dewatering of storm water & groundwater; full EIR may be required
8	Short-term operational improvements on University Avenue	EPA	minor	minor	minor	$0.18 M	$0 M	$0.09 M	$0.27 M	None	None	None	None	Would likely qualify for a Categorical Exemption
9	University Avenue Depressed/ Cantilevered Express Lanes	EPA	-1,313	-200 (-10%)	-200 (-20%)	$440 M	$64 M	$200 M	$704 M	Less-than-significant impact	Less-than-significant impact	Some impact to wetlands at edge of Bay	Minimal impact; no acquisition of businessess or residences	Would impact Hetch- Hetchy pipelines; presence of Bay mud will affect trench design/cost; trench will need a system for dewatering of storm water & groundwater; full EIR may be required

Location Key

EPA East Palo Alto | MP Menlo Park | MV Mountain View | PA Palo Alto | RC Redwood City

-- = No Data Available

na = not applicable

One more measure was created to provide a preliminary indication of benefits versus costs. In this case, a ratio of 12 hour travel time benefits to $ million of total cost was calculated for the high-capital alternatives. The results of the calculations are summarized in the table below (number shown is the ratio of 12 hour travel time benefits to total alternative cost).

ESTIMATED BENEFITS PER $ MILLION OF TOTAL COST

ALTERNATIVE	DESCRIPTION	BENEFITS PER $M TOTAL COST[1]
1	Highway 101 Auxiliary Lanes and Interchange Improvements	40
2	Highway 101 Elevated Express Lanes	15
3	Grade Separations at Bayfront/Willow and Bayfront/University	23
6	Elevated Express Lanes on Willow Road	28
7	Depressed/Cantilevered Express Lanes on Willow Road	13
9	Depressed/Cantilevered Express Lanes on University Avenue	2

[1] Value is the ratio of [change in vehicle travel time over 12 hours] to [total project cost in $M].

III. Findings and Next Steps

A. Findings

Several improvements were defined and evaluated that would address the Study Goals. One project, Highway 101 Auxiliary Lanes, is now under project development based on the analysis conducted in this Study. The two Short-Term Operational Improvements are considered very positive and worthy of early implementation with fairly small investments.

Each of the projects in the "Universe of Alternatives" has been developed to the level of understanding necessary to complete the assessment of traffic benefit, level of cost, potential impacts due to visual, noise, environmental and right-of-way. With this information a prioritization process called next steps was undertaken and ideas for a Phase 2 study were documented.

B. Next Steps

The project sponsors were asked to comment on their desire regarding the next step for each of the 71 alternatives. The consensus was to place each alternative improvement into one of the following categories.

1. An opinion that the alternative should be referred to a specific agency and not considered directly by this group. This will require a follow-up and monitoring process to help maintain progress toward implementation.
2. An opinion that the alternative needed to proceed to Project Development and preliminary design. Project Development means that the project has sufficient support to proceed to a project study report in which alternatives and costs are further defined. Further categorization reflected the importance of certain projects in terms of implementation timing. If short-term development is desired, monies will need to be found to pursue the project. If long-term development is desired, then project funding is not as imminently necessary.
3. An opinion that the alternative should be studied further in Phase 2 of this study. Phase 2 study means that additional information is needed now to be able to make a recommendation to further develop this project concept. It may require some alternatives to be further developed, including deriving specific cost estimates or benefit/cost assessments, prior to recommending it for further development.
4. An opinion that the alternative should to be studied further before making an opinion as to whether to begin project development. There is not enough information about the project at this point to be able to refer it as a specific project for short-term or long-term development. This too may require some alternatives to be further developed, including deriving specific cost estimates or benefit/cost assessments, prior to recommending it for further development. This opinion was not an indication that there was not enough interest to promote this project concept to a Phase 2 study as a group; rather, it indicated a lower priority than improvements placed in Category 3.

5. An opinion that the alternative was not in keeping with the study objectives and should be removed from consideration by this group.

After the sponsors determined that there was sufficient information to share with the TAC, the same exercise was repeated with the TAC. Knowing the TAC's suggested categorization, the same exercise was performed for the PAC without sharing the TAC's opinions. The results were summarized in a second session with the PAC and the TAC reconciled the findings where there had been differences. The final results of this categorization process, based on feedback from the PAC, are summarized in the next section of this report.

C. Categorization

The TAC and PAC completed categorizing the 71 projects identified in the "Universe of Alternatives." One project has already been forwarded to Project Development. Several other projects are being recommended for Project Development. The "Universe of Alternatives" has been categorized as shown in **Table 4**.

Table 4

CATEGORIZATION RESULTS

ID	CATEGORY 1 IMPROVEMENTS	COMMENT
A	Route 101 Auxiliary Lanes	Referred to VTA; Studied as Alternative 1
D1	Widen freeway to 10 lanes (County Line to Shoreline)	Referred to VTA
I	Extend Bayfront Expressway to Woodside Road	Referred to Redwood City
BB	Pedestrian Overcrossing at Ivy Dr. (Willow Road)	Referred to Menlo Park
YY	Install transit signal priority to support high-patronage bus routes	Referred to VTA and SamTrans
G	Improve local access across Highway 101	Intent is to separate local and regional traffic using existing interchanges and address pedestrian and bicycle linkages across 101

ID	CATEGORY 2 IMPROVEMENTS	COMMENT
Q	Signal timing during peak travel periods (Willow)	Studied as Alternative 4
R	Prohibit left turns during peak travel periods (Willow)	
T	Exit/entrance right turn pockets on Willow (Willow)	
HH	Signal timing during peak travel periods (University)	Studied as Alternative 8

II	Prohibit left turns during peak travel periods (University)	
KK	Exit/entrance right turn pockets on Willow (University)	
XX	Install traffic signal interconnect/communications infrastructure between Middlefield Road and Highway 101	
ZZ	Install trailblazers and/or arterial CMS to provide route guidance information	
AAA	Prepare Incident Management and Traveler Information Plan for Corridor	
BBB	Study the possible designation or East Bayshore (San Antonio to University) as reliever route to provide congestion relief and for incident management on Highway 101	
CCC 1	Improve 101/University Interchange – Construct Phase 2 Improvements	
CCC 2	Improve 101/University Interchange – Improve on-off connections for northbound traffic	
DDD	Define residential traffic management elements that complement high-priority capital improvements	

ID	CATEGORY 3 IMPROVEMENTS	COMMENT
B	Reconstruct Embarcadero/Oregon Interchange	
C	Reconstruct San Antonio Interchange	Included in study with Alternative 1
H	Grade separations at Bayfront/Willow and Bayfront/University	Studied as Alternative 3; consider both together and separate.
J	Construct direct flyover connection between Bayfront/Marsh and Highway 101 north of Marsh	
DD 1	Depressed express lanes : 2 lanes each direction (Willow)	
DD 2	Depressed express lanes : 1 lane each direction (Willow)	
DD 3	Depressed express lanes : Reversible 2 lanes (Willow)	
DD 4	Depressed express lanes : 3 lanes with reversible middle lane (Willow)	
FF	Tunnel express lanes (maintain existing surface street) (Willow)	
GG	Modified depressed express lanes: 1 lane each direction (surface street cantilevered inboard to minimize frontage impacts) (Willow)	Studied as Alternative 7
TT 1	Depressed express lanes : 2 lanes each direction (University)	
TT 2	Depressed express lanes : 1 lane each direction (University)	
TT 3	Depressed express lanes : Reversible 2 lanes (University)	

TT 4	Depressed express lanes : 3 lanes with reversible middle lane (University)	
VV	Tunnel express lanes (maintain existing surface street) (University)	
WW	Modified depressed express lanes: 1 lane each direction (surface street cantilevered inboard to minimize frontage impacts) (University)	Studied as Alternative 9

ID	CATEGORY 5 IMPROVEMENTS	COMMENT
D2	Widen Highway 101 to 10 Lanes plus Auxiliary Lanes (County Line to Shoreline)	
E	Widen Highway 101 to 10 Lanes plus Auxiliary Lanes (Whipple to County Line)	
F	Build elevated lanes above Highway 101 from Woodside Road to Route 85/Highway 101 North Interchange Conform	Studied as Alternative 2
L	Elevated roadway along Dumbarton Rail Corridor between University and Highway 101	
M	New Route 84 to Highway 101 Connection through East Palo Alto (surface expressway through East Palo Alto)	
N	New Route 84 to Highway 101 Connection skirting East Palo Alto (expressway viaduct along edge of Bay)	
O	Tunnel beneath East Palo Alto (University Ave. to Highway 101)	
S	Prohibit local cross traffic during peak periods (Willow)	
U	Set back curb line one land width from current traveled way at driveways(Willow)	
V	Eliminate driveway access (Willow)	
W	Eliminate selected signalized intersections: Newbridge, Ivy, and Hamilton (Willow)	
X	Eliminate signalized intersections and allow right turns only at intersections (Willow)	
Y	Eliminate signalized intersections and prohibit any access from local streets (Willow)	
Z	Widen Willow Road one lane in each direction	
AA	Grade separations at selected intersections: Newbridge, Ivy, and Hamilton (Willow)	
CC 1	Elevated viaduct express lanes: 2 lanes in each direction (Willow)	
CC 2	Elevated viaduct express lanes: 1 lane in each direction (Willow)	

CC 3	Elevated viaduct express lanes: Reversible2 lanes (Willow)	
CC 4	Elevated viaduct express lanes: 3 lanes with reversible middle lane (Willow)	
EE	Grade separations at all intersections (over crossings or undercrossings) (Willow)	
JJ	Prohibit local cross traffic during peak periods (University)	
LL	Set back curb line one lane width from current traveled way at driveways (University)	
MM	Eliminate driveway access (University)	
NN	Eliminate selected signalized intersections: Bell, Runnymede, Kavanaugh (University)	
OO	Eliminate signalized intersections and allow right turns only at intersections (University)	
PP	Eliminate signalized intersections and prohibit any access from local streets (University)	
QQ	Widen University Avenue one lane in each direction	
RR	Grade separations at selected intersections: Donohoe, Bay (University)	
SS 1	Elevated viaduct express lanes: 2 lanes in each direction (University)	
SS 2	Elevated viaduct express lanes: 1 lane in each direction (University)	
SS 3	Elevated viaduct express lanes: Reversible2 lanes (University)	
SS 4	Elevated viaduct express lanes: 3 lanes with reversible middle lane (University)	
UU	Grade separations at all intersections (over crossings or under crossings (University)	
EEE	Extend Central Expressway to Sand Hill Road	

D. Phase 2 Activities

The study sponsors are presently developing an Action Plan that provides a framework for advancing projects to implementation and further project development (engineering analysis). Projects that are being considered for Implementation include “Smart Corridors” that are geared toward managing traffic flows and managing incidents, operational improvements on Willow Road and University Avenue (in both cases, east of Highway 101), minor interchange improvements, and residential traffic management. Projects that are being considered for further engineering analysis include interchange reconstructions and expansions, grade-separated intersections, and express lanes.

Acknowledgements

The study sponsors are grateful for the participation and contributions by the following current and former members of the PAC and TAC.

Agency	Policy Advisory Committee	Technical Advisory Committee
Current Members		
City of Atherton	James Janz	Duncan Jones
City of East Palo Alto	Patricia Foster	Anthony Docto
City of Menlo Park	John Boyle	Kent Steffens Chip Taylor
City of Mountain View	Greg Perry	Mike Vroman
City of Palo Alto	Yoriko Kishimoto	Gayle Likens Shahla Yazdy
City of Redwood City	Alicia Aguirre	Chu Chang Rich Haygood
Caltrans	Bijan Sartipi	Erik Alm Zachary Chop Gene Gonzalo Lance Hall David Seriani Lee Taubeneck
Mid Peninsula Regional Open Space District	Nonette Hanko Larry Hassett	Ana Ruiz
Metropolitan Transportation Commission	Sue Lempert	Danielle Stanislaus
San Mateo County Transportation Authority	Rich Gordon	Joe Hurley Pat Dixon
Silicon Valley Manufacturing Group		Catherine Tompkison-Graham Paul Shepard
Valley Transportation Authority	Scott Haywood	Murali Ramanujam
City/County Association of Governments	Rose Jacobs-Gibson	Richard Napier Sandy Wong John Hoang Jim Bigelow

Former Members		
City of East Palo Alto	Duane Bay	
City of Menlo Park	Nicholas Jellins Mickie Winkler	
City of Mountain View	Nick Galiotto Tom Means	
City of Palo Alto	Dena Mossar	Joe Kott
City of Redwood City	Ira Ruskin	
Metropolitan Transportation Commission	John McLemore	Jeff Georgevich Doug Johnson
San Mateo County Transportation Authority	Ira Ruskin	Shahla Yazdy
Valley Transportation Authority	David Casas Breene Kerr	Carolyn Gonot
City/County Association of Governments		Walter Martone

2020 Peninsula Gateway Corridor Study

Final Report

Appendices (on enclosed CD)

- *A: Data Collection and Existing Conditions*
- *B: Public Input*
- *C: Conceptual Definition & Engineering of Alternatives*
- *D: Conceptual Cost Estimates*
- *E: Travel Forecasting*
- *F: ALPS Modeling Assumptions*

Prepared for:

C/CAG City/County Association of Governments of San Mateo County

SAN MATEO COUNTY Transportation Authority

VTA SANTA CLARA Valley Transportation Authority

Prepared by:

Kimley-Horn and Associates, Inc.

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