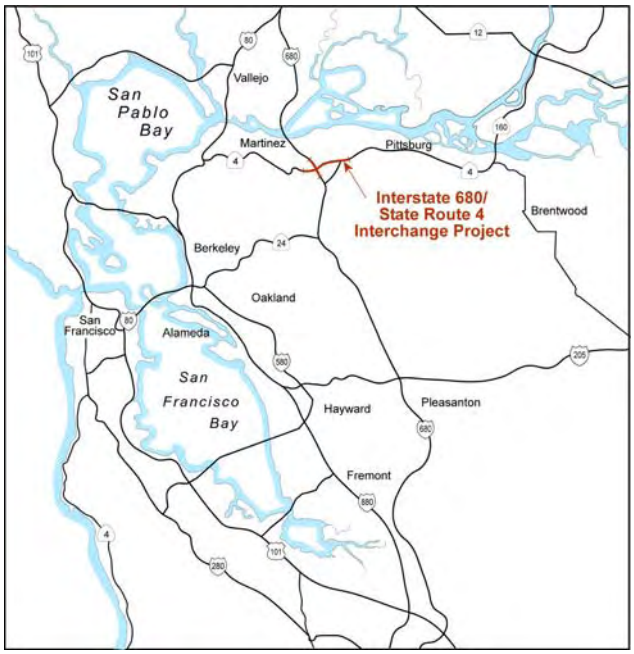
Interstate 680/State Route 4
Interchange Improvement Project



Draft Environmental Assessment (NEPA)
and
Initial Study (CEQA) / Proposed Negative Declaration

Federal Highway Administration

California Department of Transportation, District 4

Contra Costa Transportation Authority

04-CC-680, KP 32.5/35.8 (PM 20.2/22.2)
04-CC-004, KP R16.9/R24.3 (PM R10.5/R15.1)
EA 229100

May 2006

General Information About This Document

What's in this document?

This document is a *Draft* Environmental Assessment/Initial Study, which examines the potential environmental impacts of the proposed project located in Contra Costa County, California. The document describes why the project is being proposed, the existing environment that could be affected by the project, and potential impacts from each of the alternatives.

What should you do?

- Please read this Environmental Assessment/Initial Study Report.
- We welcome your comments. If you have any concerns regarding the proposed project, please attend the Public Information Meeting and/or send your written comments to the Contra Costa Transportation Authority (CCTA) by the deadline. Submit comments via regular mail to CCTA, Attn: Susan Miller, 3478 Buskirk Avenue, Suite 100, Pleasant Hill, CA, 94523, or submit comments via email to I680sr4comments@ccta.net.
- Submit comments by the deadline: September 22, 2006.

What happens after this?

After comments are received from the public and reviewing agencies, CCTA and Caltrans may (1) give environmental approval to the proposed project, (2) undertake additional environmental studies, or (3) abandon the project. If the project were given environmental approval and funding were appropriated, CCTA and Caltrans could design and construct all or part of the project.

For individuals with sensory disabilities, this document is available in Braille, large print, on audiocassette, or computer disk. To obtain a copy in one of these alternate formats, please call or write to Caltrans, Attn: Melanie Brent, Office Chief, Office of Environmental Analysis, P.O. Box 23660, Oakland, CA, 94623-0660, email: Melanie_Brent@dot.ca.gov, or use the California Relay Service TTY number (800-735-2929).

State Clearinghouse Number: TBA
04-CC-680, KP32.5/35.8
04-CC-004, KP16.9/24.3
EA 229100

Located at the interchange of
Interstate 680 (Kilometer Post 32.5/35.8)
and
State Route 4 (Kilometer Post R16.9/24.3)

ENVIRONMENTAL ASSESSMENT (NEPA)
and
INITIAL STUDY (CEQA) / PROPOSED NEGATIVE DECLARATION

Submitted Pursuant to: (State) Division 13, California Public Resources Code and
(Federal) 42 USC 4332(2)(C) and 49 USC 303

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration, and
THE STATE OF CALIFORNIA
Department of Transportation, and
CONTRA COSTA TRANSPORTATION AUTHORITY

5/9/06
Date of Approval

Dale Jones
Acting Deputy District Director,
Environmental
California Department of Transportation

5/19/2006
Date of Approval

for Gene K. Fong
Division Administrator
Federal Highway Administration

State of California
Department of Transportation

SCH Number: _____
04-CC-680, KP 32.5/35.8 (PM 20.2/22.2)
04-CC-004, KP R16.9/R24.3 (PM R10.5/R15.1)
EA 229100

Negative Declaration (ND)

Pursuant to: Division 13, Public Resources Code

Project Description

The proposed project is to construct a phased sequence of improvements to the I-680/SR-4 interchange in Contra Costa County, California, to alleviate operational deficiencies currently experienced through the facility.

The project would consist of five phases of improvements. All phases are included in the MTC's *Transportation 2030 Plan* (MTC 2005). The plan anticipates that Phases 1 and 2 will be operational by 2015 and Phases 3 through 5 will be operational by 2025. Phase 1 would construct a two-lane flyover direct connector from northbound I-680 to westbound SR-4. The existing northbound I-680 to westbound SR-4 loop would be removed. Phase 2 would construct a two-lane connector from eastbound SR-4 to southbound I-680. The current eastbound SR-4 to southbound I-680 diagonal ramp would be removed. Both Phases 1 and 2 would provide new direct local access to and from I-680.

Phase 3 would add a new lane to the median in both the eastbound and westbound directions of SR-4 within the project limits to provide additional weaving capacity. Phase 4 would replace the southbound I-680 to eastbound SR-4 loop ramp with a direct connector and remove the existing southbound I-680 to eastbound SR-4 loop ramp. It would also construct an auxiliary lane on eastbound SR-4 from the connector to the Solano Way off-ramp. Phase 5 would replace the existing one-lane northbound I-680 to eastbound SR-4 diagonal ramp with a slightly relocated two-lane diagonal ramp, replace the westbound SR-4 to northbound I-680 diagonal ramp with a two-lane diagonal connector, and widen the westbound SR-4 to southbound I-680 loop ramp from a single lane to two lanes.

Determination

Caltrans has prepared an Initial Study (IS) for compliance with the California Environmental Quality Act (CEQA). On the basis of that study, it has been

determined that the proposed project would not have a significant impact upon the environment for the following reasons:

- The proposed project would have no impacts on Agricultural Resources, Cultural Resources, Land Use and Planning, Mineral Resources, Public Services, and Recreation.

- The proposed project would have a less-than-significant impact on Air Quality, Hazards and Hazardous Materials, Transportation and Traffic, and Utility and Service Systems.

- Potential impacts to Aesthetics (including the appearance of new soundwalls and tree removal), Biological Resources (including wetlands and fisheries), Geology and Soils, Hydrology and Water Quality, Flood Risk, Noise, and Population and Housing would be mitigated to less-than-significant levels.

The proposed project would employ impact avoidance and minimization measures as part of the project design, as well as the following mitigation measures to reduce potential impacts to the environment:

- Aesthetics: Landscape planning and subsequent landscaping would be incorporated into the project design, including the placement of trees, shrubs, and groundcover within the project right-of-way. Soundwalls and retaining walls will be aesthetically treated with color, texture and patterns to help the walls blend into the environment and provide visual unity for the corridor. Soundwalls could be treated with vine plantings to reduce glare and graffiti and to enhance aesthetics. Aesthetic wall treatments will be similar to existing walls within the highway corridors. The design and aesthetic treatment of the overhead freeway structure (including the flyover and its ramps, columns, walls, etc.) shall be determined with input from public outreach meeting(s) to be held during the design phase of the project.

- Biological Resources: The total wetland permanent impacts are relatively small and would be mitigated. Wetlands and waters of the United States outside of the construction zone but on the border or nearby will be fenced off and designated for avoidance. Work within Grayson and Walnut Creeks will be seasonally restricted to the dry season (a “work window” of June 1 to October 31) to avoid potential impacts to the Central Valley evolutionarily significant unit (ESU) steelhead and chinook salmon. Work within a given area of the creeks shall be

limited to a single work window to avoid long-term effects. Work should occur only in a dry channel. If work in a live stream is necessary, the construction work space will be isolated from flowing water, shall not dewater the entire stream, and will allow fish passage through the project area. On-site mitigation opportunities for permanent, unavoidable wetland fill are limited, but off-site conservation banks and in-lieu fees are identified that may provide compensatory mitigation.

- Geology and Soils: Geotechnical and foundation studies will be performed for the final design, and the recommendations will be incorporated into the project plans. Project structures will be designed for seismic loading identified in the geotechnical studies.

- Water Quality: Construction requirements for water quality are the conditions of the National Pollutant Discharge Elimination System (NPDES) permit, other planning agreements, and the county storm water management programs. A Storm Water Pollution Prevention Plan (SWPPP) will be developed and approved for this project and applied to project construction. The SWPPP will include best management practices (BMPs) for erosion and runoff controls, which will be incorporated into the project design and operations controls prior to project construction. Long-term mitigation will meet NPDES discharge requirements for permanent Design Pollution Prevention BMPs for soil stabilization and storm water runoff treatment.

- Flood Risk: Existing flood risk would not be substantially changed by the project, and design measures can be incorporated to reduce the profile of the structure with respect to water passage.

- Noise: Soundwalls would be constructed to mitigate for long-term noise impacts. Construction contract requirements will include work restrictions.

- Population and Housing: Relocation assistance, including finding and obtaining replacement housing, relocation and business impact payments, and relocation services and counseling would be provided to eligible persons and businesses in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Policies Act, as amended.

- Transportation and Traffic: Contractor requirements will include measures to avoid and minimize regional and local traffic disruption through notification of upcoming work and posting of detour or closure plans.

5/9/06

Dale Jones
Acting Deputy District Director, Environmental
California Department of Transportation

Date

Summary

The California Department of Transportation (Caltrans) is the lead California Environmental Quality Act (CEQA) agency for the project, and the Federal Highway Administration (FHWA) is the lead National Environmental Policy Act (NEPA) agency. In this project, the Contra Costa Transportation Agency (CCTA), Caltrans, and FHWA propose to make a phased sequence of improvements to the Interstate 680 (I-680)/State Route 4 (SR-4) interchange in Contra Costa County, California, to alleviate operational deficiencies currently experienced throughout the interchange. The configuration of the existing interchange, coupled with less-than-desirable interchange spacing on SR-4, does not adequately handle existing traffic and will not meet anticipated future need. Improvements to the interchange are needed to improve safety and increase capacity to decrease congestion and accommodate both near-term and design year (2030) traffic volumes, while improving the efficiency of related widening projects within the project vicinity.

Five phases of improvements for this interchange have been identified that can be implemented independently as funding is available. The *proposed project* refers to all five phases, although each of the phases could be constructed alone and meet the purpose and need. All five phases are included in the Metropolitan Transportation Commission's (MTC's) long-range *Transportation 2030 Plan* (MTC 2005). Phases 1 and 2 are the highest priorities for this interchange, and will be included in MTC's 2007 Transportation Improvement Program (TIP)[1] for initial right-of-way acquisition.

- Phase 1 – Construct a two-lane flyover direct connector from northbound I-680 to westbound SR-4. The northbound I-680 to westbound SR-4 loop ramp would be removed in this phase.
- Phase 2 – Construct a two-lane connector from eastbound SR-4 to southbound I-680. The current eastbound SR-4 to southbound I-680 diagonal ramp would be removed. Both Phases 1 and 2 would provide new direct local access to and from I-680.
- Phase 3 – Widen SR-4 within the project limits to add eastbound and westbound lanes to improve on-ramp and off-ramp merging actions.

[1] MTC's *Transportation 2030 Plan* (MTC 2005) serves as the current program for long-range planning of Bay Area transportation projects over the next 25 years while the TIP identifies the region's priorities for specific project funding.

- Phase 4 – Replace the southbound I-680 to eastbound SR-4 loop ramp with a two-lane flyover direct connector. Construct an auxiliary lane on eastbound SR-4 from the connector to the Solano Way off-ramp.
- Phase 5 – Replace the westbound SR-4 to northbound I-680 single-lane diagonal ramp with a new two-lane diagonal connector. Replace the northbound I-680 to eastbound SR-4 single-lane diagonal ramp with a two-lane relocated diagonal connector. Widen the westbound SR-4 to southbound I-680 loop ramp from a single lane to two lanes.

Cumulative impacts are identified and evaluated in distinct subsections of this document. That evaluation consists of all five phases of the interchange improvement project considered together with other proposed projects. Other recent and planned projects that were considered for cumulative impacts included the new high-occupancy vehicle (HOV) lanes added to I-680 between Martinez and Walnut Creek, the new (second) Benicia-Martinez Bridge, the Burlington Northern–Santa Fe Railroad crossing reconstruction, local road improvements at Pacheco Boulevard and Arnold Drive, and improvements in eastern Contra Costa County to SR-4.

This Draft Environmental Assessment/Initial Study (EA/IS) addresses the proposed action's potential to have adverse impacts on the environment that are mitigated to less-than-significant impacts. Potential impacts and mitigation/minimization measures are summarized in Table S-1 (see next page).

This EA/IS has been prepared to meet the requirements of NEPA and CEQA. The project is also subject to other Federal, State, and local laws, policies, and guidelines that are addressed in this document. Applicable regulatory consultation or approvals have been completed or identified from the U.S. Fish and Wildlife Service (concurrence received that the project is unlikely to impact red-legged frog), U.S. Army Corps of Engineers (Nationwide Permit authorization required), National Oceanic and Atmospheric Administration (provided construction impact avoidance measures), State Historic Preservation Officer (consultation concluded that the project would not affect any historic property), California Department of Fish and Game (Streambed Alteration Agreement permit required), Regional Water Quality Control Board and State Water Resources Control Board (a water quality certification or waiver, and NPDES permit required).

Table S-1 Summary of Major Potential Impacts From Alternatives

Potential Impact		Phases 1 and 2		Phases 3, 4, 5	No Build Alternative	Cumulative	Mitigation/ Minimization
		Without Slip Ramps*	With Slip Ramps*				
Land Use	Consistency with the Martinez General Plan	Yes	Yes	Yes	Yes	None	None
	Consistency with the Contra Costa County General Plan	Yes	Yes	Yes	Yes	None	None
Farmland		None	None	None	None	None	None
Social and Economic		Increased capacity on roadways	Increased capacity on roadways	Increased capacity on roadways	None	No additional impacts	None
Relocation	Business Displacements	Portions of several properties required that do not affect continued use. One partial take affecting a warehouse might be necessary. A Caltrans-owned property currently leased to a self-storage business would not have its lease renewed.	Same, but with the addition of a full take of a truck camper/shell business/parcel, and the partial take of some parking spaces at a retail business on Pacheco Blvd.	None	None	No additional impacts	Assistance would be provided in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Polices Act
	Housing Displacements	Residents of 5 to 7 homes may be relocated	Residents of 5 to 7 homes may be relocated	None	None	No additional impacts	Assistance would be provided in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Polices Act
	Utility Service Relocation	Sanitary sewer line along Berry Drive would be relocated	Sanitary sewer line along Berry Drive would be relocated	None	None	None	No service disruption would result
Air Quality		Fugitive dust during construction	Fugitive dust during construction	Same as Phases 1 and 2	None	No additional impacts	Dust control practices listed in Section 2.3.5 would be incorporated

* Slip ramps are entry or exit ramps that connect local streets with freeway-to-freeway direct connector ramps.

Table S-1 Summary of Major Potential Impacts From Alternatives

Potential Impact	Phases 1 and 2		Phases 3, 4, 5	No Build Alternative	Cumulative	Mitigation/ Minimization
	Without Slip Ramps*	With Slip Ramps*				
Noise	Noise level would increase by 1 decibel. Existing and future noise levels will exceed thresholds for consideration of noise abatement at some locations	Noise level would increase by 1 decibel. Existing and future noise levels will exceed thresholds for consideration of noise abatement at some locations	Same as Phases 1 and 2	None	All five phases of interchange plus existing traffic and new I-680 HOV lane considered in evaluation.	Soundwalls are included where they meet minimum sound abatement criteria and were determined to be cost-effective. Measures outlined in Section 2.4.5 would minimize construction impacts
Waterways and Hydrologic Systems	Drainage patterns would change	Drainage patterns would change	Same as Phases 1 and 2	None	No additional impacts	Retention basins would be added to design (Section 2.12.5)
Water Quality	Construction activities could increase organic pollutants or suspended/ dissolved solids in nearby creeks or Contra Costa Canal	Construction activities could increase organic pollutants or suspended/ dissolved solids in nearby creeks or Contra Costa Canal	Same as Phases 1 and 2	None	No additional impacts	Pollution control and soil erosion measures would be taken; and a Storm Water Pollution Prevention Plan would be implemented during construction (see Section 2.12.5)
Wetlands and Waters of the United States	0.005 ha (0.011 acre) of wetlands would be permanently impacted	0.005 ha (0.011 acre) of wetlands would be permanently impacted	0.004 ha (0.012 acre) of wetlands would be permanently impacted	None	0.009 ha (0.023 acre) wetland impacts by all 5 phases. (Total cumulative permanent fill is under the 0.2 ha [0.5 acre] limit consistent with a USACE Nationwide Permit #14)	Temporary and permanent impacts would be minimized and avoidance measures would be instituted as indicated in Section 2.6.5. Seasonal work windows shall be required for activities in Grayson and Walnut Creek channels (June 1 to October 31). Unavoidable permanent wetland fill may be mitigated through use of available conservation banks or in-lieu fees.

* Slip ramps are entry or exit ramps that connect local streets with freeway-to-freeway direct connector ramps.

Table S-1 Summary of Major Potential Impacts From Alternatives

Potential Impact	Phases 1 and 2		Phases 3, 4, 5	No Build Alternative	Cumulative	Mitigation/ Minimization
	Without Slip Ramps*	With Slip Ramps*				
Wildlife and Vegetation	Construction activities will require the removal of some trees	Construction activities will require the removal of some trees	Construction activities will require the removal of some trees	None	No additional impacts	Trees that provide nesting habitat would be avoided, if possible. If infeasible, replacement and/or replanting would occur as part of landscaping. Tree removal would be done prior to Feb. 15 of each construction year to avoid impacts to nesting birds
Floodplain	New pier at Grayson Creek will have minor increase (estimated at 1 inch) in flood water elevation	New pier at Grayson Creek will have minor increase (estimated at 1 inch) in flood water elevation	Additional piers and median widening encroach on floodplain	None	All five phases increase flood flow elevation by an estimated 3 inches	Project design revised to reduce restrictions in channel
Threatened or Endangered Species	Steelhead and chinook salmon habitat may be temporarily impacted	Steelhead and chinook salmon habitat may be temporarily impacted	Same as Phases 1 and 2	None	No additional impacts	Avoidance and minimization measures listed in Section 2.8.4 would be required of the contractor. These include seasonal restrictions or “work windows,” restrictions on working within the creek channel area, requirements for storage and use of construction materials and equipment, erosion control, and monitoring if dewatering is necessary within a creek channel.

* Slip ramps are entry or exit ramps that connect local streets with freeway-to-freeway direct connector ramps.

Table S-1 Summary of Major Potential Impacts From Alternatives

Potential Impact	Phases 1 and 2		Phases 3, 4, 5	No Build Alternative	Cumulative	Mitigation/ Minimization
	Without Slip Ramps*	With Slip Ramps*				
Historic and Archaeological Preservation	Contra Costa Canal, a historical resource, is crossed by the project in Phases 1 and 2. Findings of the Historical Property Survey Report conclude that no historic properties would be affected.	Contra Costa Canal, a historical resource, is crossed by the project in Phases 1 and 2. Findings of the Historical Property Survey Report conclude that no historic properties would be affected.	Canal is also crossed by Phases 4 and 5; no historic properties affected	None	No additional impacts	No impacts are anticipated; however, if any cultural material is encountered or subject to impact, all work would stop until a qualified archaeologist makes an assessment and follows the appropriate protocol for the resource
Hazardous Waste Sites	Soils within project area may contain residual pesticides and lead.	Soils within project area may contain residual pesticides and lead.	Same as Phases 1 and 2	None	No additional impacts	All buildings acquired for the project would be investigated for contamination; soil and groundwater sampling may be carried out for four sites and for soils identified for grading or excavation; see Section 2.2
Visual	Phase 1 and 2 connectors will be visible from residential areas near freeways. Soundwalls will be added at specific locations	Phase 1 and 2 connectors will be visible from residential areas near freeways. Soundwalls will be added at specific locations	Phases 4 and 5 introduce additional ramps and soundwalls	None	Phases 1 through 5 add structures to already visible cloverleaf interchange.	Landscaping would be incorporated into the project to reduce visual impacts. Vines would be planted on soundwalls to reduce glare, visual dominance and to deter graffiti. Aesthetic treatments (color, texture and pattern), that are similar in design to existing walls within the corridor, would be applied to all sound and retaining walls.
Traffic and Transportation	Construction could result in some temporary traffic detours/delays	Construction could result in some temporary traffic detours/delays	Same as Phases 1 and 2	None	No additional impacts	Contractor will be required to minimize local traffic interruptions, and provide notification and signing
Energy	None	None	None	None	None	None
Growth Inducement	Possible	Possible	Possible	None	None	Existing land use controls

* Slip ramps are entry or exit ramps that connect local streets with freeway-to-freeway direct connector ramps.

Table of Contents

Cover Sheet i
Negative Declaration (ND) iii
Summary vii
Table of Contents xiii
List of Figures xvi
List of Tables xvii
List of Abbreviated Terms xviii

Chapter 1 Proposed Project 1-1
1.1 Project Description 1-1
1.1.1 Introduction 1-1
1.1.2 Background 1-1
1.1.3 Interchange Improvement Phases 1-3
1.2 Purpose and Need 1-15
1.2.1 Project Purpose 1-15
1.2.2 Project Need 1-15
1.2.3 Safety Concerns 1-17
1.3 Viable Alternatives 1-18
1.3.1 Alternative D2A 1-18
1.3.2 No Action Alternative 1-24
1.4 Alternatives Considered and Withdrawn 1-25
1.5 Related Transportation Projects 1-33

Chapter 2 Affected Environment, Environmental Consequences, and Mitigation Measures 2-1
2.1 Land Use, Planning, and Growth 2-3
2.1.1 Affected Environment 2-3
2.1.2 Permanent and Construction Impacts 2-8
2.1.3 Parks and Recreation 2-11
2.1.4 Cumulative Impacts 2-12
2.1.5 Mitigation Measures 2-12
2.2 Hazardous Waste and Materials 2-12
2.2.1 Affected Environment 2-13
2.2.2 Permanent and Temporary Impacts 2-15
2.2.3 Cumulative Impacts 2-15
2.2.4 Mitigation Measures 2-15
2.3 Air Quality 2-16
2.3.1 Affected Environment 2-16
2.3.2 Permanent Impacts 2-23
2.3.3 Construction Impacts 2-29
2.3.4 Cumulative Impacts 2-29
2.3.5 Mitigation 2-29
2.4 Noise 2-31
2.4.1 Affected Environment 2-31
2.4.2 Permanent Impacts 2-34
2.4.3 Construction and Temporary Impacts 2-35
2.4.4 Cumulative Impacts 2-36
2.4.5 Mitigation 2-36
2.5 Energy 2-46
2.5.1 Affected Environment and Impacts 2-47

2.5.2 Cumulative Impacts 2-47
2.5.3 Mitigation..... 2-48
2.6 Wetlands and Other Waters of the United States 2-48
2.6.1 Affected Environment..... 2-48
2.6.2 Permanent Impacts..... 2-52
2.6.3 Temporary and Construction-Phase Impacts 2-52
2.6.4 Cumulative Impacts 2-53
2.6.5 Mitigation Measures 2-54
2.7 Vegetation and Wildlife 2-57
2.7.1 Vegetation..... 2-57
2.7.2 Wildlife 2-58
2.7.3 Permanent and Temporary Impacts 2-59
2.7.4 Cumulative Impacts 2-59
2.7.5 Mitigation Measures 2-59
2.8 Threatened and Endangered Species..... 2-61
2.8.1 Affected Environment..... 2-61
2.8.2 Permanent and Construction Impacts 2-64
2.8.3 Cumulative Impacts 2-65
2.8.4 Mitigation Measures 2-65
2.9 Geology 2-67
2.9.1 Affected Environment..... 2-67
2.9.2 Permanent Impacts..... 2-73
2.9.3 Temporary and Construction-Phase Impacts 2-74
2.9.4 Cumulative Impacts 2-75
2.9.5 Mitigation Measures 2-75
2.10 Floodplains..... 2-76
2.10.1 Affected Environment..... 2-77
2.10.2 Permanent Impacts..... 2-79
2.10.3 Construction and Other Temporary Impacts..... 2-82
2.10.4 Cumulative Impacts 2-82
2.10.5 Mitigation Measures..... 2-82
2.11 Section 4(f) Parks, Recreational Areas, Wildlife and Waterfowl Refuges, and Wild and Scenic Rivers 2-82
2.12 Hydrology, Water Quality and Storm Water Runoff 2-84
2.12.1 Affected Environment..... 2-84
2.12.2 Permanent Impacts..... 2-92
2.12.3 Construction and Other Temporary Impacts..... 2-92
2.12.4 Cumulative Impacts 2-93
2.12.5 Mitigation Measures..... 2-94
2.13 Farmlands/Agricultural Lands..... 2-96
2.13.1 Affected Environment..... 2-96
2.13.2 Permanent, Temporary, and Cumulative Impacts..... 2-96
2.13.3 Mitigation Measures..... 2-97
2.14 Community Impacts (Social, Economic) and Environmental Justice..... 2-97
2.14.1 Affected Environment..... 2-97
2.14.2 Community Services and Facilities..... 2-102
2.14.3 Permanent Impacts..... 2-102
2.14.4 Community Cohesion..... 2-108
2.14.5 Employment and Unemployment..... 2-108
2.14.6 Construction and Other Temporary Impacts..... 2-109

2.14.7 Cumulative Impacts 2-109
2.14.8 Mitigation and Avoidance Measures 2-109
2.15 Utilities and Emergency Services 2-110
2.15.1 Affected Environment 2-110
2.15.2 Permanent Impacts 2-111
2.15.3 Temporary Impacts 2-112
2.15.4 Cumulative Impacts 2-112
2.15.5 Mitigation Measures 2-112
2.16 Traffic and Transportation 2-112
2.16.1 Affected Environment 2-112
2.16.2 Permanent Impacts 2-114
2.16.3 Temporary Impacts 2-114
2.16.4 Cumulative Impacts 2-114
2.16.5 Mitigation Measures 2-114
2.17 Visual/Aesthetics 2-115
2.17.1 Methodology 2-115
2.17.2 Affected Environment 2-116
2.17.3 Permanent and Temporary Impacts 2-121
2.17.4 Cumulative Impacts 2-122
2.17.5 Mitigation Measures 2-123
2.18 Historical Resources 2-124
2.18.1 Affected Environment 2-124
2.18.2 Cumulative Impacts 2-128
2.18.3 Mitigation Measures 2-128
2.19 Archaeological Resources 2-128
2.19.1 Affected Environment 2-128
2.19.2 Permanent and Temporary Impacts 2-130
2.19.3 Cumulative Impacts 2-130
2.19.4 Mitigation Measures 2-130
Chapter 3 Required Approvals and Coordination 3-1
Chapter 4 List of Preparers 4-1
Chapter 5 References 5-1
Chapter 6 List of Technical Studies 6-1
Appendix A Project Phases and Details A-1
Appendix B CEQA Checklist B-1
Determining Significance Under CEQA B-1
CEQA Environmental Checklist B-1
Discussion of CEQA Checklist Responses and Summary of Mitigation Measures B-12
Appendix C Summary of Mitigation and Avoidance Measures C-1
Appendix D Summary of Relocation Benefits D-1
Appendix E Glossary of Technical Terms E-1
Appendix F Noise Measurements, Modeling Results, and Barrier Analysis F-1
Appendix G Title VI Policy Statement G-1
Appendix H Consultation and Coordination H-1
Appendix I Peak Traffic Volume Diagrams I-1

List of Figures

Figure 1-1 Project Vicinity Map 1-2
Figure 1-2 Interchange Vicinity Map, Proposed Project Phases 1 and 2 1-5
Figure 1-3 Project Area Phases 1 and 2 1-7
Figure 1-4 I-680/SR-4 Future Phases 3, 4, and 5 1-9
Figure 1-5 Project Area with Future Phases 3, 4, and 5 1-11
Figure 1-6 Location and Cross Section Map 1-13
Figure 1-7 Interchange Improvements Evaluated at Concord Avenue/I-680 and Morello Avenue/SR-4 1-32
Figure 2.1-1 Project Study Area and Census Tracts 2-4
Figure 2.1-2 Study Area Land Use Map 2-5
Figure 2.6-1 Wetlands and Waters of the U.S. Crossed or in Vicinity of Phases 1 through 5 2-49
Figure 2.9-1 Major Active Faults in the Project Area 2-69
Figure 2.9-2 Alquist-Priolo Earthquake Fault Zone 2-71
Figure 2.12-1 Surface Water Resources 2-85
Figure 2.14-1 Community Impact Assessment Study Area 2-99
Figure 2.14-2 I-680/SR-4 Project Area Resources Potentially Affected 2-105
Figure 2.17-1 Location and Direction of Key Views 10 and 11 2-117
Figure 2.17-2 Photosimulation of Key View No. 10 2-119
Figure 2.17-3 Photosimulation of Key View No. 11 2-120

List of Tables

Table S-1 Summary of Major Potential Impacts From Alternatives ix
Table 1-1 Summary of Local Roadway and Intersection Improvement Options Considered 1-28
Table 2.1-1 Study Area Populations 2-8
Table 2.2-1 Potential Hazardous Waste Sites 2-14
Table 2.3-1 Bay Area Attainment Status 2-17
Table 2.3-2 Ambient Pollutant Concentrations in the Project Vicinity 2-21
Table 2.3-3a Carbon Monoxide Screening: Comparison of Project Interchange and Worst-case Traffic Conditions in Vicinity of Local Air Quality Monitoring Station 2-26
Table 2.3-3b Carbon Monoxide Screening: Comparison of Project Interchange and Worst-case Traffic Conditions in Vicinity of Local Air Quality Monitoring Station 2-27
Table 2.4-1 Federal Noise Abatement Criteria 2-33
Table 2.4-2 Phase 1 and 2 Soundwalls Preliminarily Evaluated as Feasible and Reasonable 2-37
Table 2.4-3 Phases 3 through 5 Soundwalls Preliminarily Evaluated as Feasible and Reasonable 2-38
Table 2.6-1 Summary of Permanent and Temporary Wetlands and Other Waters of the United States Impacted by All Five Project Phases 2-52
Table 2.7-1 Potentially Impacted Oak Trees 2-60
Table 2.12-1 Suisun Bay Water Quality 2-88
Table 2.12-2 Concentrations of Total Metals Collected Near Pacheco Creek, 1996-2000 2-89
Table 2.12-3 Storm Water Runoff Analysis at Various Locations in I-680 Just South of the Benicia Bridge 2-90
Table 2.14-1 Income in 2000 2-98
Table 2.14-2 Properties Potentially Impacted by the I-680/SR-4 Interchange Project Right-of-Way 2-104
Table 2.14-3 Racial/Ethnic Composition of the Study Area in 2000 2-108

List of Abbreviated Terms

ABAG	Association of Bay Area Governments
APE	Area of Potential Effect
ASR	Archaeological Survey Report
BART	Bay Area Rapid Transit
BMP	best management practice
BNSF	Burlington Northern–Santa Fe (Railroad)
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCTA	Contra Costa Transportation Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
cm	centimeters
CO	carbon monoxide
CRHR	California Register of Historic Resources
CRLF	California red-legged frog
CT	census tract
CWA	Clean Water Act
dBA	A-weighted decibel
DBH	diameter at breast height
DPP	Design Pollution Prevention
EDR	Environmental Data Resources, Inc.
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHPM	Federal-aid Highway Program Manual
FHWA	Federal Highway Administration
ha	hectare
HOV	High-occupancy vehicle
I-680	Interstate 680
ISA	Initial Site Assessment
km	kilometer(s)
L_{eq}	Equivalent Sound Level
LOS	Level of service
M	moment magnitude
NAC	Noise Abatement Criteria
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWP	Nationwide Permit (U.S. Army Corps of Engineers)
O_3	ozone
Pb	lead
PM	Post mile
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter

ppm	parts per million
PS&E	plans, specifications, and estimates
PSR	Project Study Report
ROG	reactive organic gases
RTP	Regional Transportation Plan
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SR	State Route
SR-4	State Route 4
SR-242	State Route 242
SWPPP	Storm Water Pollution Prevention Plan
TIP	Transportation Improvement Program
TNAP	Traffic Noise Analysis Protocol
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

Chapter 1 Proposed Project

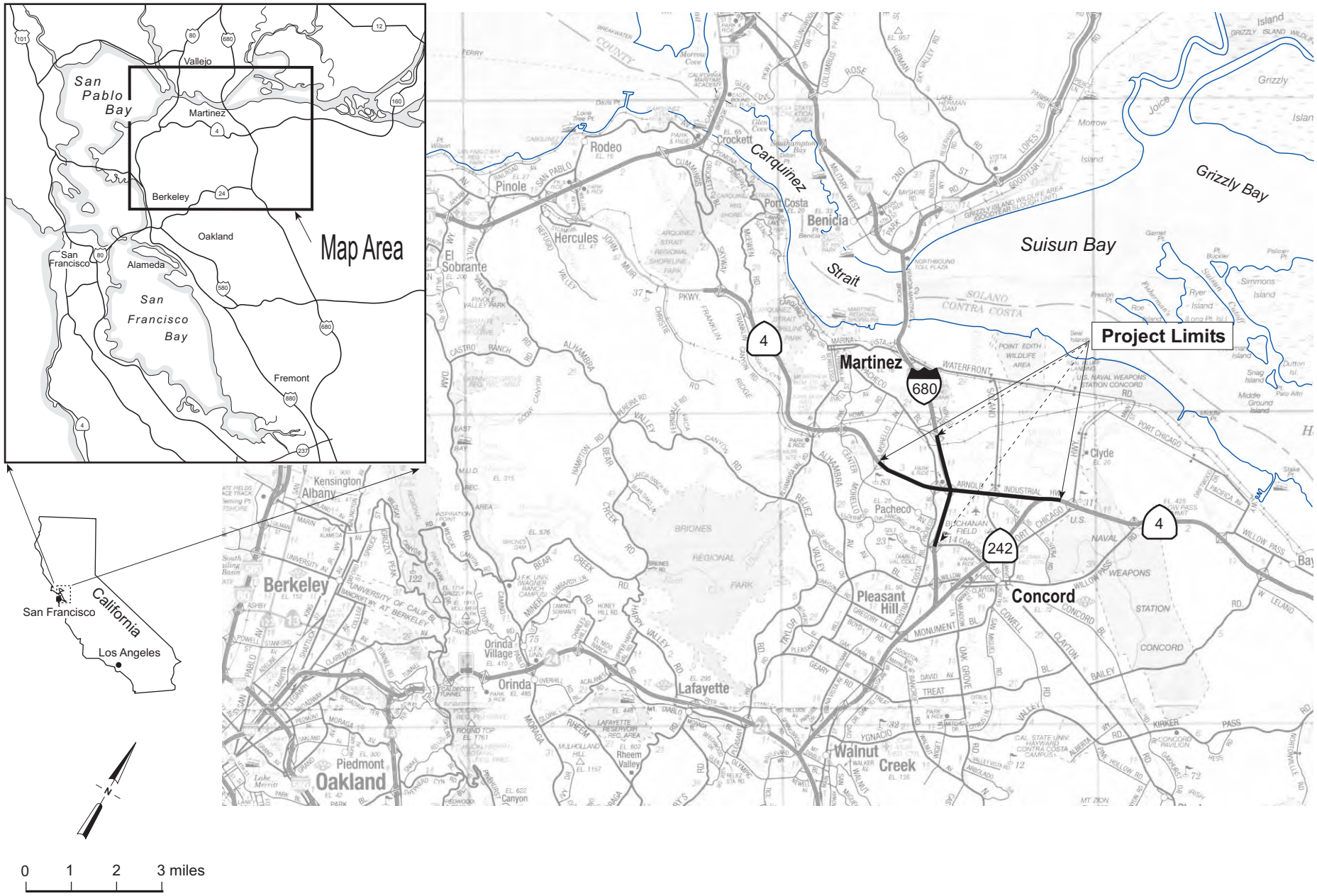
1.1 Project Description

1.1.1 Introduction

The California Department of Transportation (Caltrans) is the lead California Environmental Quality Act (CEQA) agency for the project, and the Federal Highway Administration (FHWA) is the lead National Environmental Policy Act (NEPA) agency. In this project, the Contra Costa Transportation Agency (CCTA), Caltrans, and FHWA propose to make improvements to the Interstate 680 (I-680)/State Route 4 (SR-4) interchange in Contra Costa County (Figure 1-1). The existing facility is a full cloverleaf freeway-to-freeway interchange. Growth in traffic since the original construction of this interchange four decades ago has exceeded the capacity of some directional movements. Traffic congestion is partly due to the high existing volumes but is also attributed to specific constraints associated with the current inadequate ramp spacing and lane configurations (primarily short weaving and merging sections, described in Section 1.2). Making capacity improvements to this interchange provides the opportunity to improve safety by eliminating some of the most congested weaving and merging locations.

1.1.2 Background

Reconstruction of this interchange has been formally considered since the early 1980s. As described in more detail in Section 1.4, preliminary concepts that would provide freeway-to-freeway connections with greater capacity were developed in the early 1990s that could replace the existing slower-speed loop ramps and closely spaced ramp configurations that currently constrain traffic flow. A lack of available funding limited actions to planning for a future interchange and identifying the areas immediately surrounding the existing State right-of-way from potentially encroaching land use development. As traffic congestion and delays increased at this interchange due to growth in traffic volumes, a Project Development Team (PDT) consisting of Federal, State, and local transportation planning representatives evaluated and completed a Project Study Report (PSR) in 2001 that recommended specific actions that could be implemented to improve traffic conditions and accommodate anticipated future traffic volumes that will result from planned regional and local growth.



0 1 2 3 miles

Source: AAA, San Francisco Bay region, 1997

URS	Project No. 26812934	PROJECT VICINITY MAP	Figure 1-1
	I-680/SR-4		

26812934.31300/122002/gos

The PSR resulted in identification of a preferred action, called Alternative D2A, which was used to prioritize the planned improvements evaluated in this report.

1.1.3 Interchange Improvement Phases

The planned improvements identified for Alternative D2A consist of five independent phases that can be implemented as funding is available. The details of each of the phases are summarized below and illustrated in Appendix A. Additional features of Alternative D2A are described in Section 1.3.1.

The existing northbound I-680 to westbound SR-4 and eastbound SR-4 to southbound I-680 traffic movements are the most impacted by the existing interchange's design and capacity constraints (see Section 1.2.2). Figure 1-2 shows the entire interchange project limits, and Figure 1-3 shows an enlarged detail of the interchange connections. Phases 1 and 2 of the project would improve capacity and safety for those directional movements. Transportation funding has been identified for the first two phases. Phases 3 through 5, considered future phases as no immediate funding has been designated, are illustrated in Figures 1-4 and 1-5. Figure 1-6 shows existing and proposed typical cross sections of different segments of the interchange.

1.1.3.1 Phase 1

Phase 1 would replace the northbound I-680 to westbound SR-4 loop ramp with a two-lane connector ramp that passes over both I-680 and SR-4. Auxiliary lanes would be added on northbound I-680 from the Concord Avenue on-ramp to the connector ramp and from the connector ramp to Morello Avenue. The existing loop ramp would be removed and the existing auxiliary lane on westbound SR-4 would be lengthened to the divergence point of the westbound SR-4 to northbound I-680 diagonal ramp and SR-4. The design of Phase 1 (and Phase 2, described below) allows for the addition of local access ramps between Pacheco Boulevard and I-680, called "slip ramps." The slip ramps are described in detail in Section 1.3.1 and are shown in Figures 1-2 and 1-3 and in Figures A-i, A-ii, A-4, and A-11 within Appendix A. The Phase 1 slip ramp would require the relocation of the Blum Road/Pacheco Boulevard intersection 95 meters (312 feet) to the north and the modification of the existing Caltrans Park and Ride lot.

1.1.3.2 Phase 2

Phase 2 proposes a new eastbound SR-4 to southbound I-680 ramp with auxiliary lanes from the Morello Avenue on-ramp to the connector and from the connector to the Concord Avenue off-ramp. Phase 2 would also extend the existing auxiliary lane

from the Muir Road/Pacheco Boulevard intersection to the eastbound SR-4 on-ramp and the eastbound SR-4 to northbound I-680 loop ramp. The existing diagonal ramp would be removed in this phase. Including a slip ramp at this location would create a connection between I-680 and Pacheco Boulevard. The connector ramp would be two lanes wide, but if the slip ramp were included in the project, a total of three lanes would follow the point where the slip ramp merges with the connector ramp (see Appendix A, Figure A-4).

1.1.3.3 Phase 3

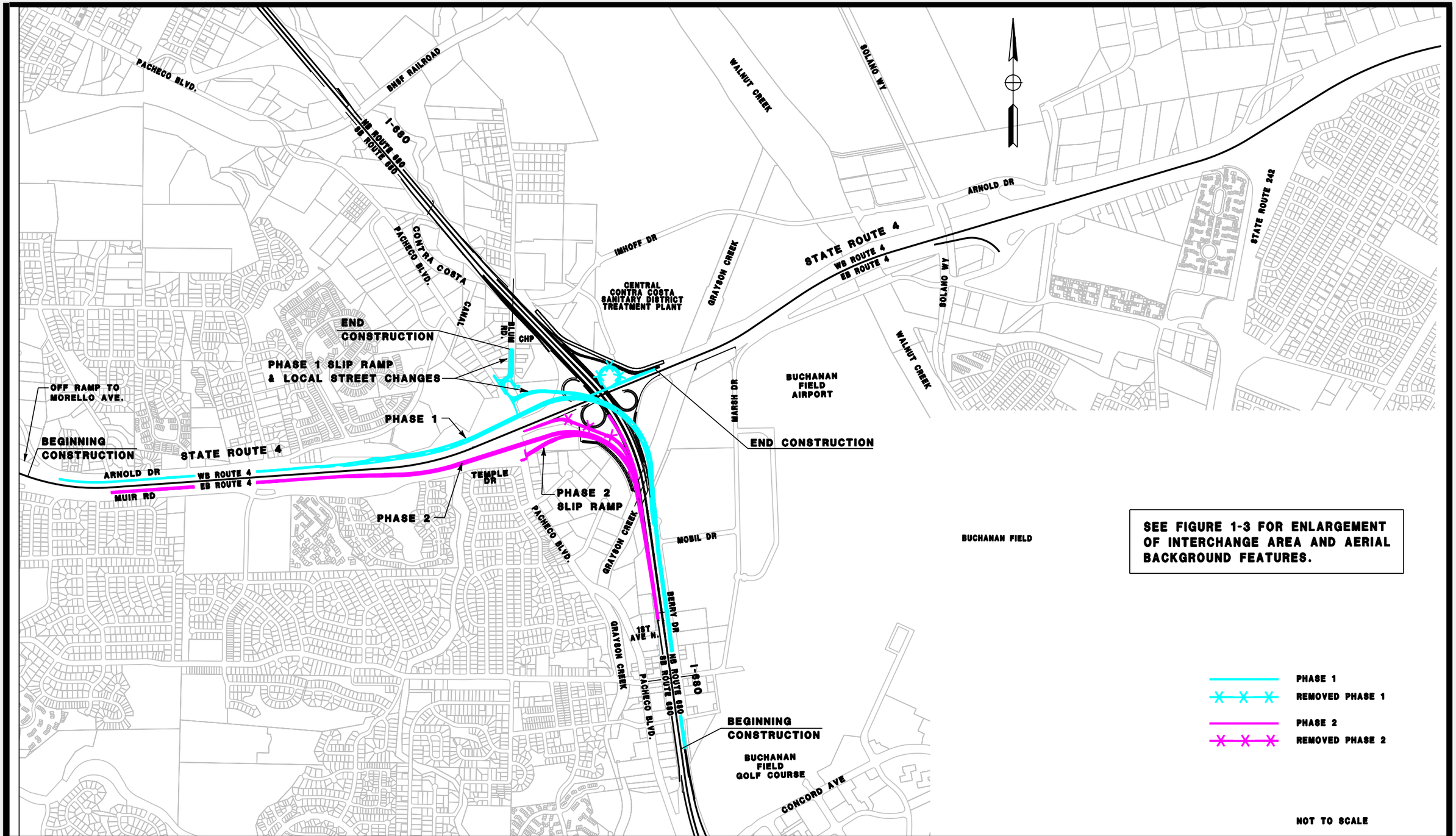
Phase 3 would add one eastbound lane and one westbound lane in the existing median of SR-4 in the vicinity of I-680. This phase adds capacity to SR-4 within the interchange area, allowing through traffic to better avoid on- and off-merging activity associated with the ramps and connections. The limits of this phase are from just west of the SR-4/Pacheco Boulevard and SR-4/Muir Road on- and off-ramps to just east of the State Route 242 (SR-242) interchange. Phase 3 would provide a longer distance in which drivers can change lanes outside of the immediate vicinity of the ramp connections, thereby spreading out some of the existing points of overlapping traffic movements and congestion.

1.1.3.4 Phase 4

Phase 4 would consist of a southbound I-680 to eastbound SR-4 direct-connector flyover ramp. It also would eliminate the existing southbound I-680 to eastbound SR-4 loop ramp. An auxiliary lane would be constructed on eastbound SR-4 from the connector to the Solano Way off-ramp. These changes result in a new higher-capacity direct connector and eliminates two congested weaving sections from the existing interchange (the existing southbound I-680 to SR-4 east off- and on-weaves, where southbound I-680 cars approach and enter the loop off-ramp, and then exit the same loop ramp onto eastbound SR-4).

1.1.3.5 Phase 5

Phase 5 would provide a westbound SR-4 to northbound I-680 direct connector to replace the existing diagonal ramp connection. This improvement provides a higher-capacity direct connector at a location that is functioning at very low levels of service in the morning commute direction. Two additional improvements would be made to the westbound SR-4 to southbound I-680 direction: the loop ramp in the northwest quadrant of the interchange (serving the westbound SR-4 to southbound I-680 movement) would be widened from a single lane to two lanes, and the



Contra Costa Transporation Authority	I-680/Rte4 Interchange Vicinity Map, Proposed Project Phases 1 and 2	Figure 1-2

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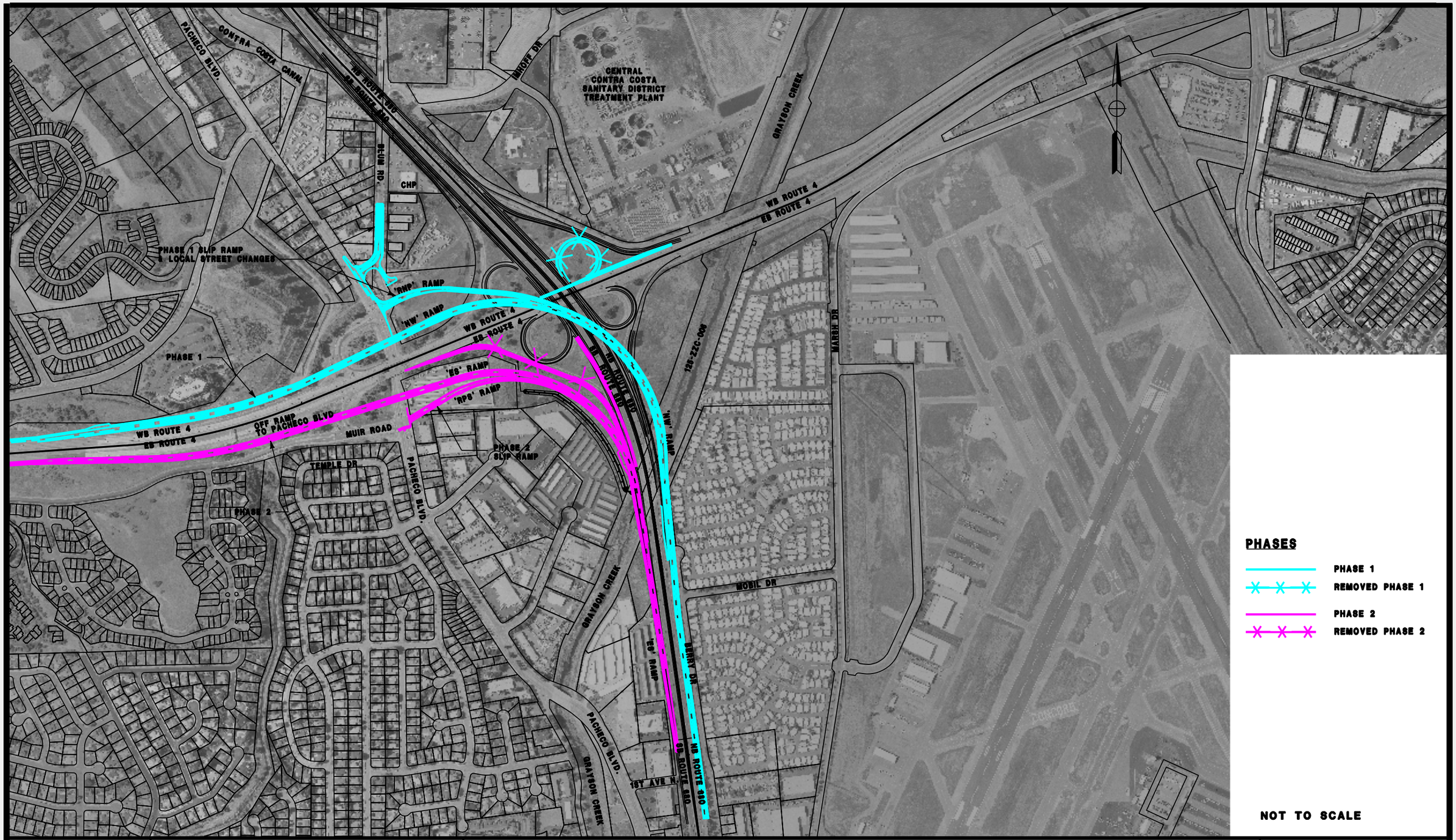

Contra Costa Transportation Authority	Project Area Phases 1 and 2	Figure 1-3

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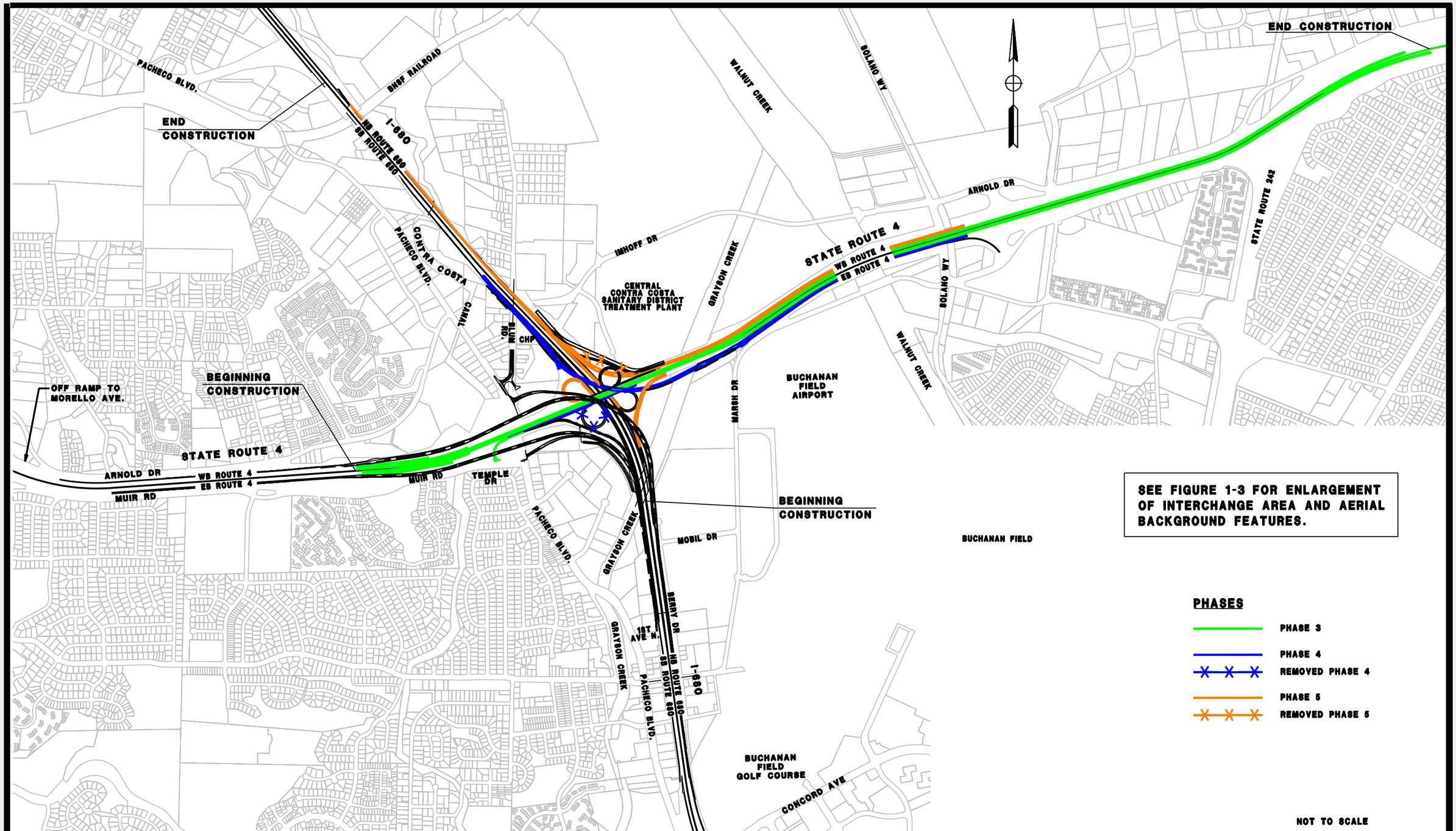

Contra Costa Transportation Authority	I-680/Rte4 Future Phases 3, 4 and 5	Figure 1-4

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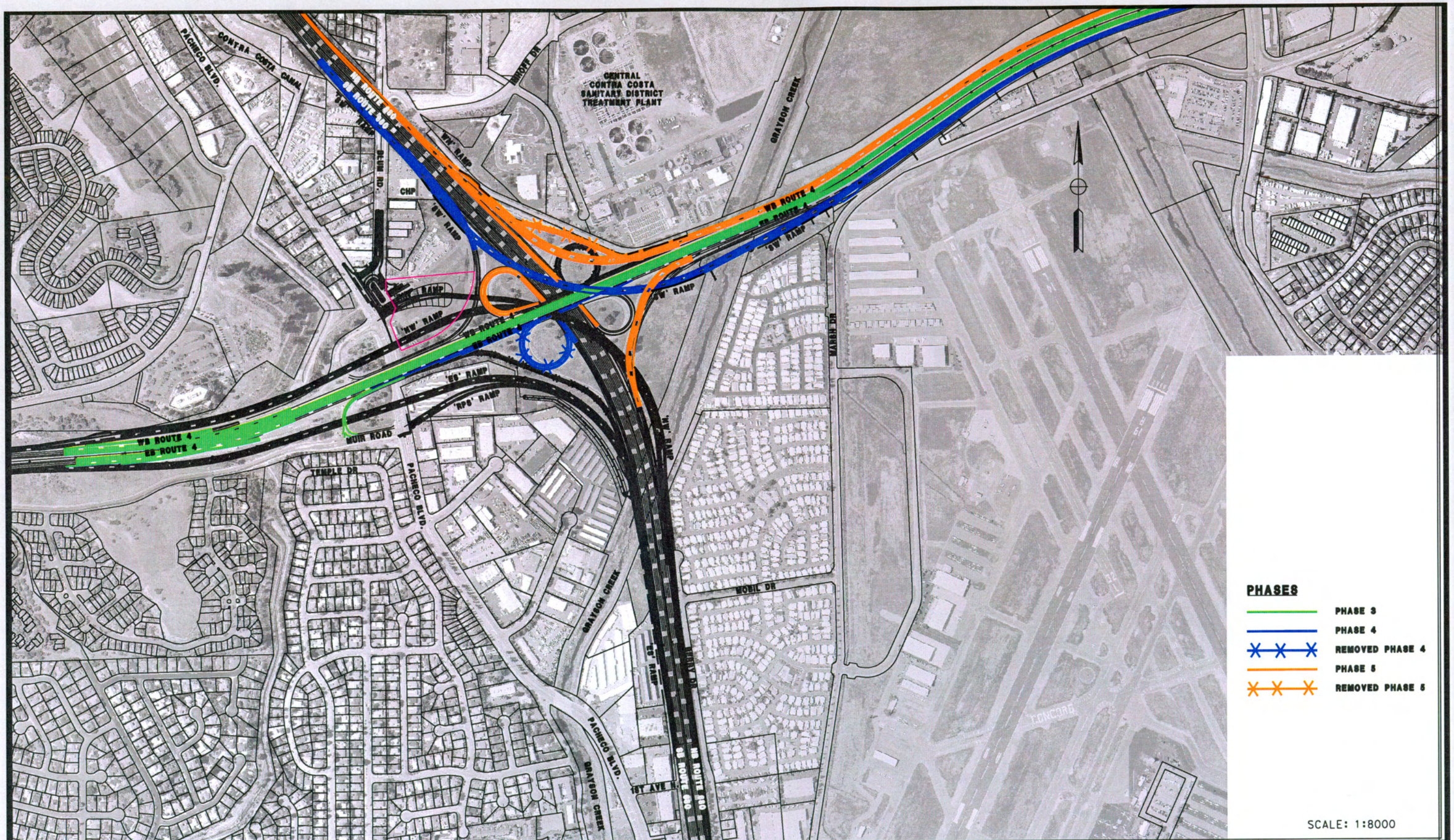

Contra Costa Transportation Authority	Project Area with Future Phases 3,4, and 5	Figure 1-5

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	CC	680	32.0 - 36.5		
04	CC	004	16.6 - 23.6		

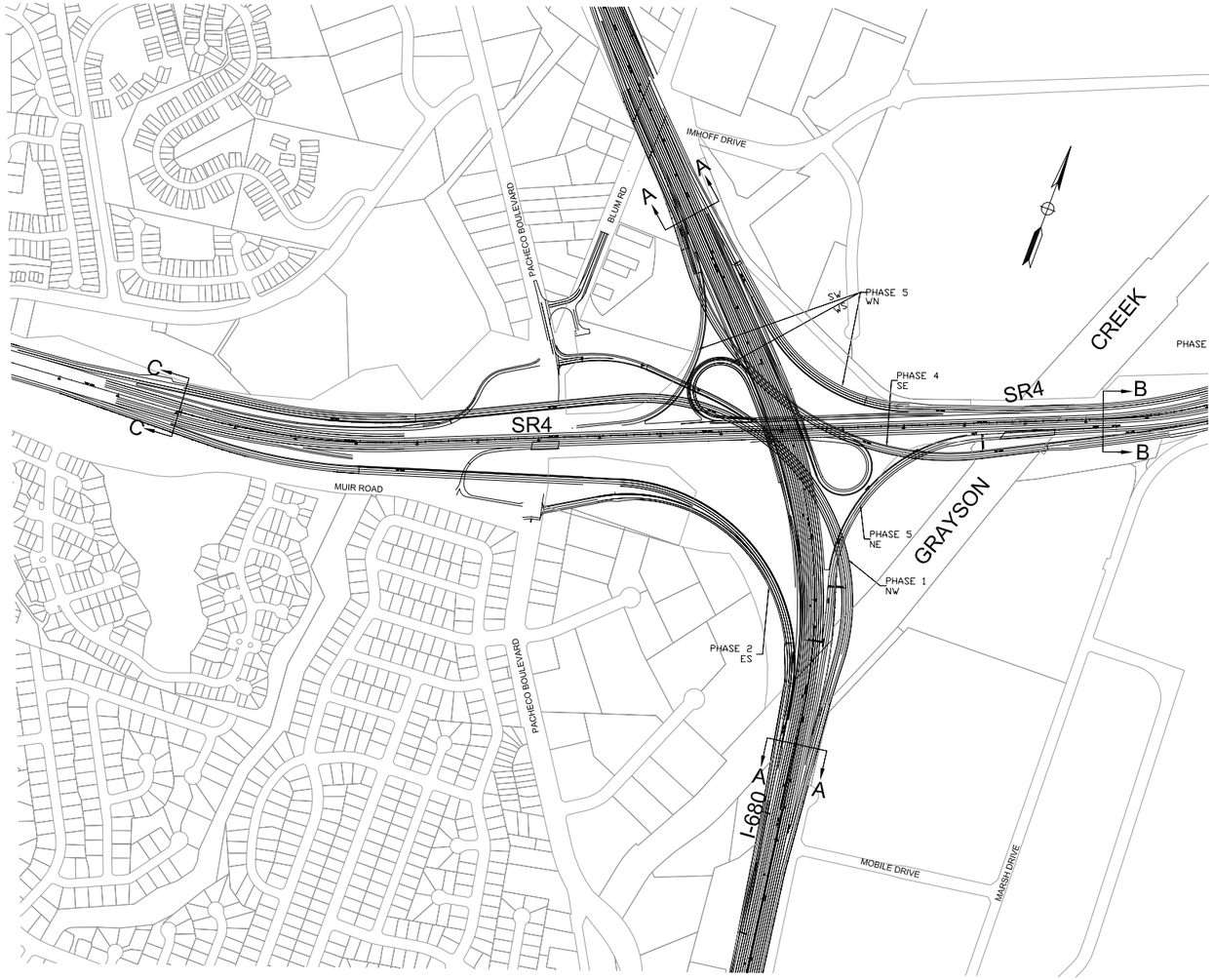
Caltrans Metric

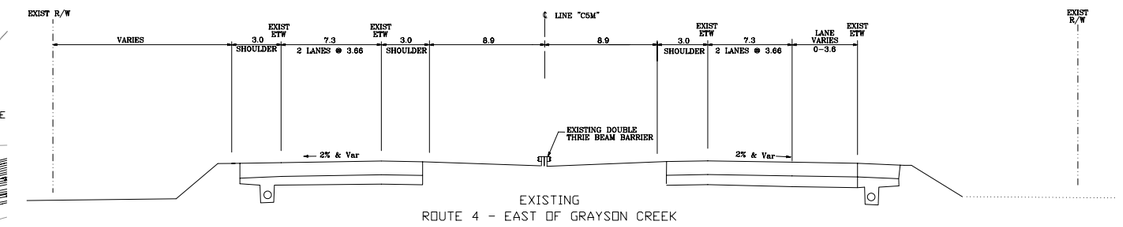
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

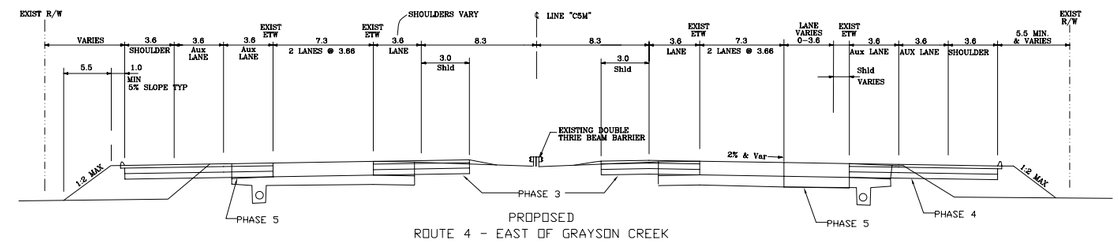
REGISTERED PROFESSIONAL ENGINEER No. Exp. STATE OF CALIFORNIA

URS CORPORATION
1333 Broadway Suite 800
Oakland, CA 94612



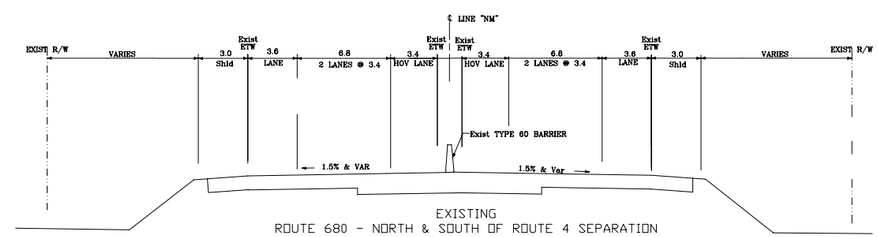


EXISTING
ROUTE 4 - EAST OF GRAYSON CREEK

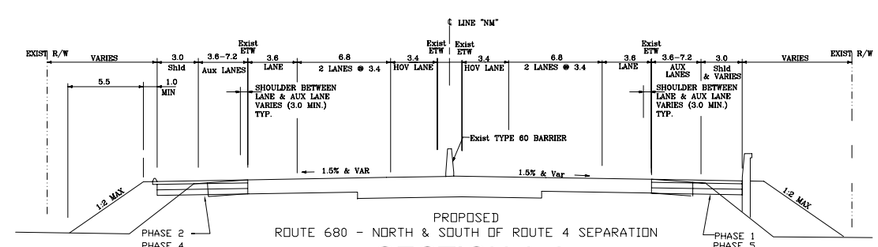


PROPOSED
ROUTE 4 - EAST OF GRAYSON CREEK

SECTION B-B

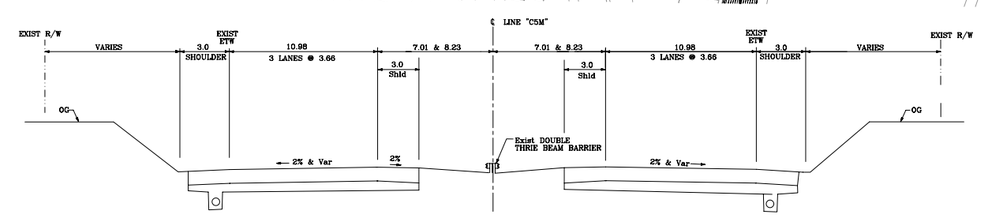


EXISTING
ROUTE 680 - NORTH & SOUTH OF ROUTE 4 SEPARATION

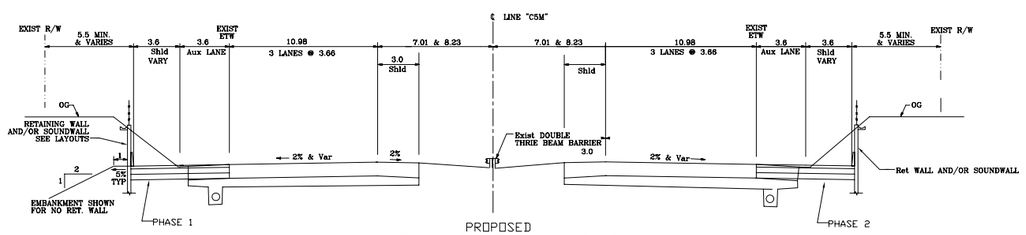


PROPOSED
ROUTE 680 - NORTH & SOUTH OF ROUTE 4 SEPARATION

SECTION A-A



EXISTING
ROUTE 4 - WEST OF PACHECO BLVD



PROPOSED
ROUTE 4 - WEST OF PACHECO BLVD

SECTION C-C

NO SCALE

FIGURE 1-6
LOCATION & CROSS SECTION MAP

I680/SR4 INTERCHANGE

LATEST REVISION

	DATE	REVISED BY
		DATE REVISED

CALCULATED/DESIGNED BY ML
CHECKED BY SK

PROJECT ENGINEER

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

Dec 16, 2005 - 3:44pm
X:\x_tss\ZIP\x_trans\I-680Rt4\CAD\Enviromental Document\X Sections\Layout.dwg

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

USERNAME => $USER
DGN FILE => $REQUEST

CU 00000

EA 10-3A1300

existing one-lane diagonal ramp in the southeast quadrant would be replaced to provide a two-lane ramp. During geometric review of the Draft Project Report, the replacement proposed for the diagonal ramp in the southeast quadrant was identified as a means to improve the curvature of the existing ramp, providing enhanced sight distance for motorists. These improvements are proposed to meet the anticipated future increase in traffic demand for the westbound SR-4 to southbound I-680 directional movement.

The proposed design is compatible with other recently completed and currently planned transportation improvements in the area, including the I-680 High-Occupancy Vehicle (HOV) Lane Project, the new Benicia-Martinez Bridge, the SR-242 widening project, and planned improvements along Pacheco Boulevard.

1.2 Purpose and Need

1.2.1 Project Purpose

The purpose of the project is to:

- Improve operational efficiency of the I-680/SR-4 interchange and reduce traffic congestion and delays
- Improve safety by eliminating short weaving and merging sections
- Provide direct local access between I-680 and Pacheco Boulevard
- Accommodate existing and planned growth in travel demand within these segments of I-680 and SR-4

1.2.2 Project Need

The I-680/SR-4 interchange, built in the 1960s, is unable to accommodate current traffic patterns and volumes. Contra Costa County has planned for growth through its General Plan process, Countywide Transportation Plan, and establishment of growth limit lines. Since the construction of this interchange, the county has subsequently experienced substantial residential and economic growth along both the I-680 and SR-4 corridors. These highways serve residents and workers who are traveling increased distances between their homes and jobs, both within the county and from more distant regional areas. The existing configuration of the interchange cannot adequately handle current or future projected traffic volumes or patterns, resulting in

substantial congestion and travel delays and contributing to safety problems, as discussed below.

1.2.2.1 Capacity Constraints

The existing cloverleaf design of the interchange is a capacity constraint to both I-680 and SR-4. The loop ramps have a tight radius, which limits travel speed. The distances between the on-ramps and off-ramps in each direction are relatively short, which limits the distance in which exiting and entering vehicles can merge or "weave" and causes backups that extend onto the freeway ramps during peak periods. The traffic at these points can back up and contribute to congestion on the freeway mainlines. This is one of the primary causes of congestion at this location for both I-680 and SR-4, and the resulting congestion limits the traffic volume that can pass through the interchange. A contributing operational deficiency on SR-4 is the close spacing of the Pacheco Boulevard on- and off-ramps, which are just to the west of the I-680 on- and off-ramps. Thus, within a short distance along SR-4, drivers must contend with congestion and merging actions at the loop on- and off-ramps with I-680, the I-680 diagonal on- and off-ramps, and the Pacheco Boulevard hook on- and off-ramps.

1.2.2.2 Local Circulation and Freeway Access

Pacheco Boulevard is a primary north-south arterial that links Martinez to the north with Pleasant Hill and Concord to the south. (Pacheco Boulevard becomes Contra Costa Boulevard south of Concord Avenue.) Short hook ramps connect Pacheco Boulevard to SR-4 just west of I-680 and Muir Road. Pacheco Boulevard and Contra Costa Boulevard provide access to both residential and commercial uses. The hook ramp connections between SR-4 and Pacheco Boulevard provide the only regional freeway access between Contra Costa Boulevard and Arthur Road, which are about 4 kilometers (km) (2.5 miles) apart. The ramp connections also provide important access to commercial vehicles that would otherwise have to use routes through residential areas that have steep grades, impacting local roadway operation.

1.2.2.3 Traffic Volumes

In 2002, total mainline traffic volumes on I-680 within the project limits were approximately 109,000 vehicles per day north of the interchange and 133,000 vehicles per day south of the interchange.[2] On SR-4, the volumes were 86,000 west of the interchange and 81,000 east of the interchange. Within the interchange, some

[2] These are the total volumes (both directions) as listed in the 2002 Traffic Volumes on the California Highway System Web site.

ramps are carrying traffic volumes and experiencing operational deficiencies that result in points of congestion. As noted in Section 1.2.2.1, traffic entering and exiting the interchange ramps must merge or weave with the highway mainline traffic, which constrains the level of service (LOS). LOS is a measure of traffic flow that indicates how well a roadway or intersection is operating, based on the available capacity and the volume of predicted traffic. LOS is expressed using the letters A (representing the best conditions, with unrestricted or relatively free-flow traffic) through F (representing the worst conditions, with stop-and-go congestion and/or breakdown of traffic flow). Evaluation of weaving within the existing interchange showed that all but two of the weaving sections studied function at LOS F during both the morning and afternoon peak periods.

By the year 2030, peak hour demand will exceed mainline capacity on westbound SR-4 and southbound I-680 in the morning peak hour, and on northbound I-680 in the evening peak hour. In particular, northbound I-680 to westbound SR-4 and eastbound SR-4 to southbound I-680 will be limited by bottlenecks that will constrain flow through these directional movements. Appendix I includes line diagrams that show freeway peak hour volumes and lane configurations for the interchange and connecting roadways.

1.2.3 Safety Concerns

The short weaving distances between the on- and off-ramps in each direction are the primary location of accidents within the interchange. Evaluation of Traffic Accident Surveillance and Analysis System (TASAS) data for the project's Draft Project Report (Caltrans 2004) for the period July 2000 to June 2003 (for the SR-4 segment within the project limits) and October 2000 to September 2003 (for the I-680 segment) indicates that accidents take place at similar-to-average rates for similar facilities (i.e., cloverleaf interchanges) for the overall project limits, and some conditions within the project limits are above statewide averages. The proposed phases address many of the interchange's deficiencies and improve both safety and operational characteristics. Areas of concern within the existing facility include the following:

- Eastbound SR-4:
  - Vicinity of the lane drop west of the Pacheco Boulevard exit ramp
  - Weave section between the Pacheco Boulevard on-ramp and SR-4 to the southbound I-680 slip ramp

  - Weave section between loop on- and off-ramps to and from I-680
- Westbound SR-4:
  - Weave section between the loop on- and off-ramps to and from I-680
  - Weave section between the I-680 slip on-ramp and the Pacheco Boulevard off-ramp
- Northbound I-680: Weave section between the loop on- and off-ramps to and from SR-4
- Southbound I-680:
  - Weave section between the loop on- and off-ramps to and from SR-4
  - Exit ramp to Concord Avenue interchange
- Loop Ramps: Northbound I-680 to westbound SR-4

1.3 Viable Alternatives

1.3.1 Alternative D2A

During preparation of the PSR, Alternative D2A was selected for further study. All other alternatives identified in the PSR were eliminated from further consideration (see Section 1.5). Alternative D2A is referred to herein as the proposed project.

Additional improvements have been added to the project since the completion of the PSR. These proposed improvements include features designed to improve the geometric layout of the interchange and accommodate future traffic flow. The improvements primarily affect Phase 5, although other refinements have been included in all phases of the project, described in Section 1.1.3.

The following subsections describe other components of the project phases, including the proposed slip ramps, the proposed work at the Contra Costa Canal crossings, soundwalls, and project funding and schedule.

1.3.1.1 Slip Ramps

The term slip ramp refers to local access entry or exit ramps that connect with freeway-to-freeway direct connector ramps. If approved, slip ramps could be included in Phases 1 and 2 to connect I-680 with Pacheco Boulevard. Section 1.3.1.3 describes Phases 1 and 2 of the project with and without slip ramps.

1.3.1.2 Approval Required for Change in Freeway Access Design

Access to the national freeway system (e.g., onto I-680) is carefully controlled for many reasons, among them to maintain integrity of the system, uniformity of design, and safety. Phases 1 and 2, with or without slip ramps, would change existing access to and from I-680. FHWA retains the approval rights to any request to access or modify an existing access to the national freeway system. Following review of the project, FHWA granted conceptual approval of the slip ramps in November 2005 (FHWA 2005). If no changes are made to the proposed alternatives and no major changes are made to the proposed design, FHWA would issue final approval of the slip ramps upon completion of the environmental review process.

1.3.1.3 Proposed Freeway Access Change

Northbound I-680 to Westbound SR-4

Currently, vehicles traveling northbound on I-680 exit the freeway on a short-radius loop ramp to connect to westbound SR-4, travel a short distance on SR-4 through a merge area for southbound I-680 to westbound SR-4 traffic, and then exit SR-4 on a short-radius hook ramp that connects to Pacheco Boulevard.[3] Phase 1 would add a direct-connector flyover ramp for the I-680 northbound to SR-4 westbound movement, allowing removal of the existing loop ramp. Removal of this loop ramp eliminates one point of congestion and weaving caused by slow-moving vehicles exiting I-680 and entering SR-4 in relatively close proximity to the westbound SR-4 to southbound I-680 off-ramp, the southbound I-680 to westbound SR-4 on-ramp, and the westbound SR-4 to Pacheco Boulevard off-ramp. Removal of this loop ramp is consistent with the purpose and need of the project in that it eliminates two weaving sections at this interchange, one from westbound SR-4 and one from northbound I-680.

The proposed direct-connector flyover would allow drivers to take a relatively high-speed ramp connection from northbound I-680 to westbound SR-4, avoiding the existing short-radius loop ramp connection with the exiting and entering merging areas on SR-4. The proposed direct connector meets the purpose and need of the project by reducing congestion and subsequently improving the operational efficiency of the interchange. The direct connector is also intended to accommodate anticipated traffic growth in future years.

[3] The existing ramps and connections can be seen in the background of the aerial photos included in Appendix A. Specifically, Figures A-i, A-ii, A-3, and A-4 show the I-680/SR-4 and the SR-4/Pacheco Boulevard interchange ramps discussed in this section.

The approved slip ramp design, connecting the proposed Phase 1 freeway-to-freeway direct connector ramps to Pacheco Boulevard, helps maintain an important access point to and from the freeway system at this interchange. The proposed slip ramp from the northbound I-680 to SR-4 connector to Pacheco Boulevard would address the purpose of providing freeway access to Pacheco Boulevard at this location. This slip ramp would enable travelers on northbound I-680 to first exit I-680 on the proposed direct-connector ramp to westbound SR-4, continue approximately 800 meters to 1 km (0.5 to 0.6 mile) to the north, and then exit the freeway on the slip ramp to Pacheco Boulevard. The slip ramp would provide a freeway connection to Pacheco Boulevard via the northbound I-680 to westbound SR-4 ramp, a connection that would be otherwise eliminated from the interchange due to the removal of the loop ramp. The slip ramp connection is consistent with the purpose and need objective of providing access between I-680 and Pacheco Boulevard.

Without the slip ramps, travelers on northbound I-680 would have less efficient options for exiting the freeway system to access businesses or homes on Pacheco Boulevard, Muir Road, or Arnold Drive in the immediate vicinity of the interchange. They would have to (1) use the I-680/Concord Avenue interchange to the south and then drive north on Pacheco Boulevard; (2) take the SR-4/Morello Avenue interchange to the west and use Arnold Drive or Muir Road; or (3) use the Pacheco Boulevard/I-680 interchange north of the project area and travel south on Pacheco Boulevard. Those benefiting from the proposed slip ramp connections would include residents and businesses located near the existing I-680/SR-4 and I-680/Pacheco Boulevard interchanges, as well as the California Highway Patrol (CHP) and the Contra Costa County Sheriff. The CHP has an office on Blum Road just north of the interchange, and the Sheriff has an office on Muir Road west of the interchange. Both law enforcement offices use the existing ramps from Pacheco Boulevard and Muir Road to access SR-4 and I-680. Letters submitted by the CHP and Sheriff (included in Appendix H) state that maintaining access to and from Pacheco Boulevard would prevent an increase in emergency response time and a potential increase in traffic conflicts during emergencies due to the additional travel required to reach alternate freeway interchanges at Concord Avenue and Morello Avenue.

The slip ramp would introduce a new exit from the freeway system along a freeway-to-freeway connector, which is intended to function as a relatively high-speed facility. FHWA policy calls for freeway facilities to conform to established design standards that maximize safety and maintain the uniformity in the freeway system. Including slip ramps therefore requires approval from FHWA as an exception to national

policy. As stated in Section 1.3.1.2, FHWA has reviewed and granted conceptual approval of this slip ramp in November 2005 (FHWA 2005).

Eastbound SR-4 to Southbound I-680

The current interchange has a single-lane diagonal connector ramp between eastbound SR-4 and southbound I-680. On- and off-ramps for eastbound SR-4 to Muir Road are located immediately preceding the diagonal connector, requiring travelers exiting to the eastbound SR-4 to southbound I-680 ramp to first pass through traffic exiting and entering Muir Road. This area of weaving is one point of congestion for the existing interchange.

Phase 2 would replace the existing diagonal connector ramp between eastbound SR-4 and southbound I-680 with a high-speed freeway-to-freeway direct-connector ramp. The exit point from SR-4 to this ramp would be west of and separate from the existing Muir Road ramps to reduce the overlapping merging and weaving that takes place at this location. This design would improve the traffic flow on SR-4 as well as help to maintain the speed of traffic heading onto the new connector ramp to southbound I-680.

The proposed slip ramp from Pacheco Boulevard to southbound I-680 would connect approximately midway along the new eastbound SR-4 to southbound I-680 direct connector. The slip ramp would provide access to I-680, similar to the access provided by the combination of the Pacheco Boulevard to eastbound SR-4 on-ramp and eastbound SR-4 to southbound I-680 ramp connections. This slip ramp had the potential to introduce a merging area that could increase unwanted congestion or conflicts midway along a connector ramp that is intended to maintain freeway-level speeds. To minimize this potential conflict, the length of the slip ramp from Pacheco Boulevard to the connector ramp was designed to allow maximum time for drivers to accelerate as they approach the merge area on the connector. The intersection of the proposed slip ramp at Pacheco Boulevard would also be signalized, which if necessary can be timed to control or meter groups of vehicles entering the freeway. FHWA granted conceptual approval of this slip ramp in November 2005 (FHWA 2005).

Without the proposed slip ramp, drivers would have to use the next-nearest entrance to the freeway system at either Concord Avenue on I-680, Morello Avenue on SR-4, or the I-680/Pacheco Boulevard ramps north of the project area. Officers traveling from the CHP station on Blum Road or the Sheriff's office on Muir Road could still

access eastbound SR-4, but entering southbound I-680 would require taking Pacheco Boulevard south to the Concord Avenue/I-680 southbound on-ramp, which would add unwanted additional response time.

1.3.1.4 Contra Costa Canal Crossing

The SR-4/Contra Costa Canal crossing is located approximately 225 meters (740 feet) from the SR-4/Pacheco Boulevard crossing. The existing canal crosses under SR-4, the Pacheco Boulevard to westbound SR-4 on-ramp, the eastbound SR-4 to Pacheco Boulevard off-ramp, and Muir Road through a box culvert siphon structure. The SR-4/Contra Costa Canal crossing includes the placement of bridge abutments for the Phase 1 and Phase 2 structures. The PSR and Advanced Planning Studies[4] indicate that the proposed bridge abutments may conflict with the Contra Costa Canal siphon. It was determined in the Project Report phase that either the Contra Costa Canal siphon/culvert structure would need to be slightly relocated or bridge abutments would need to be relocated to resolve the conflict. The selection of the accommodating procedure will be completed during the design of the project in the PS&E stage.

1.3.1.5 Soundwalls and Aesthetic Design of Structures

Within the project limits, I-680 has existing soundwalls and SR-4 has one existing soundwall. Additional soundwalls are included in a separate project to add HOV lanes on I-680. Soundwalls included in the I-680/SR-4 interchange improvements are discussed in Section 2.4. Soundwall locations evaluated for the I-680/SR-4 interchange project are shown in Appendix A, Figures A-1 through A-13.

The design and aesthetic treatment of the overhead freeway structure (including the flyover and its ramps, columns, walls, etc.) shall be determined with input from public outreach meeting(s) to be held during the design phase of the project. New soundwalls would be similar in design and aesthetic treatment to adjacent existing soundwalls to be visually consistent within the I-680/SR-4 freeway corridor

1.3.1.6 Project Funding and Schedule

Phases 1 through 5 are included in MTC's long-range *Transportation 2030 Plan* (MTC 2005). The plan anticipates that Phases 1 and 2 will be operational by 2015

[4] The PSR is an engineering report that documents agreement on scope, schedule, and estimated cost for advancement of a project concept for future funding and design studies. Advanced Planning Studies are structural engineering reports that are completed in early project development or design stages to determine whether any roadway structures or features involved in the project need to be rehabilitated or upgraded as part of the project.

and Phases 3, 4, and 5 will be operational by 2025. An amendment to the MTC Transportation Improvement Program (TIP) will include Phases 1 and 2 for initial funding in the 2008 fiscal year.

The voters of Contra Costa County approved Measure C in 1988 to provide funding for transportation improvements, and CCTA is responsible for distributing Measure C funds for proposed projects. Although funding for Phases 3 through 5 has not been identified, Measure C funds are a possible source of temporary or permanent funding. The CCTA 2002 Strategic Plan states that although construction funds have not been identified for improvements to the I-680/SR-4 interchange, the CCTA wishes to ensure that the project development activities continue. Therefore, $1.244 million (in 1998 dollars) has been allocated for project development through the environmental document stage. Amendment No. 4 of the Strategic Plan, dated December 4, 2003, has scheduled the project into its Program of Projects and has allocated approximately $764,000 to the project for fiscal year 2004. CCTA also applied for $5.5 million in additional funding for the PS&E for the 2004/2005 program year in the 2002 State Transportation Improvement Program and will look to future State Transportation Improvement Programs for construction implementation, as funding is available.

The following lists the major schedule steps for the project.

Milestone	Date
Phases 1 and 2:	
Approve PSR	November 2001
Project Approval and Environmental Document	October 2006
Right-of-Way Certification	October 2012
Ready to List	October 2012
Approve Contract	November 2012
Job Completion	June 2014
Phase 3 Completion	2020
Phase 4 Completion	2020
Phase 5 Completion	2020

A schedule for Phases 3 through 5 has not been formulated, but these phases are generally anticipated to be completed by 2020, as funding is obtained.

Preliminary cost estimates for the proposed phases are as follows.

	With Slip Ramps	Without Slip Ramps
Phase 1:		
Roadway Items:	$28,309,000	$25,861,000
Structure Items:	$27,563,000	$20,413,000
Right of Way Items:	$ 2,803,000	$ 2,258,000
Phase 1 Cost:	$58,675,000	$48,352,000
Phase 2:		
Roadway Items:	$22,136,000	$20,566,000
Structure Items:	$12,162,000	$12,162,000
Right of Way Items:	$ 1,563,000	$ 1,544,000
Phase 2 Cost:	$35,861,000	$34,272,000
Phase 3:		
Roadway Items:	$25,368,000	
Structure Items:	$ 9,982,000	
Right of Way Items:	$ 13,000	
Phase 3 Cost:	$35,363,000	
Phase 4:		
Roadway Items:	$17,696,000	
Structure Items:	$16,309,000	
Right of Way Items:	$ 672,000	
Phase 4 Cost:	$34,677,000	
Phase 5:		
Roadway Items:	$24,483,000	
Structure Items:	$ 4,507,000	
Right of Way Items:	$ 175,000	
Phase 5 Cost:	$28,990,000	

Total Project Cost With Slip Ramps (Phases 1–5):	$193,379,000
Total Project Cost With No Slip Ramps (Phases 1–5):	$181,467,000

1.3.2 No Action Alternative

The No Action Alternative would make no improvements to the interchange. The existing constraints described in Section 1.2 would continue, but traffic conditions are expected to worsen over time as the number of drivers using the facility increases due to local and regional growth. Projected traffic growth for the year 2030 based on Association of Bay Area Governments (ABAG) regional population and economic estimates will result in freeway volumes that approach or exceed capacity at several locations in the interchange vicinity: southbound I-680 just south of SR-4 (AM), westbound SR-4 just east of I-680 (AM), northbound 1-680 just south of SR-4 (PM),

and eastbound SR-4 just east of I-680 (PM). A number of freeway facilities or segments would also experience continued impacts, and levels of service would deteriorate due to constrained areas of weaving and merging.

The No Action Alternative would have none of the impacts that have been identified for the various phases, although all of these impacts can be mitigated as described in Section 2. The soundwalls identified in this report would not be constructed under the No Action Alternative, which would leave some homes exposed to noise levels that exceed noise abatement and local noise standards.

1.4 Alternatives Considered and Withdrawn

The I-680/SR-4 interchange has long been identified as needing operational and capacity improvements. Since the interchange was constructed in the early 1960s, traffic patterns have substantially changed in central and eastern Contra Costa County.

In 1983, the Contra Costa County Board of Supervisors requested planning for reconstruction of the existing cloverleaf interchange, following the upgrading of SR-4 from a conventional highway to freeway standards, but plans were not implemented. In 1993, Caltrans prepared a PSR/Project Report for the purpose of protecting right-of-way in the vicinity of the interchange from future encroachment and to encourage compatible land uses. The PSR/Project Report considered a single concept for an ultimate four-level freeway-to-freeway interchange.

In January 2000, engineering studies were started to investigate potential improvements to the interchange, including both near-term and long-term or "ultimate" improvements, and to examine what improvements should be incorporated into the I-680 HOV Lane Project design to ensure compatibility with future improvements.

A Project Development Team was assembled consisting primarily of participants from CCTA, Caltrans, the FHWA, and Contra Costa County. Coordination and presentations by PDT members were made periodically to local cities, the Pacheco Municipal Advisory Committee, and the Transportation Partnership and Coordination – Central County (TRANSPAC) (the regional transportation planning committee for central Contra Costa County). The role of the PDT was to provide direction in the development of alternative concepts, evaluation of the alternatives,

and recommendations for project implementation while gaining feedback and input from the interested cities and committees.

During the Conceptual Engineering Studies phase, a broad range of 17 alternative concepts were developed for both short-term operational improvements and long-term ultimate improvements. They were grouped into six categories: Near-Term Improvement Alternatives, Pacheco Interchange Improvement Alternatives, SR-4 CD Road Alternatives, 3-Level Interchange Alternatives, HOV Connection Alternatives, and 4-Level Interchange Alternatives. With the exception of three long-term alternative concepts and two short-term alternatives, all other concepts were dropped from consideration for not meeting the project purpose and need in terms of traffic operations or maintaining local access; not proving to be cost effective; or for not meeting an acceptable geometric standard for freeway-to-freeway interchange design.

The remaining five alternatives under consideration were subsequently evaluated according to 30 criteria grouped into seven categories. The categories were Purpose and Need, Geometric Considerations, Traffic Operations, Constructability, Environmental, Right-of-Way, and Costs and Benefits.

In June 2000, Caltrans representatives met with FHWA to discuss the five interchange alternatives under consideration, prior to presentation of the alternatives evaluation results to the PDT. Support was expressed for the Long-Term Conceptual Alternative D2A, the currently proposed Phases 1 through 5.

In July 2000, project representatives made presentations to senior staff of the Pacheco Municipal Advisory Committee to update them on the alternative concepts being considered. The committee expressed support for Conceptual Alternative D2A because it was the only alternative that would maintain all current traffic movements without out-of-direction travel.

At the completion of the conceptual studies and distribution of the Draft Conceptual Engineering Report, the PDT requested that senior staff members at TRANSPAC be contacted and the findings of the team be shared. In September 2000, a presentation was made to TRANSPAC of the findings. Following the presentation, TRANSPAC submitted a letter of concurrence expressing support for Alternative D2A.

In 2003 and 2004, during geometric review of the Draft Project Report for the interchange phases, several additional options were developed for some of the connector ramps (northbound I-680 to eastbound SR-4 and westbound SR-4 to

southbound I-680). Two identified options would provide improvements and were confirmed and included in the project phases. These improvements were reconstruction of the northbound I-680 to eastbound SR-4 diagonal ramp into a two-lane ramp with improved curvature and sight distance, and inclusion of the westbound SR-4 to southbound I-680 two-lane loop ramp. Other ramp variations were considered but dropped. These rejected options included the following:

- Adding a lane to the existing northbound I-680 to eastbound SR-4 diagonal ramp. This option was rejected in favor of rebuilding/realigning this ramp to improve the curvature and sight distance while still providing an additional lane.
- Combining the northbound I-680 exit ramps (as proposed, there will be a northbound I-680 exit ramp for the flyover to eastbound SR-4 in Phase 1, followed by a northbound I-680 to eastbound SR-4 at-grade two-lane ramp in Phase 5). The rejected option considered having both northbound I-680 to eastbound SR-4 and northbound I-680 to westbound SR-4 traffic on one ramp exiting I-680, and just north of the I-680 exit this ramp option would divide into westbound and eastbound SR-4 traffic directions. This option was rejected in favor of the proposed separate I-680 exits for each of the northbound I-680 to westbound and eastbound SR-4 movements to avoid combining different directional movements within a single exit ramp.
- An option to provide a westbound SR-4 to southbound I-680 two-lane connector ramp was evaluated and rejected as it would require a fourth-level flyover ramp structure at a relatively high cost. This option would partially duplicate the regional traffic movement already served by westbound SR-4 to SR-242. The proposed five-phase I-680/SR-4 interchange design would not preclude adding such an option in the future, as a separate project, if required due to high traffic volume growth in the region.

To address the FHWA requirement to support the proposed use of slip ramps to provide access to I-680 (see Section 1.3.1), a review was performed of possible options to improve the next-nearest existing interchange access points on I-680 and SR-4. This review focused on the existing interchanges at I-680 and Concord Avenue and at SR-4 and Morello Avenue. Twenty-two potential improvements were identified and evaluated for their relative performance, right-of-way requirements, bicycle and pedestrian facility conflicts or requirements, and estimated cost. These options are listed and summarized in Table 1-1 and shown in Figure 1-7.

Table 1-1 Summary of Local Roadway and Intersection Improvement Options Considered

Option	Location	Description	Advantages	Disadvantages	Right-of-Way Impacts	Bike / Pedestrian	Cost
Pacheco Boulevard/Contra Costa Boulevard/Chilpancingo Parkway/Concord Avenue Intersection							
Option 1	WB Concord Ave.	Add a right-turn lane and columns (existing could become a thru lane or remain as right-turn lane)	Adds capacity to intersection, funnels traffic to SB I-680 from Concord Ave.	Right-turn geometry is constrained by right-of-way (most likely nonstandard design); turning radius may limit truck traffic	None	No existing sidewalk/bike path, no proposed sidewalk or bike path.	$1.0 Million
Option 2	WB Concord Ave.	Add a through and left-turn lane on WB approach at intersection	Adds additional capacity to intersection	Limited width under the structure requires realignment of lanes	Requires acquisition of right-of-way from gas station and others	Bike lane on Chilpancingo Pkwy. is to remain. Contra Costa Blvd. could become less pedestrian friendly due to limited right-of-way.	$2.1 Million
Option 3	SB Pacheco Blvd.	Add exclusive right-turn lane	Frees vehicles from queue backup at intersection, could shorten green-time for SB Pacheco Blvd.	Require right-of-way acquisition from shopping center, loss of parking or landscaping; construction would likely affect business	Requires acquisition of right-of-way from Pleasant Hill Shopping Center, will result in loss of parking and landscaping for shopping center.	Potential to lose sidewalk due to limited right-of-way and the need to preserve parking.	$2.7 Million
Option 4	SB Pacheco Blvd.	Add third left-turn lane	Allows for additional capacity for the left-turn, free SB lanes from the backup of the left-turn queue	Limited right-of-way and lane configuration constraints limit the feasibility of this option without acquiring right-of-way from Shopping Center	Right-of-way is needed from Shopping Center	Potential to lose sidewalk due to limited right-of-way and the need to preserve parking.	$2.7 Million
Option 5	NB Contra Costa Blvd.	Add a NB lane both north and south of the intersection	Adds capacity to NB and intersection	Limited right-of-way on east side of Contra Costa Blvd.	Requires acquisition of right-of-way on east side of Contra Costa Blvd.	Existing sidewalk on Contra Costa Blvd. would need to be replaced.	$1.2 Million
Option 6	EB Chilpancingo Pkwy.	Add exclusive right-turn lane	Vehicles turning right will avoid backup at intersection, and queuing is reduced	Limited right-of-way; acquisition of right-of-way would be required from adjacent businesses. Contra Costa Canal culvert would need to be widened.	Requires acquisition of right-of-way from gas station and others	Existing sidewalk on Chilpancingo Pkwy. would need to be replaced.	$0.6 Million

Table 1-1 Summary of Local Roadway and Intersection Improvement Options Considered

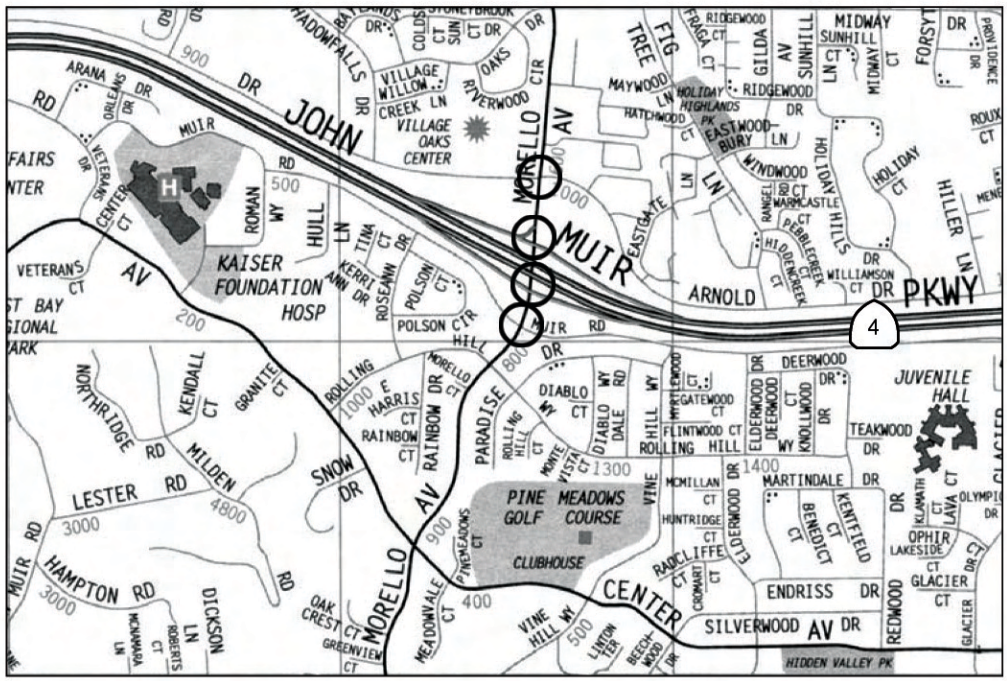
Option	Location	Description	Advantages	Disadvantages	Right-of-Way Impacts	Bike / Pedestrian	Cost
Pacheco Boulevard/SB I-680 Off-Ramp/Pleasant Hill Shopping Center							
Option 7	SB Pacheco Blvd.	Add exclusive right-turn lane into shopping center	Allows greater flow of traffic SB, easier access to shopping center	Requires right-of-way acquisition from shopping center, loss of parking and landscaping and disruption to shopping center during construction.	Requires acquisition of right-of-way from Pleasant Hill Shopping Center, will result in loss of parking and landscaping for shopping center.	Potential to lose sidewalk due to limited right-of-way and the need to preserve parking.	$1.3 Million
Option 8	SB Pacheco Blvd.	Add second left-turn pocket lane	Increases capacity of left turn; will improve the flow of traffic to SB I-680 and SB Pacheco Blvd.	Limited right-of-way makes alternative difficult. Requires right-of-way acquisition from shopping center.	Requires acquisition of right-of-way from Pleasant Hill Shopping Center, will result in loss of parking and landscaping for shopping center.	Potential to lose sidewalk due to limited right-of-way and the need to preserve parking.	$1.3 Million
Option 9	NB Pacheco Blvd.	Extend left-turn lane into shopping center	Added queuing will help NB traffic flow, and avoid backup of queue into NB Pacheco Blvd. Provides better access to shopping center.	Right-of-way is severely limited; would require acquisition of right-of-way of shopping center.	Requires acquisition of right-of-way from Pleasant Hill Shopping Center, will result in loss of parking and landscaping for shopping center.	Potential to lose sidewalk due to limited right-of-way and the need to preserve parking.	$1.1 Million
Option 10	NB Pacheco Blvd.	Eliminate left-turn lane.	Allows for higher NB flow of traffic. Other access into shopping center exists from all directions.	Loss of access to shopping center, could affect businesses.	None	No loss of existing sidewalk.	$0.4 Million
Option 11	WB approach from I-680	Add third left-turn lane	Allows for greater capacity at intersection	Requires additional right-of-way to the south; shopping center would be affected; may require modifications to the off-ramp; tight right-turn radius.	Requires Acquisition of right-of-way south of Pleasant Hill Shopping Center	No loss of existing sidewalk.	$0.7 Million

Table 1-1 Summary of Local Roadway and Intersection Improvement Options Considered

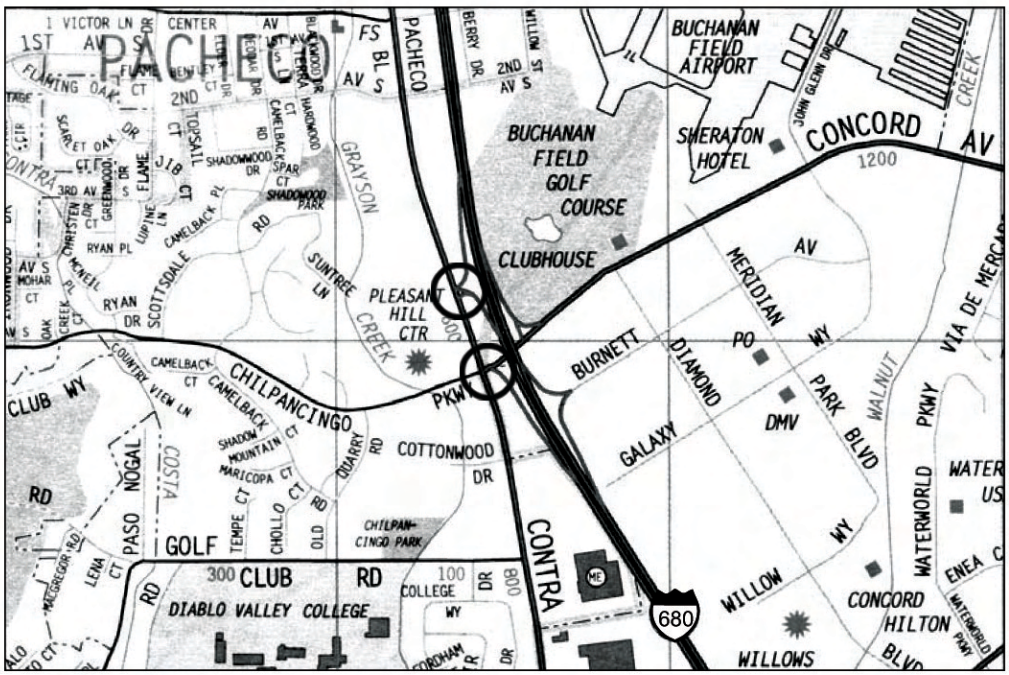
Option	Location	Description	Advantages	Disadvantages	Right-of-Way Impacts	Bike / Pedestrian	Cost
Option 12	Eastbound approach (exit from shopping center)	Add exclusive right-turn lane	Reduces queue and green-time for shopping center, increased green-time for Pacheco Blvd.	Loss of parking and landscaping at shopping center	Shopping center exit would be widened, affecting the shopping center.	Potential loss of sidewalk and landscaping in shopping center parking lot.	$0.9 Million
Morello Avenue/SR 4 Interchange							
Option 13	WB SR 4 off-ramp to Morello Ave.	Add exclusive left-turn lane, in addition to the combined left and through lane	Adds capacity to intersection	Affects landscaped area, retaining wall; utility relocation needed.	None	No existing bike lanes; sidewalks on Morello Ave will remain	$1.4 Million
Option 14	Morello Ave. to EB SR-4 (southbound approach)	Add third left-turn lane to EB SR 4	Adds capacity to intersection	Requires widening on ramp to accommodate 3 lanes, additional right-of-way may be needed. Retaining wall needed on Morello Ave under structure.	Additional right-of-way may be need for third lane on Morello Ave. to EB SR-4 on-ramp.	Existing bike lane and sidewalk on Morello Ave will need to be replaced.	$1.1 Million
Option 15	Morello Ave. to EB SR-4 (northbound approach)	Add exclusive right-turn lane	Adds capacity to intersection	Requires additional right-of-way	Additional right-of-way is needed on Morello Ave.; this could affect the Chevron gas station on Morello Ave.	Potential to loose sidewalk due to limited right-of-way and the need to preserve parking.	$1.3 Million
Morello Avenue/Muir Road							
Option 16	Southbound Morello Ave. approach	Add exclusive right-turn lane	Adds capacity to intersection	Requires additional right-of-way, retaining wall and utility relocation	Additional right-of-way is needed on Morello Ave. and Muir Road	Bike lane and sidewalk on Morello Ave. could be affected due to limited right-of-way on Morello Ave. and Muir Road.	$1.3 Million
Option 17	Southbound Morello Ave. approach	Add second left-turn lane	Adds capacity to intersection	Requires additional right-of-way	Additional right-of-way is needed on Muir Road for lane drop.	Sidewalk on Muir Road could be affected due to limited right-of-way.	$1.3 Million
Option 18	Northbound Morello Ave. approach	Add exclusive right-turn lane	Adds capacity to intersection	Requires additional right-of-way	Additional right-of-way is needed on Morello Ave. and Muir Road	Sidewalk on Muir Road could be affected due to limited right-of-way.	$0.8 Million

Table 1-1 Summary of Local Roadway and Intersection Improvement Options Considered

Option	Location	Description	Advantages	Disadvantages	Right-of-Way Impacts	Bike / Pedestrian	Cost
Option 19	Northbound Morello Ave. approach	Add second left-turn lane	Adds capacity to intersection	Requires additional right-of-way	Additional right-of-way is needed on Morello Ave. and Muir Road	Bike lane and sidewalk on Morello Ave. could be affected due to limited right-of-way on Morello Ave. and Muir Road.	$1.4 Million
Morello Avenue/Arnold Drive							
Option 20	Southbound Morello Ave. approach	Add exclusive right-turn lane	Adds capacity to intersection	Requires additional right-of-way, retaining wall and utility/signal relocation	Additional right-of-way is needed on Morello Ave. and Arnold Dr.	Bike lane and sidewalk on Morello Ave. could be affected due to limited right-of-way	$1.5 Million
Option 21	Southbound Morello Ave. approach	Add second left-turn lane	Adds capacity to intersection	Requires additional right-of-way, retaining wall and utility/signal relocation	Additional right-of-way is needed on Morello Ave. and Arnold Dr.	Bike lane and sidewalk on Morello Ave. could be affected due to limited right-of-way	$2.2 Million
Option 22	Northbound Morello Ave. approach	Add exclusive right-turn lane	Adds capacity to intersection	Requires additional right-of-way	Additional right-of-way is needed on Morello Ave. and Arnold Dr.	Bike lane and sidewalk on Morello Ave. could be affected due to limited right-of-way	$1.4 Million



SR4/Morello Avenue Interchange



I-680/Concord Avenue Interchange

Local intersection/interchange access evaluated for potential improvement

0 0.5 mile

N

Source: Thomas Guide, Metropolitan Bay Area, 2001

URS	Project No. 26812933 I-680/SR-4	INTERCHANGE IMPROVEMENTS EVALUATED AT CONCORD AVENUE/I-680 AND MORELLO AVENUE/SR-4	Figure 1-7

26812933.02900/111803/gos

Individually, the options provide a range of potential benefits but are not sufficient to address the purpose and need discussed in Section 1.2. Logical combinations of some of the options can provide promising local benefits. However, several conclusions were reached that ultimately eliminated these options from further consideration as alternatives to this project. At a local level (in the vicinity of the potential improvement options), the benefits would be incremental; however, even considered cumulatively, these options would not solve the long-term need to better accommodate traffic at Concord Avenue and Pacheco Boulevard. The existing split-interchange configuration, the cost to construct the improvements, and the potential adverse affects from acquisition of businesses and land make these options disruptive, difficult to build, and costly. In addition, the options would not substantially improve access to SR-4 at Pacheco Boulevard or Muir Road. Travelers would have to use the Concord Avenue interchange to access I-680 and the Morello Avenue interchange to access SR-4, which requires a longer travel distance for trips originating or ending at Pacheco Boulevard or Blum Road in the vicinity of the I-680/SR-4 interchange. For these reasons, the options listed in Table 1-1 were not advanced for further consideration because even cumulatively they would not sufficiently fulfill the project purpose identified in Section 1.2.1.

Additional review was also performed to examine any other alternatives to the proposed slip ramps connecting to Pacheco Boulevard (see Section 1.3.1). The review resulted in the development of six options that were considered by the PDT, but these options were also not recommended for further development or study. The options identified included the construction of a tunnel under the I-680/SR-4 interchange and design variations of connections to Pacheco Boulevard or Muir Road. It was concluded that none of the designs analyzed sufficiently improved upon the proposed slip ramps. Two options that would combine the I-680 northbound to eastbound and westbound SR-4 exit ramps could degrade traffic operations on I-680 to LOS F at the ramp, which could cause backups onto I-680 and potentially negate the traffic flow improvements provided by the proposed Phase 1 high-speed direct connector. Almost all of the options required additional project costs and right-of-way, with associated impacts to adjacent local land uses (e.g., access changes and acquisition of shopping center parking) and to bike lanes and pedestrian facilities.

1.5 Related Transportation Projects

Other major transportation projects in the vicinity of the I-680/SR-4 interchange are described below.

I-680 HOV Lanes. The I-680 HOV Lane Project will be completed in late 2005, adding a new HOV lane in the northbound direction of I-680 between SR-242 and the Marina Vista interchange in Martinez and in the southbound direction between North Main Street overcrossing in Walnut Creek and Marina Vista. The new lanes are designated for HOV vehicle use. These lanes will also link to the new HOV lanes on the new Benicia-Martinez Bridge, described below.

Second Benicia-Martinez Bridge. A second Benicia-Martinez Bridge is under construction that will be parallel to the existing railroad and highway bridges. This new structure will increase the number of lanes to eight (four lanes eastbound on the new bridge and four lanes westbound on the existing bridge). Provisions will be made for HOV bypass lanes at the toll plaza. The construction for this bridge has been delayed but is expected to be completed in 2007.

Burlington Northern–Santa Fe Railroad Crossing. The Burlington Northern–Santa Fe (BNSF) railroad crosses I-680 south of the Pacheco Boulevard connection ramps with I-680. The initial plans and environmental clearance for the I-680 HOV lanes included reconstruction of the BNSF structure over I-680. However, it was determined during final design of the HOV lanes that reconstruction of the structure was not necessary to construct as part of that freeway widening improvement, and it was separated out as an individual project to be built at a later time. Phase 5 of the interchange project would be completed after the BNSF crossing is constructed, as that phase extends the northbound widening on I-680 to just north of (and through) the BNSF crossing structure.

Local Road Improvements. The CCTA 2004 Countywide Transportation Plan Update includes two nearby projects: widening of Pacheco Boulevard to four lanes from Blum Road to Arthur Road, and extension of Arnold Drive from its existing easterly terminus at Pacheco Boulevard beneath I-680 to join Imhoff Drive at Blum Road.

SR-4/I-680 HOV Connection and Ramps. TRANSPAC is the sponsor of a potential future HOV connection between the existing SR-4 HOV lanes (which extend to the east on SR-4 beginning at the SR-242/SR-4 interchange area) and the HOV lanes on I-680. This would add an HOV lane connection between westbound SR-4 and southbound I-680 and between northbound I-680 and eastbound SR-4. The five phases of construction described for the I-680/SR-4 interchange project would not preclude the possible future addition of this HOV connector.

SR-4 Improvements. SR-4 has been a priority for highway improvements for many years. Recent construction has widened the existing four lanes to eight lanes between Railroad Avenue and Loveridge Road, and planned improvements will continue the roadway widening east to Somersville Road. Ultimately, the SR-4 segment from Somersville Road to SR-160 and the County line is planned to be widened from six to eight lanes.

Chapter 2 Affected Environment, Environmental Consequences, and Mitigation Measures

This chapter addresses the environmental impacts of the proposed project as well as identified avoidance and mitigation measures that will be carried out as part of the project. Maps of the project design are included in Appendix A. An evaluation of the project consistent with CEQA checklist criteria is provided in Appendix B. Mitigation measures are discussed for each of the discipline areas covered in the following subsections and are also summarized in Appendix C.

As described in Chapter 1, Phases 1 and 2 of the interchange improvements are designated for funding, and Phases 3, 4, and 5 are considered future improvements to be implemented as funding becomes available. All five phases were evaluated as the proposed project in the following sections. Impacts of each phase are detailed where appropriate.

In addition to the proposed project, other nearby projects were also considered for cumulative impacts in each topic area. The following summarizes the other projects and plans considered in the evaluation of impacts and/or cumulative effects.

Other Nearby Transportation Improvements Considered for Cumulative Impacts

HOV lane improvements on I-680. HOV lanes will be operational in late 2005 in both directions of I-680 from Alamo (south of the I-680/SR-24 interchange) to Dublin. HOV lanes will be open between Walnut Creek and Martinez in 2005 (see Section 1.6). An HOV "gap closure" project that would connect the HOV lanes between Alamo and the North Main Street exit in Walnut Creek (i.e., through the I-680/SR-24 interchange) is included in the CCTA Countywide Comprehensive Transportation Plan, which if funded and constructed would provide nearly continuous HOV lanes on I-680 through Contra Costa County. A new 100-car Park and Ride lot is planned at Buskirk Avenue and Oak Park Boulevard in Pleasant Hill, just off of I-680. (Park and Ride lots already exist at Rudgear Road just off I-680 in southern Walnut Creek and at Blum Road adjacent to the project site.)

Second Benicia-Martinez Bridge and BNSF Railroad (East Martinez) Underpass reconstruction projects, and SR-4 widening projects in Eastern Contra Costa County. These projects are described in Section 1.5.

Use of Future Cumulative Land Use Planning Forecasts for Evaluation of Cumulative Impacts

ABAG's Projections 2000 land use forecasts, the Metropolitan Transportation Commission's (MTC's) 2001 RTP, and the CCTA Countywide Comprehensive Transportation Plan[5] planning documents and land use forecasts provided the basis for the traffic volume forecasting for future years. Thus, the traffic projections used for this project already include future growth in land use through the study year of 2030, based on regional development planning and approved or planned transportation network improvements. The future year traffic volumes and circulation patterns were subsequently used for the technical studies, and those studies incorporate future projections of cumulative growth in traffic as well as planned or proposed changes in the roadway network.

Other (Nontransportation) Project Developments in the Project Vicinity

According to the Contra Costa County Planning Department, no other major land use developments in the vicinity of the I-680/SR-4 interchange have filed or proposed applications for review. A concept for developing Buchanan Field Airport, which is adjacent to the existing I-680/SR-4 interchange, for housing, office space, parks, and community facilities has been discussed at meetings of the Contra Costa County Board of Supervisors. No formal application for a change in land use has been developed or submitted as of the preparation of this EA/IS, and no specific information on environmental or land use impacts was available. Any conversion of the airport facilities to non-aviation uses would first require approval by the Federal Aviation Administration (FAA), with subsequent approval by the County Board of Supervisors.

[5] ABAG and MTC regularly update these land use and transportation plans. The versions cited were the latest updates to the plans available at the time the traffic studies were performed for this project.

2.1 Land Use, Planning, and Growth

This section provides a discussion of the existing land uses, General Plan land use designations, and urban policies related to Contra Costa County, the City of Martinez, and the study area. This section also addresses growth and the potential for growth inducement.

2.1.1 Affected Environment

2.1.1.1 Current Land Use

Contra Costa County's land use ranges from urban to rural. In the west and central county areas, including the study area, primary uses of suburban cities and towns are residential, commercial, and industrial. In the east central county and east county area, land is used primarily for agriculture and general open space.

The proposed project falls largely within the unincorporated areas of Pacheco and Vine Hill. A small portion of eastern Martinez is included in the study area. The study area is defined as the right-of-way, while the overlying Census Tracts (CTs) were used to gather available data to represent the project's study area and adjacent land uses and communities. Residential areas fall within each of the study area's CTs, with some small neighborhoods located along the major roads. Figure 2.1-1 is a regional map of the project study area and overlying census tracts.

2.1.1.2 Land Use Planning

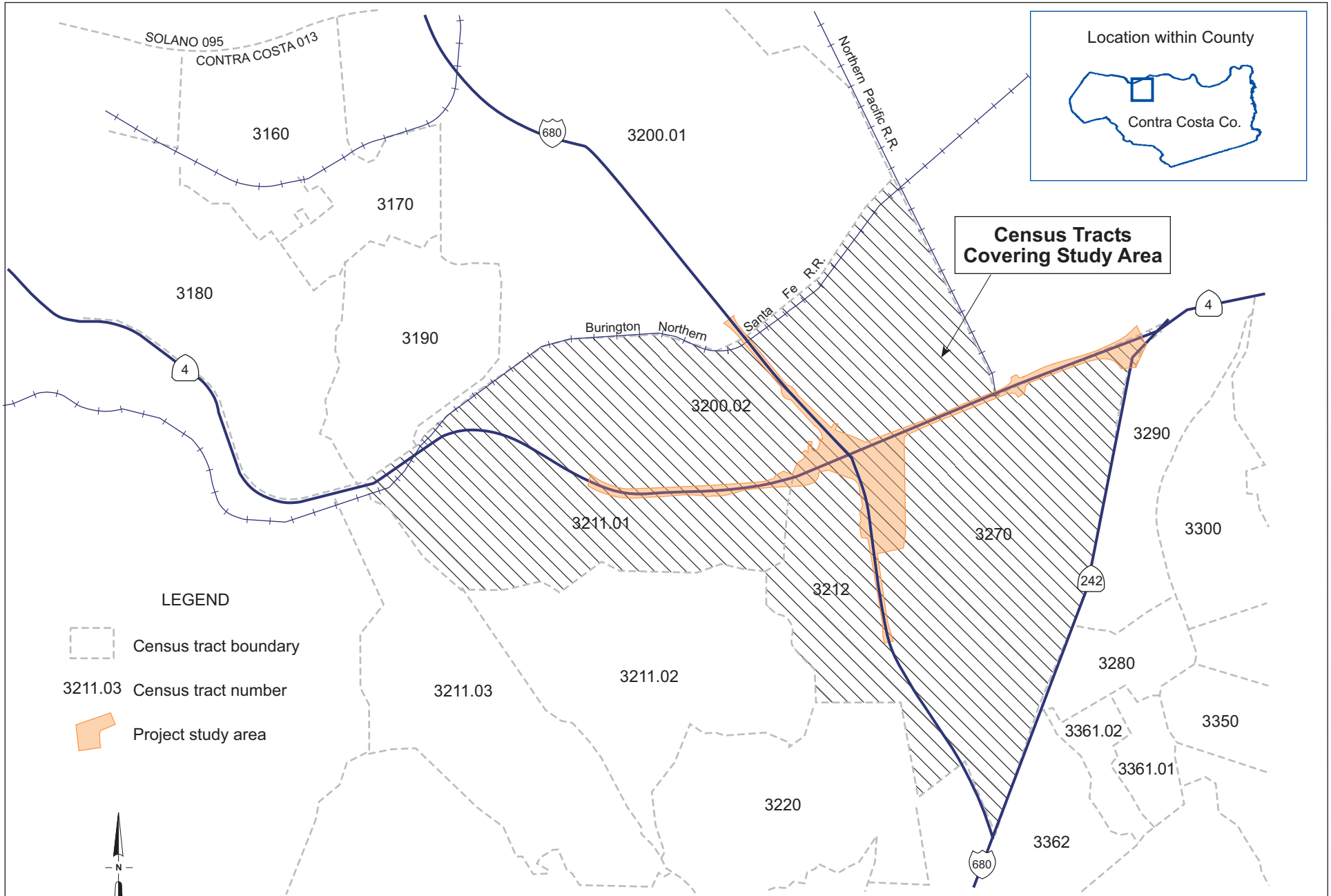
The proposed project would cross the jurisdictional boundaries of the City of Martinez and Contra Costa County. The alignment of SR-4 east of I-680 is in county lands and west of I-680 is either city lands or within the city sphere's of interest and influence (Martinez 1995; Contra Costa County 1996). The land use designations of the city and county are shown on Figure 2.1-2.

City of Martinez

The Martinez General Plan designates residential and commercial land uses within the study area west of I-680. With the exception of a small residential area and the Central Contra Costa Sanitary District Sewage Treatment Plant, the area east of I-680 and north of SR-4 is designated as open space.

Contra Costa County

Since 1990, Contra Costa County has had the 65/35 Contra Costa County Land Preservation Plan in place (also referred to as Measure C). This measure requires,



URS	Project No. 26812934 I-680/SR-4 Interchange Improvement Project	PROJECT STUDY AREA AND CENSUS TRACTS	Figure 2.1-1

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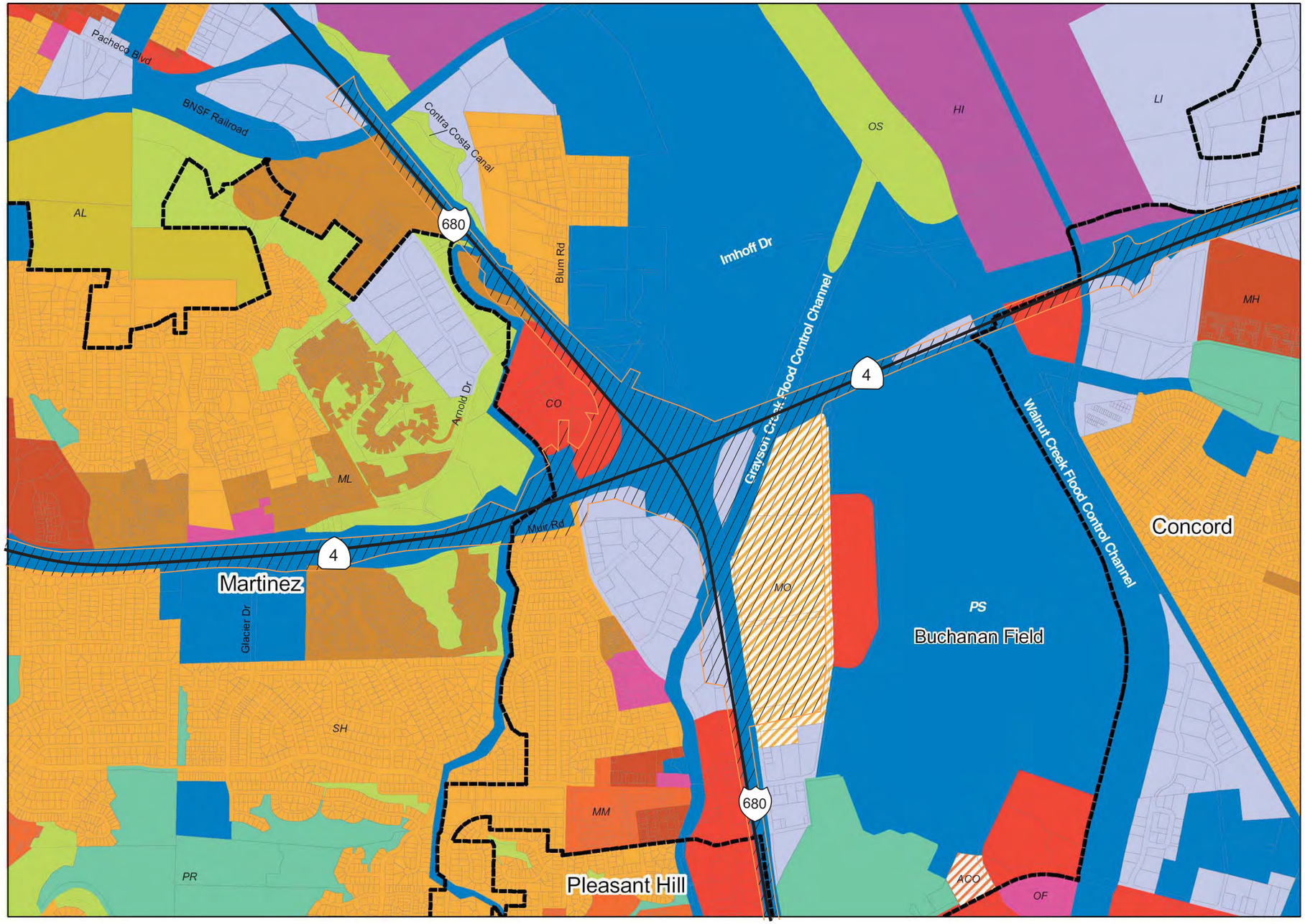

LEGEND

- SV (Single Family Residential - Very Low)
- SL (Single Family Residential - Low)
- SM (Single Family Residential - Medium)
- SH (Single Family Residential - High)
- ML (Multiple Family Residential - Low)
- MM (Multiple Family Residential - Medium)
- MH (Multiple Family Residential - High)
- MV (Multiple Family Residential - Very High)
- MS (Multiple Family Residential - Very High Special)
- CC (Congregate Care/Senior Housing)
- MO (Mobile Home)
- CO (Commercial)
- OF (Office)
- BP (Business Park)
- LI (Light Industry)
- HI (Heavy Industry)
- AL, OIBA (Agricultural Lands & Off Island Bonus Area)
- CR (Commercial Recreation)
- ACO (Airport Commercial)
- LF (Landfill)
- MU (Mixed Use)
- PS (Public/Semi-Public)
- PR (Parks and Recreation)
- OS (Open Space)
- AL (Agricultural Lands)
- AC (Agricultural Core)
- DR (Delta Recreation)
- WA (Water)
- WS (Watershed)

Study Area

N

0 1000 2000

feet

URS	Project No. 26812934 I-680/SR-4 Interchange Improvement Project	STUDY AREA LAND USE MAP	Figure 2.1-2

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among other things, that no less than 65 percent of the land in the county be preserved for parks, open space, agriculture, wetlands, and other nonurban uses. According to the Contra Costa County's Community Development office and based on data from the California Department of Conservation, as of 2000, between 28 percent and 30 percent of the county's land had an urban land use or was planned for urban use. The remaining 70 percent of the county lands had nonurban land uses and were planned for nonurban uses.

Most of the land in the immediate vicinity of the proposed project is designated as public or semipublic land. Within the project's proposed right-of-way, some land is also designated for commercial or light industrial use.

2.1.1.3 Growth

Existing and Planned Growth

The Contra Costa County 1995–2010 General Plan lays out the county's growth management policies that are intended to optimize land use and control urban sprawl (Contra Costa County 1996). One such policy is the 65/35 Land Preservation Plan described above. The Plan operates on a countywide basis and includes urban and nonurban land uses within cities as well as unincorporated areas (Contra Costa County 1996: 3-17).

In 2000, in order to address the region's mounting traffic congestion, housing affordability crisis, and shrinking open space, the intra-regional Bay Area Smart Growth Strategy and Regional Livability Footprint Project was initiated. The project incorporates public participation into its long-term planning process through numerous public workshops that lead to "Smart Growth Visions" on a county-by-county basis. Because much of the study area is in unincorporated areas of the county, it falls under the county plan and thus, the Smart Growth strategy. In Contra Costa County, the Smart Growth strategy works in tandem with the local "Shaping Our Future" program. Launched by all 19 Contra Costa County cities, Shaping Our Future is a local growth management program that incorporates land use planning and other growth-related needs. For example, the county has an established urban limit line beyond which urban densities are not allowed. The urban limit line also facilitates the enforcement of the 65/35 Land Preservation Plan.

For Contra Costa County, the major growth centers are the cities of Clayton, Antioch, Danville, and San Ramon, each of which recorded population growth of over 25 percent between 1990 and 2000, according to 2000 Census data.

According to the Contra Costa County Community Development Department, no approved, proposed, or planned developments currently exist within the study area (Roche 2002).

Development Trends

Within Contra Costa County, approximately 37,109 hectares (ha) (91,701 acres) of land is either approved or proposed for development. However, none of it is located within the study area. The nearest developable land is located just outside the northwest portion of the study area.

The county's population, housing, and employment are also expected to increase as the project's design year 2030 approaches. ABAG predicts that between 2000 and 2025, the county population will have grown approximately 27.5 percent while county jobs will have increased by 37.2 percent (see Table 2.1-1; the census tracts listed in that table are shown in Figure 2.1-1). By comparison, during the same period, the population in the study area will have grown by 11.1 percent. Jobs in the study area are projected to grow from 23,525 in 2000 to 29,304 in 2025, an increase of 25 percent. These forecasts show strong projected job growth, which may add pressure for commercial and industrial sector growth in the study area.

Table 2.1-1 Study Area Populations

Attribute	Contra Costa County	CT 3200.02	CT 3211.02	CT 3212	CT 3270
Total Population (1990)	803,732	6,256	6,769	4,716	6,475
Total Population (2000)	948,816	8,225	6,526	5,249	6,963
Percent Change 1990-2000	*+18%*	*+31%*	*-3.6%*	*+11%*	*+7.5%*
Total Population (2025, estimated)	1,209,900	9,225	6,934	6,374	7,435
Percent Change 2000-2025	*+27.5%*	*+12.2%*	*+6.3%*	*+21.4%*	*+6.8%*

Source: U.S. Census 1990 and 2000, ABAG population projections

2.1.2 Permanent and Construction Impacts

2.1.2.1 Land Use Changes

Some of the proposed project phases would result in direct land use changes, such as the conversion of residential and commercial lands to State right-of-way. Limited loss of property may take place within the existing parking areas for up to two area businesses and the CHP, but business operations would not be affected. Public

parking would be maintained throughout the project vicinity. Areas of a Caltrans Park and Ride lot may also be affected by project construction, but steps would be taken during the project construction phases to ensure that there is no net loss of parking.

Indirect land use changes could also occur within the study area because of the proposed project. However, these are limited by the physical constraints within the vicinity of the existing interchange. Development that occurs adjacent to the proposed project would still be in the areas covered under the City and County General Plans and thus not considered growth inducement, as discussed below.

2.1.2.2 Consistency with Land Use Plans

The plans to improve the I-680/SR-4 interchange are consistent with the County General Plan and regional Bay Area plans, and the land use designations set forth in the County General Plan do not conflict with the proposed land uses for the project. Moreover, the Transportation Element of the Contra Costa County General Plan indicates that Contra Costa households generate more trips than the average Bay Area household (9.8 trips per day versus 8.7 trips per day), and that county households are more likely to use a car for their trips than other Bay Area households (8.1 in-vehicle trips per day versus 6.8 in-vehicle trips per day). On an average weekday, the General Plan states, Contra Costa residents make almost one million trips, with 120,000 trips for commuters working outside the county. The congestion generated by these traffic patterns requires a more efficient transportation network. As I-680 and SR-4 are major arterial roadways for the county, improvements to this roadway system are in keeping with the goals and plans set forth in the County General Plan.

2.1.2.3 Growth and the Potential for Growth Inducement

Growth, as used in this report, refers to the development of the built environment as communities respond to the demands of an increasing population and/or business environment. Growth trends fluctuate over periods of low and high activity depending on factors such as policy, zoning, economy, and infrastructure that either encourage or discourage it. The nature of a development project can be described as tending toward growth inducement or growth accommodation; the former being a project that creates potential for further development where it is not planned for, and the latter being a project that is planned as a response to existing or foreseeable demands of the community served. This distinction generally explains the intent and purpose of a proposed project.

This discussion of growth addresses the compatibility of the proposed project with the planning documents that direct development activities (i.e., the County General Plan) and the potential for the project to contribute to planned or unplanned growth, individually or cumulatively.

Contra Costa County plans for growth through development of its General Plan, which designates areas suitable for development. The land use designations and policies expressed in the General Plan represents how the County plans to grow, identifying the areas where growth is planned and not planned. Planned growth is represented by urban land use designations, such as residential, industrial, and commercial. Nongrowth areas include agriculture, open space, and park designations. The County General Plan is intended to present current and potential future land uses through a planning period. For example, the Contra Costa County General Plan was adopted in 1996 and represents a planning period through 2010. Applications (usually by landowners and land developers) can be made to amend a General Plan for a different land use designation at specific properties, requiring environmental and public review. The County can also revise land use designations when it updates and adopts its overall General Plan.

Growth Constraints

City and County General Plan land use designations are the primary means used to plan and manage future growth. Land use designations are supported by zoning ordinances that contain enforceable requirements to regulate development (e.g., allowable dwelling densities, minimum lot sizes, and setback requirements).

A number of land uses create physical constraints within the study area that limit the extent of future growth in the vicinity of the existing interchange. Federal Aviation Administration air space restrictions are particularly important because flight paths at Buchanan Field Airport restrict additional land use development. In the northeast quadrant of the I-680/SR-4 interchange, the Central Contra Costa Sanitary District Sewage Treatment Plant lies immediately adjacent to the diagonal ramp from westbound SR-4 to northbound I-680. The plant has restrictive sewage and water easements through the study area and in the larger project area.

Growth Pressures

Contra Costa County is growing, and this growth is predicted to continue over the next 20 years. ABAG predicts that the County population will increase by 27.5 percent between 2000 and 2025 (ABAG Projections 2002). Over the same period, by

contrast, the study area population would increase by only 11.1 percent. Meanwhile, between 2000 and 2025, economic growth for the county and study area are expected to rise by 37.2 percent and 24.3 percent, respectively.

Based on 1996 data, Contra Costa County has 33,109 ha (91,701 acres) of land available for development. This land would be sufficient to accommodate projected demand for the project design year, assuming a constant housing density of 6.25 units per ha (2.5 units per acre).

Conclusions

The land use policies of the County General Plan and its supporting zoning ordinances are the primary land use controls that set forth the current and future planned growth in the project area. The approval of the proposed project would require acquisition of some parcels and portions of parcels within the proposed right-of-way but would not change the current land use designations in the overall vicinity of the interchange.

Traffic demand projections for the I-680/SR-4 corridor are consistent with the planned growth as outlined in the Contra Costa County General Plan and the Regional Transportation Plan. The proposed project is not designed for excess capacity that could induce unplanned growth during the 20-year period following construction completion.

2.1.3 Parks and Recreation

The study area encompasses three large community parks: (1) Holiday Highlands Park, located at Fig Tree Lane and Eastwoodbury Lane in Martinez; (2) Hillcrest Community Park, at Olivera Road and Grant Street in Concord; and (3) Sun Terrace Park, located at Vancouver Way and Montreal Circle in Concord.

Other parks are located outside of the study area but within the general vicinity: Morello School Park, at Morello Avenue and Morello Park Drive; Bayview Circle Park in Concord at Bayview Circle; Mountain View Park at Parkway Drive in Martinez; and John Muir Park at Vista Way in Martinez.

The parks will be unaffected by the proposed project and any related direct property takes. No visual impacts or noise impacts to the parks would occur due to the project.

2.1.4 Cumulative Impacts

2.1.4.1 Cumulative Land Use

The proposed project is consistent with the land use plans and policies of the County General Plan. Construction of the interchange improvements would accommodate traffics demands in the areas associated with the adopted County General Plan.

2.1.4.2 Cumulative Growth Inducement

The Contra Costa County Community Development Office has confirmed that no projects are planned in the project vicinity. The capacity and design of the proposed interchange take into account the traffic projections for the area and would accommodate anticipated growth. The project is not expected to have any unplanned growth-inducing impacts. The project's development would not require the addition or relocation of any public services. Overall, the proposed project would accommodate planned growth through the design year. Therefore, no growth-inducing cumulative impacts are anticipated.

2.1.5 Mitigation Measures

Existing land use planning and controls will limit potential cumulative growth impacts. No additional mitigation measures are proposed.

2.2 Hazardous Waste and Materials

This section summarizes the results of an Initial Site Assessment (ISA) (Hazardous Waste Study) conducted for the proposed I-680/SR-4 Interchange Improvement Project. The purpose of the ISA was to identify environmental conditions in the study area, as defined by the American Society for Testing and Materials. Completion of the ISA was the first screening step for a hazardous waste site evaluation. The findings of the ISA indicated that vehicular traffic on I-680 and SR-4 may have contaminated the project area with aerially deposited lead from leaded gasoline used prior to its phase-out beginning in the mid 1970s. In addition, because the project area was historically used as farmland, surface soil may contain residual agricultural chemicals at concentrations that may be hazardous. A total of four potential hazardous waste sites were identified. Further investigation of the four sites is recommended at the Plans, Specifications, and Estimates (PS&E) stage of project development.

2.2.1 Affected Environment

2.2.1.1 Methods

The ISA study area included the proposed project right-of-way and adjacent properties within 0.8 km (0.5 miles) of the proposed project right-of-way. To conduct the investigation, a previous Caltrans ISA was reviewed. Publicly available records at the Contra Costa Health Services Department and the Regional Water Quality Control Board were reviewed, as well as historical aerial photographs (which can show previous land uses that might involve use or disposal of hazardous materials). A visual site reconnaissance was also performed. Environmental Data Resources, Inc. (EDR), was contacted to conduct a regulatory database search of known underground storage tanks (USTs), landfills, hazardous waste generation or treatment, storage and disposal facilities, and subsurface contamination in the study area. Based on the available information collected and reviewed, the potential for on-site contamination within the study area was assessed.

2.2.1.2 Evaluation of Sites

Potential hazardous waste sites are locations that have used or currently use hazardous material that, if spilled or leaked, could adversely affect soil and/or groundwater. Four properties were identified as potential hazardous waste sites through the regulatory database search and site reconnaissance because hazardous materials are handled on-site. These sites are located within the proposed project's right-of-way or less than 0.8 km (0.5 miles) from the proposed project area. All four sites are located within the northwestern quadrant of the project area. These properties are described in Table 2.2-1.

In addition to the sites noted above, other potentially hazardous sites were identified within the study area but outside of the proposed project right-of-way. These include IT's Montezuma Hills Facility, which is listed on the Toxic Pits database and located at 4585 Pacheco Boulevard, close to Arthur Road. A review of this site indicated that the groundwater is assumed to flow away from the proposed project right-of-way and any possible contamination at this site should not impact the proposed project or any of its subsequent phases. A second site at 4355 Pacheco Boulevard is a Shell gas station listed in the Leaking Underground Storage Tank (LUST) database. Remedial action is in progress at this site. The groundwater flow direction at this site is to the north away from the proposed project, and it is unlikely that any impact would result.

Other sites reviewed include the Central Contra Costa Sanitary District wastewater treatment plant facility at 5019 Imhoff Place, the Kinder Morgan petroleum products

Table 2.2-1 Potential Hazardous Waste Sites

No.	Source	Facility/ Owner Name	Address/ Location	Description/Notes
1	Visual Observation	Big Tex Trailers	Between Blum Road and I-680	A trailer and recreational vehicle sales business. Vehicles are stored on the gravel surface of the lot. The site is not listed in any regulatory database. Although no observed environmental conditions are identified, soil and/or groundwater on the lot may be impacted with petroleum hydrocarbons, volatile organic compounds (VOCs), or metals released during storage or maintenance of these vehicles. Since observation was conducted from points of public access (closest possible vantage points), ground surface at the lot was not visually examined for petroleum hydrocarbon stains. Further investigation is recommended for the site.
2	EDR #59 (EDR 2002)	Bay Area Bobcat	5031 Blum Road	A Bobcat (small front-end loader) sales and maintenance shop is located on this property. The site is listed on the HAZNET database. Although no observed environmental conditions are identified, soil and/or groundwater on the lot may be impacted with petroleum hydrocarbons, VOCs, or metals released during storage or maintenance of these vehicles. Since observation was conducted from points of public access (closest possible vantage points), ground surface at the lot was not visually examined for petroleum hydrocarbon stains. Further investigation is recommended for the site.
3	Visual Observation	*NA*	Railroad crossing over I-680	A railroad crosses over I-680 on a trestle. No environmental conditions can be visually observed. However, due to railroad activity, soils and groundwater in the immediate vicinity of the tracks may be contaminated with diesel fuel and heavy metals such as lead. This kind of contamination cannot be determined from visual observation. Therefore, further investigation is recommended for the site.
4	EDR #59 (EDR 2002)	California Highway Patrol Office	Between Blum Road and I-680	The EDR report states the site is listed on the UST-HIST and State UST databases. Although no observed environmental conditions were identified, soil and/or groundwater on the lot may be impacted with petroleum hydrocarbons, VOCs, or metals released during storage or maintenance of highway patrol vehicles. Since the site is immediately adjacent to the proposed project right-of-way, any possible soil and groundwater contamination at this site may impact the right-of-way. Further investigation is recommended for the site.

tank farm on Imhoff Road, businesses and auto repair facilities at 1919 Arnold Industrial Way, a former Exxon gas station and an active Shell gas station at 605-606 Contra Costa Boulevard, a Chevron gas station at 698 Contra Costa Boulevard, a Rotten Robbie gas station at 1090 Contra Costa Boulevard, and a portion of the Buchanan Field Airport. None of these sites were found to have the potential to impact the proposed project or subsequent phases of the I-680/SR-4 Interchange Improvement Project.

2.2.2 Permanent and Temporary Impacts

The results of the ISA indicate that the most likely contaminants potentially present within the project area would be pesticides and lead in surface soil. A low potential exists for hydrocarbon-impacted soil and groundwater to be present due to fueling storage or maintenance of vehicles. Further investigations on the four identified properties are recommended prior to construction to evaluate the potential for hydrocarbon impacts. Testing of soil samples within the project area should be performed to determine any need to manage excavated or graded soils potentially contaminated with lead, pesticides, or hydrocarbons. Completion of these studies prior to construction avoids unnecessary delays and helps ensure work safety.

2.2.3 Cumulative Impacts

No additional cumulative impacts are anticipated.

2.2.4 Mitigation Measures

Prior to construction, steps would be taken to verify whether site contamination in the study area might impact the proposed project or subsequent phases of the interchange improvement. The proposed steps would include but are not limited to the following:

- **Investigations of all buildings acquired for the project.** The ISA did not address any potential contamination issues regarding existing structures. Because the project would involve the acquisition of commercial and residential properties, these structures should be investigated for potential hazardous materials or contamination issues prior to construction. The investigations should include checking for the presence of building materials painted with lead-based paint, storage buildings that might contain hazardous materials, asbestos (i.e., transit pipe, insulation, and siding), home heating fuel storage tanks, and other similar issues.
- **Soil and groundwater sampling.** Further investigation of the four identified potential hazardous waste sites is recommended prior to construction to evaluate the potential for hydrocarbon impacts. Soil sampling and analysis will be required if the excavated material is used on-site, disposed of off-site in a landfill, or reused off-site. This sampling and analysis should be conducted prior to construction. Although none of the reports and databases reviewed indicates that the proposed project right-of-way or the right-of-way of future project phases are

likely to be contaminated, potential hazards or construction delays would be avoided by early investigation.

Where contamination is present, a remediation plan that complies with State and Federal standards would be developed and implemented in cooperation with the current landowner.

2.3 Air Quality

2.3.1 Affected Environment

2.3.1.1 Climate, Meteorology, and Topography

Air quality in the Bay Area is a function of pollutants emitted locally and regionally combined with the meteorological and topographic factors that influence dispersion and the intrusion of pollutants generated outside of the region. Given the topographic diversity of the Bay Area, the region's meteorology and climate can be described in terms of different subregions and their associated microclimates. The I-680/SR-4 interchange is located at the border of the Carquinez Strait and the Diablo Valley. The Carquinez Strait area has prevailing winds that flow from the west to the east. Occasionally, regional atmospheric pressure patterns will reverse, causing an east-to-west airflow through the strait, elevating temperatures and pollutant levels. The Diablo Valley is a broad valley with the Carquinez Strait at its north end and the narrower San Ramon Valley to its south. The Coast Range on the west side of the Diablo Valley blocks much of the marine air from reaching the valley, allowing for generally mild wind speeds, inversion layers, and higher pollution potential. In the summer, ozone can be transported into the valley from both the Central Valley and the central Bay Area.

2.3.1.2 Air Quality Pollutants of Concern in the Bay Area

National and State air quality standards have been established for six ambient air pollutants (referred to as criteria pollutants): ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter less than 10 micrometers in diameter (PM_{10}), fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$), and lead. State and national ambient air quality standards (NAAQS) for criteria pollutants are listed in Table 2.3-1.

Table 2.3-1 Bay Area Attainment Status

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone	8 Hour	--	--	0.08 ppm	N
	1 Hour	0.09 ppm (180 µg/m^3)	N	0.12 ppm (235µg/m^3)	N[4]
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3)	A[5]
	1 Hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	A
Nitrogen Dioxide	Annual Average	--	--	0.053 ppm (100 µg/m^3)	A
	1 Hour	0.25 ppm (470 µg/m^3)	A	--	--
Sulfur Dioxide	Annual Average	--	--	80 µg/m^3 (0.03 ppm)	A
	24 Hour	0.04 ppm (105 µg/m^3)	A	365 µg/m^3 (0.14 ppm)	A
	1 Hour	0.25 ppm (655 µg/m^3)	A	--	--
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N[6]	50 µg/m^3	A
	24 Hour	50 µg/m^3	N	150 µg/m^3	U[7]
Particulate Matter – Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N[6]	15 µg/m^3	U/A
	24 Hour	--	--	65 µg/m^3	U/A
Sulfates	24 Hour	25 µg/m^3	A	--	--
Lead	Calendar Quarter	--	--	1.5 µg/m^3	A
	30 Day Average	1.5 µg/m^3	A	--	--
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	U	--	--
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m^3)	No information available	--	--
Visibility Reducing particles	8 Hour (1000 to 1800 PST)	--[8]	U	--	--

Source: BAAQMD Web site, updated January 2003; Fairley 2003

A=Attainment N=Nonattainment U=Unclassified

ppm=parts per million mg/m^3=milligrams per cubic meter µg/m^3=micrograms per cubic meter

Notes:

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that ARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the State standard.
2. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 65 µg/m^3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially averaged across officially designed clusters of sites falls below the standard.
3. National air quality standards are set at levels determined to be protective of public health with an adequate margin of safety. Each state must attain these standards no later than three years after that state's implementation plan is approved by the USEPA.
4. In 2004, the USEPA issued a finding that the Bay Area has attained the national 1-hour ozone standard, but the agency has not approved formal redesignation to attainment for the 1-hour standard.
5. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour CO standard. Urbanized areas of Contra Costa County are considered a CO maintenance area, which is an area that had a history of nonattainment but now meets the NAAQS.
6. In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.
7. The national 24-hour PM_{10} standard is listed as unclassified because the USEPA has not made a determination as the whether the Bay Area has attained this standard.
8. Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per km when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

The major criteria pollutants of concern in the Bay Area air basin are described below.

- O_3 is a secondary pollutant that forms in the atmosphere as a result of the interaction between ultraviolet light, reactive organic gases (ROGs), and NO_x. ROG and NO_x are generated by motor vehicle exhaust and stationary sources. Air quality programs for O_3 focus on reductions of mobile source emissions. Substantial reductions in O_3 have been achieved through the State-mandated vehicle inspection program. The Bay Area does not attain the national or State 8-hour ambient standards for this pollutant. In 2004, the USEPA issued a finding that the Bay Area has achieved attainment of the 1-hour national standard but must demonstrate compliance with an adopted maintenance program. The Bay Area Air Quality Management District (BAAQMD) has an approved Ozone Attainment Plan to reduce O_3 concentrations.
- ROGs are important components of ozone formation, and their emissions contain gases that are toxic compounds. The primary sources of ROGs are petroleum transfer and storage, mobile sources, and organic solvents. Though no ambient standards exist for ROGs, the regional air quality attainment plan contains many control measures to reduce these gases as they are O_3 precursors.
- NO_x is created during the combustion of fossil fuels under high temperature and pressure. The Bay Area is in attainment of the national and State ambient standards of this pollutant, but this pollutant contributes to O_3 formation.
- PM_{10} and $PM_{2.5}$ consist of atmospheric particles resulting from many sources, including industrial and agricultural operations, motor vehicle tire wear, combustion, atmospheric photochemical reactions, burned agriculture waste, construction activities, and wind-raised dust. PM_{10} may generally be referred to as “coarse particles” and $PM_{2.5}$ as “fine particles,” relative to their aerodynamic diameter (measured in micrometers). The Bay Area is in attainment of the national ambient standards for PM_{10} and nonattainment of the State ambient standard. The Bay Area is designated as unclassified/attainment for the national $PM_{2.5}$ standard and nonattainment for the State standard.
- CO is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. Motor vehicles are a primary source of CO. Carbon monoxide tends to dissipate rapidly into the atmosphere. Consequently, violations of the CO standard are generally limited to major intersections during

peak-hour traffic conditions. The Bay Area is in attainment of the national and State ambient standards for this pollutant.

- Sulfur oxides can damage and irritate lung tissue, accelerate the corrosion of exposed materials, and harm vegetation. SO_2 is a colorless gas created by the combustion of sulfur-containing fossil fuels. The Bay Area is in attainment of the national and State ambient standards for this pollutant.
- Lead is a metal that was used to increase the octane rating in auto fuel, a practice that is no longer allowed. The Bay Area is in attainment of the State ambient standards for this pollutant. Only a State ambient standard exists for lead.

2.3.1.3 Air Quality Regulatory Setting

Within the project vicinity, air quality is monitored, evaluated, and controlled by the U.S. Environmental Protection Agency (USEPA), California Air Resources Board (CARB), and BAAQMD. These three agencies develop rules and regulations to attain the goals or directives imposed by legislation. The major elements of this air quality regulatory framework are summarized below, as they might pertain to the review of the proposed project.

The project area is subject to air quality planning programs established by the Federal Clean Air Act of 1970 and the California Clean Air Act of 1988. The 1990 Federal Clean Air Act Amendments require that each state have an air pollution control plan called the State Implementation Plan (SIP). The SIP, which is reviewed by the USEPA, includes strategies and control measures to attain the NAAQS by deadlines established by the Federal Clean Air Act. As described later, federally funded transportation projects such as the I-680/SR-4 interchange project must be included in a regional transportation plan (RTP)—the *Transportation 2030 Plan* (MTC 2005)—and Transportation Improvement Program (TIP)[6] (MTC 2004) that demonstrate the achievement of the air quality goals of the SIP. Plans may also include interim milestones for progress toward attainment.

The USEPA has classified air basins (or portions thereof) as being in attainment, nonattainment, or unclassified for each criteria air pollutant, based on whether the NAAQS have been achieved. An area is designated unclassified when insufficient air quality data are available on which to base an attainment or nonattainment designation. The USEPA classifies the Bay Area air basin as being in nonattainment

for O_3, and in attainment for lead, NO_x, PM_{10}, and SO_2. The Bay Area/Contra Costa County is classified as a maintenance area for CO, meaning that the area had a history of nonattainment for this pollutant but now meets the NAAQS.

The CARB regulates mobile emissions sources and oversees the activities of county and regional air quality management districts. The CARB regulates local air quality indirectly by establishing vehicle emission standards through its planning, coordinating, and research activities.

California has adopted ambient standards that are more stringent than the national standards for the criteria air pollutants. Under the California Clean Air Act, areas are also designated as being in attainment, in nonattainment, or unclassified with respect to the State ambient air quality standards. The California Clean Air Act requires that districts design a plan to achieve an annual reduction of 5 percent or more in districtwide emissions for each nonattainment criteria pollutant or its precursor(s)[7]. The Bay Area air basin is in nonattainment for the State O_3 and particulate matter standards. The air basin is designated as an attainment area for State CO, lead, NO_x, sulfate, and sulfur oxide (SO_x) standards.

The BAAQMD has jurisdiction over air quality in the Bay Area air basin and regulates most air pollutant sources except for motor vehicles, locomotives, aircraft, agriculture equipment, and marine vessels. In 1996 (revised in 1999), the BAAQMD published its CEQA Guidelines, which advises local jurisdictions on procedures for addressing air quality in environmental documents. The BAAQMD coordinates with ABAG and the MTC in the development and implementation of the transportation plans required by the Federal and State Clean Air Acts.

2.3.1.4 Existing Air Quality

Table 2.3-2 provides a four-year summary of ambient air quality measured at the two air quality monitoring stations closest to the proposed project site. The Pittsburg air quality monitoring site is located in the Carquinez Strait region, and the Concord air quality monitoring site is located in the Diablo Valley. The monitoring station in Pittsburg is approximately 12 km (7.5 miles) from the proposed project, on the outskirts of the City of Pittsburg near several large industrial facilities. This

[6] The RTP and TIP are long-term plans produced by a regional transportation planning agency—in this case, the MTC—that specifies how Federal, State, and local transportation funds will be spent in the region.

[7] A precursor is a compound that chemically reacts with another to form a criteria air pollutant. For example, organic compounds are precursors for ozone.

Table 2.3-2 Ambient Pollutant Concentrations in the Project Vicinity

	2001	2002	2003	2004
Ambient Ozone levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 1-hour Concentration	0.134	0.103	0.101	0.097
Measured days>State standard	6	5	5	1
Measured days>National standard	1	0	0	0
Highest 8-hour Concentration	0.087	1.089	0.085	0.083
Measured days>National standard	1	3	1	0
Pittsburg-10th Street				
Highest 1-hour Concentration	0.118	0.111	0.094	0.090
Measured days>State standard	2	4	0	0
Measured days>National standard	0	0	0	0
Highest 8-hour Concentration	0.092	0.096	0.080	0.081
Measured days>National standard	1	2	0	0
Ambient CO levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 8-hour Concentration	2.67	2.28	1.99	2.00
Pittsburg-10th Street				
Highest 8-hour Concentration	2.44	2.51	1.66	1.91
Ambient NO_2 levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 1-hour Concentration	0.065	0.063	0.062	0.065
Annual Average	0.015	0.015	1.013	0.012
Pittsburg-10th Street				
Highest 1-hour Concentration	0.062	0.054	0.061	0.048
Annual Average	0.014	0.013	0.012	0.011
Ambient SO_2 levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 24-hour Concentration	0.005	0.007	0.003	0.010
Annual Average	0.001	0.001	0.001	0.001
Pittsburg-10th Street				
Highest 24-hour Concentration	0.012	0.016	0.007	0.008
Annual Average	0.003	0.002	0.002	0.002
Ambient PM_{10} levels (micrograms/cubic meter)				
Concord-2975 Treat Blvd.				
Highest 24-hour Concentration	105.8	62.8	32.0	48.3
Measured days>State standard	2	3	0	1
Measured days>National standard	0	0	0	0
State annual geometric mean	17	21.7	16.4	No data
National annual arithmetic mean	--	21.1	15.9	No data
Pittsburg-10th Street				
Highest 24-hour Concentration	97.7	73.2	58.3	61.9
Measured days>State standard	3	3	1	1
Measured days>National standard	0	0	0	0
State annual geometric mean	16	24.5	No data	21.7
National annual arithmetic mean	--	23.8	20.2	21.1

Source: CARB Web site www.arb.ca.gov/adam/cgi-bin/dbwww/adamtop4w/

monitoring station is in a location that has prevalent winds typical for the Carquinez Strait. The Concord monitoring station is located approximately 5.2 km (3.2 miles) from the proposed project at 2975 Treat Boulevard. This monitoring station is located at the north end of the Diablo Valley and is adjacent to a heavily congested intersection. The region's air quality standards and status is discussed below.

2.3.1.5 Transportation Conformity with Air Quality Plans

Transportation projects receiving Federal funding (Phases 1 and 2 of the I-680/SR-4 Interchange Improvement Project are programmed for Federal transportation project funding) must demonstrate that they do not exceed the emissions inventory allowance in the SIP and, therefore, conform to the current SIP. The SIP describes how a state will maintain or meet NAAQS. Each region in the state submits its emissions allowances and strategies for reducing emissions of air pollutants that are above NAAQS to the CARB, which prepares the SIP.

Applicable Air Quality Plans

Applicable regulatory air quality plans (which are elements of the SIP) are listed as follows and explained below. These plans were adopted in response to monitored pollutant levels that did not meet Federal standards.

Pollutant	Applicable Implementation Plan or SIP
CO	2004 Revision to the California State Implementation Plan for CO, Updated Maintenance Plan for Ten Federal Planning Areas (updates the 1996 CO Maintenance Plan). Effective on January 30, 2006.
O_3	2001 Ozone Attainment Plan, S.F., Bay Area (amends the S.F. Bay Area Ozone Attainment Plan for the 1-hour National Ozone Standard, adopted June 1999).

For CO, the SIP was revised and adopted in 1996 to document that the Bay Area was one of 10 areas in the State that had attained the Federal 8-hour CO standard and had demonstrated measures to maintain compliance with the standard. In 2003, monitored ambient CO levels reported by CARB for the Bay Area were 4.9 ppm, or approximately 50 percent of the Federal standard. In 2005, CARB proposed to extend the existing CO maintenance plan to 2018, which was adopted by USEPA in January 2006.

CARB adopted a SIP revision for O_3 in 1999. Portions of the SIP revision were approved, but USEPA also determined that the plan had deficiencies requiring corrective action. In response to the USEPA action, the plan was revised in 2001, and most of it was approved in 2003. Subsequent monitoring data showed that the Bay

Area was in compliance of the 1-hour standard. USEPA agreed in 2004 that the Bay Area has met the national 1-hour standard, but USEPA will not formally redesignate the area as attainment until compliance with an approved maintenance plan is demonstrated.

Transportation planning is coordinated with this conformity process. The RTP contains a long-range plan for transportation projects and estimated costs of each project. The TIP also contains planned transportation projects, but is more restrictive: the projects in the TIP must be funded or partially funded within a three-year planning period. The RTP and TIP are consequently updated on a regular basis to reflect changes in priorities, project costs, and timing. The air quality evaluations for updated RTPs and TIPs include emissions allowances for designated or planned projects within the jurisdiction of a local regional transportation agency (i.e., the MTC). All projects included in the TIP must be derived from or be consistent with the RTP. The TIP must conform to the SIP by having emissions allowances for the planned projects that do not exceed the emissions allowance in the SIP. For an individual project to conform to the SIP, it must be contained in a “conforming” TIP that meets this criteria.

All phases of the I-680/SR-4 interchange improvements are included in MTC’s *Transportation 2030 Plan* (MTC 2005). The plan anticipates Phases 1 and 2 to be operational by 2015 (MTC RTP #21205) and Phases 3 through 5 to be operational by 2025 (MTC RTP #22350).

The project is also included in MTC’s 2005 TIP, which was adopted on July 28, 2004, and amended in 2005 (TIP ID #CC-010023, Amendment No. 05-00). The 2005 amended TIP only described Phase 1 of the project (a two-lane direct connector ramp between northbound I-680 to westbound SR-4 with slip ramps at Pacheco Boulevard) with funding designated for environmental studies. CCTA, the project sponsor, will process a TIP amendment prior to completion of the environmental review and approval process that will modify the project description to include both Phases 1 and 2 and designate project funding beginning in Fiscal Year 2008. The processing of the TIP amendment for the I-680/SR-4 interchange will result in the project’s inclusion in the TIP.

2.3.2 Permanent Impacts

Air quality issues relate to a range of different pollutants and their individual regulatory standards. The evaluation of air quality impacts addressed in this section

focuses on the project's conformity with the regional air quality framework (discussed in Section 2.3.1) and the project's potential to result in an adverse impact to the region's compliance with the relevant standards.

Transportation planning involves the evaluation of air quality impacts for adoption of funding and priorities for transportation improvements. Generally, the first step of this process is the inclusion of the project in the RTP. As Contra Costa County and MTC identify priorities for transportation projects in the RTP, the entire program must be evaluated and must show that it provides a benefit to regional air quality. This process links to showing conformity with the SIP, which is discussed below.

The outcome of this process provides for transportation improvement planning that evaluates the contribution of traffic sources of pollutants (e.g., NO_x, O_3, ROG, etc.) at a regional level, consistent with the regional nature of air quality issues. In contrast to most air pollutants, one pollutant, CO, is of primary concern at a localized level, especially where people are closest to congested traffic. This discussion of impacts focuses on the project's consistency with regional planning and the potential for localized, traffic-related CO impacts.

2.3.2.1 Conformity to the SIP

Section 176(c) of the Federal Clean Air Act Amendments requires that federally funded or approved transportation plans, programs, and projects conform to the SIP, which contains the controls necessary for the State to meet the NAAQS. USEPA promulgated 40 Code of Federal Regulations (CFR) Parts 50 and 93 to implement Section 176(c) of the Federal Clean Air Act Amendments.

As discussed above, the RTP and TIP planning process allows for transportation planning that includes air quality analysis; provides for timely or prompt use of transportation control measures; and contributes to overall annual reductions in CO, NO_x, PM_{10}, and volatile organic compounds emissions. The planning and design of Phase 1 of the project was included in the 2005 TIP. CCTA, the project sponsor, will amend the 2007 triennial year TIP to include both Phase 1 and 2 for initial funding for right-of-way and/or initial construction to occur in the 2008/2009 fiscal year. The amended TIP will undergo review and approval by MTC. These steps are planned for completion prior to approval of the final environmental document and NEPA review process. Under 40 CFR Part 93, Phases 1 and 2 of the I-680/SR-4 Interchange Improvement Project will be in conformance with the SIP.

2.3.2.2 Evaluation of Traffic-Related CO Impacts

Method

The CO impacts analysis (detailed in the technical report for this project) followed the procedures set forth in *Transportation Project-Level Carbon Monoxide Protocol*, prepared by the University of California, Davis, Institute of Transportation Studies (CO Protocol). This protocol applies screening procedures, based on the attainment status of the area in which the project is planned, to evaluate potential CO impacts of the project and assess the need for further detailed analysis. Because the project is in a CO maintenance area, the first level of analysis outlined by the CO Protocol is the determination of whether the project would lead to an increase in localized CO emissions by comparing traffic volumes and other variables that affect air quality between the proposed project and the No Project scenarios. The next level of analysis evaluates whether the project would potentially create CO concentrations higher than those existing within the region at the time that CO attainment was demonstrated (i.e., the current year). That evaluation relied on a comparative analysis or screening-type evaluation comparing the proposed project to a similar, existing roadway in the same air basin (consistent with the CO Protocol methods). If the proposed project satisfies the above conditions, it would not lead to a violation of the CO standards. The impact is not considered adverse and no further analysis, such as a microscale CO model, would be required.

CO Comparison Evaluation

Traffic conditions for all five phases of the proposed project were compared to traffic conditions at two nearby similar traffic roadways that meet the criteria outlined in the CO Protocol: the mainline roadway of I-680 (north of the Main Street exit and south of the Geary Road exit) in the City of Walnut Creek (worst-case mainline) and the intersection at Ygnacio Valley Road and Civic Drive in the City of Walnut Creek (worst-case intersection). Comparison of the roadway segments of the project phases to the mainline segment of I-680 noted above showed that all conditions (meteorology, land uses, and background CO levels) were similar, except that traffic volumes that were consistently lower for the project segments (Tables 2.3-3a and 2.3-3b). Similarly, the comparison intersection of Pacheco Boulevard, Muir Road, and the I-680 southbound on-ramp during the afternoon/evening peak hour (the project study area intersection) is lower than the Ygnacio Valley Road at Civic Drive in Walnut Creek (worst-case intersection). These tables show that traffic volumes and congestion are lower at and near the I-680/SR-4 interchange relative to the comparison worst-case roadways and intersections in the local area. The project location and the representative comparison locations are within 2 to 4 miles of the

nearest CO monitoring station (only 8-hour monitoring data are available), which has recorded levels that are substantially lower than the applicable national and State CO standard. The CO monitoring station is at a major local roadway intersection. In accordance with the screening criteria, CO levels are expected to be lower at the I-680/SR-4 interchange and its connections with local streets. Because the nearby monitoring location has recorded CO levels well below the State and national CO standards, the comparative traffic conditions at the project location should not lead to a violation of the CO standards.

Table 2.3-3a Carbon Monoxide Screening: Comparison of Project Interchange and Worst-case Traffic Conditions in Vicinity of Local Air Quality Monitoring Station

Traffic Conditions at I-680/SR-4 Mainline Roadway and Comparison Roadway		
	I-680/SR-4 Interchange Roadway Segment	**Comparison Roadway Segment**
Project and Comparison Mainline Roadway Locations	I-680/SR-4 Mainline Project Study Segment: I-680 between SR-4 and Center Avenue in Pacheco	Comparison Roadway Segment in Local Area: I-680 between Main Street and Geary Road in Walnut Creek
Traffic Volumes on Comparison Roadway Segment	14,920 vehicles (PM peak hour)	19,300 Vehicles (PM peak hour)[1]
Nearby and Adjacent Land uses	Suburban and commercial	Suburban and commercial
Relative Location of Nearest CO Monitoring Station (on 6-lane Treat Blvd. at 4-lane Oak Grove Road in Concord)	Station is approximately 4 miles from I-680/SR-4 interchange roadway segment.	Station is approximately 2 miles from Main Street and Geary Road.
Conclusion	I-680/SR-4 roadway segment has recorded traffic volumes that are 30% lower than along I-680 in Walnut Creek. Project location and comparison roadway segments are within 2 to 4 miles of nearest representative monitoring station that has recorded CO levels of 2.0 ppm 8-hour period, substantially below standard of 9.0 ppm.	

[1] Worst-case traffic volumes from Caltrans, Traffic and Vehicle Data Systems Unit; Traffic Volumes on CSHS for 2001.

Table 2.3-3b Carbon Monoxide Screening: Comparison of Project Interchange and Worst-case Traffic Conditions in Vicinity of Local Air Quality Monitoring Station

Traffic Conditions at Pacheco Boulevard and Local Comparison Intersection		
Local Road Location at Project Interchange and at Comparison Intersection	I-680/SR-4 interchange representative intersection: Pacheco Boulevard/Muir Road	Comparison Intersection in Local Area: Ygnacio Valley Road/Civic Drive Current Year
Traffic Volumes	3,340 vehicles (PM peak hour)	7,801 vehicles (PM peak hour)[1]
Level of Service	C	F
Volume-to-Capacity Ratio	0.78	1.31 (PM peak hour)[1]
Relative Location of Nearest CO Monitoring Station (on 6-lane Treat Blvd. at 4-lane Oak Grove Road in Concord)	Station is approximately 4 miles from I-680/SR-4 interchange roadway segment.	Station is approximately 3 miles from Ygnacio Valley Road/Civic Drive intersection.
Conclusion	Worst-case local roadway at project intersection has traffic level of service conditions that are substantially better and volumes that are less than 50% of comparison local roadway. Both locations are relatively near closest representative monitoring station that has recorded CO levels of 2.0 ppm 8-hour period, substantially below standard of 9.0 ppm.	

[1] Worst-case traffic volumes from Fehr and Peers Transportation consultants, Civic Park Master Plan, August 2001.

2.3.2.3 Particulate Matter "Hot Spot" Analysis

The project is within an area that meets the Federal particulate matter or PM_{10} standards, but does not meet the more stringent State standards. A qualitative review was performed against several established criteria that confirmed that the project would not cause a violation of the Federal PM_{10} standard. The proposed project is not expected to have any adverse effects on microscale particulate levels or contribute to a PM_{10} hot spot that would cause or contribute to violations of the PM_{10} NAAQS. The project is not located in an agricultural area or area of unpaved shoulders and roads; in an area with an unusually high concentration of diesel vehicles such as truck/bus terminals, rail yards; or in an area with heavy wintertime sanding operations for snow control.

The criteria are as follows:

- Phases 1 and 2 of the I-680/SR-4 interchange project are included in the MTC 2001 RTP, which was adopted by the MTC in December of 2001 and found to conform to the SIP. These phases have also been included in the 2003 TIP. These phases of the project have therefore been accounted for and assessed in

regional air quality planning. Phases 3, 4, and 5 would be included for evaluation in the RTP in the future when funding is designated.

- Monitoring at the nearest air quality station to the project (Treat Boulevard in Concord) shows no exceedances of Federal standards in recent years.
- PM_{10} control measures are included in the attainment plan for PM_{10} in air basins that do not meet Federal PM_{10} standards. The Bay Area air basin currently attains the Federal standard and the attainment plan is not currently applicable to this project.

2.3.2.4 Regional Air Pollutant Cumulative Impact Analysis

Emissions of ozone precursors (NO_x and ROG), CO, and PM_{10} are addressed in the RTP regional air quality analysis, which included Phases 1 and 2. To evaluate the contributions from Phases 3 through 5, the regional emissions of criteria pollutants from project-related vehicle trips were calculated. The emissions were based on estimates of vehicle trips associated with Phases 3 through 5. The traffic analysis showed an increase in the number of daily trips with Phases 3 through 5 from vehicles using I-680 and SR-4 instead of diverting to surface streets or using other freeways, as they do under No Project conditions. The difference in the number of daily vehicle trips between the No Project conditions and traffic conditions with Phases 3 through 5 completed was used to calculate the change in vehicle miles traveled (VMT) as a result of implementing all phases of the project. The total change in emissions was estimated based on the difference in VMT, multiplied by the emission rates for each criteria pollutant. A comparison of the calculated daily emissions and the BAAQMD thresholds is shown below.

Pollutant	Estimated Daily Emissions (lbs/day)	BAAQMD Significance Thresholds (lbs/day)
ROG	2.0	82
CO	23.5	550
NO_x	4.2	82
SO_2	0.1	--
PM_{10}	0.8	82

The BAAQMD provides methods and thresholds for evaluating significance under CEQA. No corresponding methods have been approved for NEPA evaluation by FHWA for calculating some pollutants such as PM_{10}. None of the calculated

emission totals approached or exceeded the significance thresholds published by the BAAQMD. No numerical significance threshold for SO_2 exists, but SO_2 is an attainment pollutant in the Bay Area and SO_2 emissions from motor vehicles are minimal. Overall, the increase in regional criteria air pollutants as a result of completion of all five project phases would not constitute a substantial impact with regard to BAAQMD's CEQA thresholds.

2.3.3 Construction Impacts

Construction is a source of dust emissions that can have temporary impacts on local air quality (i.e., exceedances of the State air quality standards for PM_{10}). Construction emissions would result from earth moving and heavy equipment use involved in land clearing, ground excavation, cut and fill operations, and the construction of the project facilities. Dust emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather.

In addition to particulate emissions from earth moving, combustion emissions (CO, NO_x, PM_{10}, and ROG) from construction equipment may create a temporary impact on local air quality. Such equipment is typically diesel fueled and can contribute NO_x and PM_{10} emissions during the construction period.

2.3.4 Cumulative Impacts

The traffic modeling for this project accounts for completion of the transportation improvement projects described at the beginning of Section 2 as well as future planned (cumulative) land use development. This traffic modeling was the basis for the air quality assessment discussed and analyzed in the previous subsections. Therefore, the analysis presented in the previous subsections addressed cumulative conditions on a regional and local basis, incorporating future cumulative growth in traffic and completion of planned projects.

2.3.5 Mitigation

No substantial impacts to air quality would result from operation of Phases 1 and 2, or from the cumulative implementation of Phases 1 through 5. To mitigate potential construction impacts, dust control practices would be employed to minimize or avoid potential exceedances (violations) of the PM_{10} air quality standard during construction. Mitigation measures that would be employed include the following (in accordance with BAAQMD CEQA Guidelines):

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials *or* require all trucks to maintain at least 0.6 meter (2 feet) of freeboard.
- Pave, apply water three times daily, or apply nontoxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 24 km per hour (15 miles per hour).
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

In addition, the following can mitigate pollutant emissions in construction equipment exhaust:

- Keeping engines properly tuned
- Limiting idling
- Avoiding unnecessary concurrent use of equipment

The proposed measures would be implemented for the construction of Phases 1 through 5. Implementation of the above mitigation measures would result in construction emissions occurring at a less than substantial level.

2.4 Noise

2.4.1 Affected Environment

The existing I-680/SR-4 interchange is bordered by a mixture of land uses, including homes, businesses, Buchanan Field Airport, undeveloped parcels, and highway, railroad, and local road rights-of-way. The Walnut and Grayson creek flood channels and Contra Costa Canal also cross beneath I-680 and SR-4 within the interchange area. Two previous projects have been conducted to improve I-680 within the current project limits. The first project widened I-680 to three lanes in each direction in the early 1990s. As a result of that project, a 14-foot-high soundwall was installed at a mobile home development on the northbound direction of I-680, south of the Grayson Creek channel. SR-4 has one existing barrier on the eastbound direction just west of SR-242. In 2003, construction began on the I-680 HOV Lane Project and will include installation of additional soundwalls at locations on I-680 determined to qualify for abatement that were not previously protected. The HOV Lane Project includes lengthening the existing soundwall over Grayson Creek and installing new soundwalls at locations north of the existing interchange in the Blum Road area and on the north side of I-680 approximately between its crossings of the Contra Costa Canal and the BNSF railroad.

2.4.1.1 Noise Measurements and Levels

To characterize existing noise levels within the project limits, field noise measurements were conducted at land uses that could be affected by existing and project-related noise levels. Long-term measurements were recorded over a 24-hour period at locations that are affected by I-680 or SR-4 traffic noise and that represent noise-sensitive land uses (referred to as noise-sensitive receptors or just receptors). Short-term measurements (about 10 minutes) were conducted simultaneous with the collection of traffic counts at more than 50 locations throughout the study area. These short-term measurements were also conducted at areas of frequent use (e.g., commonly at residential yards fronting the freeway where permission to monitor was granted) or at equivalent accessible locations. The noise measurements were used for the modeling and prediction of future noise levels at sensitive and representative receptor locations throughout the study area.

Noise measurement locations (Appendix A, Figures A-1 through A-13) are also used as noise modeling receivers for prediction of future noise levels. Noise measurements were taken in July 2002, and additional measurements were made in February 2003. Appendix F summarizes the measurement locations and the results of

modeling for future conditions with and without the project (discussed in Sections 2.4.2 through 2.4.5).

2.4.1.2 Noise Assessment Criteria

The Federal and State standards, regulations, and policies relating to traffic noise are discussed in detail in the *Traffic Noise Analysis Protocol* (TNAP) (Caltrans 1998a). The Caltrans *Technical Noise Supplement* (Caltrans 1998b) establishes guidelines for construction of noise barriers along highways where sensitive receptors such as residences are located. These policies fulfill the highway noise analysis and abatement/mitigation requirements for all relevant State and Federal environmental statutes, including those guidelines defined in 23 CFR Part 772.

Under FHWA regulations, noise abatement must be considered for "Type I" projects when the noise levels result in a substantial noise increase, or when the predicted noise levels approach or exceed the Noise Abatement Criteria (NAC). The NAC categories, shown in Table 2.4-1, are assigned to both exterior and interior activities. Caltrans has further defined the level of "approaching the NAC" to be 1 A-weighted decibel (dBA) below the NAC (e.g., 66 dBA is considered approaching the NAC for Category B activity levels). When levels approach or exceed the applicable NAC categories, noise abatement measures that are reasonable and feasible and that are likely to be incorporated into a project as well as impacts for which no apparent solution is available, must be identified and incorporated into the plans and specifications. A noise increase is considered substantial when the predicted noise levels with the project exceed existing levels by 12 dBA $L_{eq[h]}$[8] or more.

For noise barriers to be considered feasible, a 5-dBA reduction must be achieved, and the line of sight between a truck exhaust stack (assumed to be 3.5 meters [11.5 feet] high) and the receiver (assumed to be 1.5 meters [5 feet] above the ground) must be interrupted. The noise barrier must also conform to Caltrans design standards (Caltrans Highway Design Manual, Chapter 1100, 5th Edition). Under these guidelines, the height of the noise barrier is limited to 4.9 meters (16 feet), unless constructed within 4.5 meters (15 feet) of the traveled way, where the limit is 4.2 meters (14 feet). Severe noise impacts, defined as a worst-case level of 75 dBA $L_{eq[h]}$ or greater at Category B receivers, were measured at receivers along Bayview Street.

[8] L_{eq} is the equivalent steady state noise level in a stated period of time that would contain the same acoustic energy as the time varying noise level during the same period.

Table 2.4-1
Federal Noise Abatement Criteria

Activity Category	Noise Abatement Criteria (dBA) $L_{eq[h]}$[1, 2]	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

[1] Noisiest hour expressed as the energy-average of the A-weighted noise level occurring during a one-hour period, or $L_{eq[h]}$.
[2] Note that criteria is applied as 'approach or exceed' the thresholds, which has been defined as 1 dBA. For Category B, the "approaching the NAC" is therefore 66 dBA, as applied in this study.

"Reasonableness" of noise abatement is more subjective than the determination of feasibility. This criterion includes consideration of a multitude of factors, including but not necessarily limited to the number of receivers effectively protected by the barrier; the date of development of the homes; cost of the barriers; predicted future noise levels and the difference from existing levels; and achievable noise reduction. These factors are used to make a "preliminary reasonableness decision" for potential noise barriers that are identified and discussed in this report. Additional factors including environmental impacts, community concerns, and other social, economic, legal, and technological factors are subsequently considered with public input in making final decisions on potential noise barriers ultimately included in the project design and construction. The draft environmental document therefore identifies the potential noise barriers as "preliminarily reasonable" or "preliminarily not reasonable" as input to this project's public input and review process.

The adopted TNAP sets forth the procedures and criteria that are used to calculate a "reasonableness allowance" for each of the barriers identified and evaluated in the noise study performed for this project. (These procedures are presented in Section 2.8 of TNAP; the TNAP reasonableness evaluation procedures are summarized at the end of Section 2.4.1 of this document). This allowance is used as a benchmark cost

to help preliminarily identify whether a barrier that may protect some homes is sufficiently effective to justify its cost of construction and maintenance. The cost to construct the barriers identified for this project was estimated based on the height and length of each proposed wall, the necessary excavation and foundation, the probable barrier type, construction access, and cost contingencies. Construction estimates and bid prices for the I-680 HOV Lane Project construction (estimated and bid in 2003) were reviewed to apply the most current and applicable cost criteria available. The estimated costs for each soundwall evaluated in this study were then compared to a calculated reasonableness allowance to determine the cost effectiveness of each barrier. In general, walls that showed estimated costs of construction that were less than or very close to the calculated reasonableness allowance were identified as preliminarily feasible. Other factors were also considered, such as the total number of residences effectively protected, the potential for severe traffic noise impacts, and the potential for noise abatement measures to result in adverse environmental impacts. Soundwalls that could protect only a limited number of homes (where at least 5 dBA traffic noise reduction could be gained) and would have barrier construction costs substantially exceeding the calculated reasonableness allowance were identified. These criteria are in accordance with the TNAP (Sections 2.9 and 3.0 of TNAP), where:

- If traffic noise impacts are predicted, but the proposed noise abatement is not feasible or reasonable, noise abatement will not be recommended.
- The noise impacts will not cause a significant[9] adverse environmental impact.

The final decision on the project's noise abatement measures will be made upon completion of project design and public involvement process.

2.4.2 Permanent Impacts

Modeling of future year (2030) traffic conditions predicts that noise levels will increase with the project by 1 to 3 dBA at most of the receivers in the study area (the noise modeling results are listed by receiver location in the tables in Appendix F). Many of the modeled receivers show that they already approach or exceed the FHWA NAC (66 dBA for residential or Category B areas), and in some cases the 1-to-3-dBA increase from the project results in additional locations exceeding this criterion. As

[9] The reference to "significant" is applied here consistent with the procedures, criteria, and terminology contained in TNAP and does not apply with regard to NEPA.

discussed in Section 2.4.1.2, this is the threshold at which noise abatement measures are evaluated for effectiveness. These locations are as follows:

- Along both sides of SR-4, west of I-680, a number of residential properties between the western project limit (at the Morello Avenue on- and off-ramp connections to SR-4) and Glacier Drive exceed the NAC threshold.
- On the south side of SR-4, between Glacier Drive and Pacheco Drive, two residences exceed the threshold.
- Along I-680, from the southern project limits just north of the Buchanan Field Golf Course to Grayson Creek, homes in the Concord Cascade and Rancho Diablo mobile home parks are currently protected by an existing soundwall on the northbound side of I-680. A portion of that wall south of Grayson Creek will have to be removed and replaced due to the addition of the northbound I-680 to westbound SR-4 ramp connection. This area was modeled as if a soundwall were not present, to accurately evaluate the effectiveness and design of a replacement wall with the I-680 northbound to SR-4 westbound interchange ramp in place. The modeled noise levels for receptors identified as “S-E” in the southeast quadrant of the interchange represent a worst-case condition with no existing protection, and show levels that exceed the applicable NAC threshold.

2.4.3 Construction and Temporary Impacts

Construction is anticipated to occur over several years for each phase of the interchange reconstruction. In addition, the phases may not be constructed sequentially, depending on funding. The majority of project construction would occur at the interchange area. With the exception of the interchange area, roadway construction activities would not typically remain in one location for long periods. Noise-sensitive receivers in the immediate interchange vicinity could be subject to construction-generated noise for extended periods.

Roadway, retaining wall, and soundwall construction on the outside portions of the highways would likely result in the highest noise levels. Near the source (measured at 15 meters [49 feet]), noise levels range from approximately 80 to 90 dBA for equipment such as scrapers, bulldozers, trucks, backhoes, pneumatic tools, and pumps. Pile drivers, if necessary, create the highest noise levels (95 to 105 dBA). The clearing of vegetation prior to construction can also result in high noise levels. Construction activities that occur along the median (e.g., the addition of new inside

lanes) results in lower construction noise impacts since this noise is farther away and masked by traffic noise.

Residential land uses in the south leg of the interchange area and nearest the interchange immediately adjacent to portions of the project would be most affected by construction noise. Residential receivers near Blum Road would also be affected by construction noise. These activities would be temporary, and mitigation is proposed to minimize the potential impacts.

2.4.4 Cumulative Impacts

Consistent with the discussion of cumulative impacts for air quality and at the beginning of Section 2, the noise analysis was also based on traffic projections that included other cumulative or related transportation improvement projects. The noise analysis also included traffic growth increases to future years based on adopted general plans. In general, except where the forecasted cumulative traffic volumes showed conditions functioning at better than LOS C (at which traffic noise levels are the loudest), worst-case noise traffic operating conditions were assumed to evaluate impacts and noise abatement measures.

The only overlapping project with regard to potential cumulative noise impacts is the I-680 HOV lanes, which included noise barriers along I-680, in the Blum Road area, and in the area north of the Contra Costa Canal. The I-680 HOV lane project included noise abatement (soundwalls) along I-680. The noise study for the I-680/SR-4 interchange improvements remeasured and evaluated all areas of I-680 within the proposed interchange project limits, even if soundwalls were already proposed for construction by the I-680 HOV Lane Project. Therefore, the noise studies for the interchange project took into account cumulative traffic and current plans for noise abatement measures. No substantial differences were identified between the two projects for the areas along I-680.

2.4.5 Mitigation

Noise levels on I-680 and SR-4 with a range of barriers in place are listed in Tables 2.4-2 (Phases 1 and 2) and 2.4-3 (Phases 3 through 5). Tables 2.4-2 and 2.4-3 also summarize the evaluation of barriers in regard to noise reduction and their effectiveness in terms of homes protected. For each of the soundwalls, a “reasonableness allowance” has been calculated that considers the future noise level, the noise level increase caused by the project (e.g., most are within a 1 to 3 dBA

Table 2.4-2
Phase 1 and 2 Soundwalls Preliminarily Evaluated as Feasible and Reasonable

Soundwall (Project Phase)	Alternative	Description	Length	Predicted Noise Reduction	Number of Benefited Receivers or Residences	Reasonable Allowance Per Residence ($000s)	Total Reasonable Allowance ($000s)	Estimated Cost of Soundwalls $000.s (1)	Preliminary Recommendation(2)
SW1A (Phase 1)	2.4m	Along EOS of NB I680 Sta. 101+20 (conform to existing) to 102+80 on NB I680 to WB SR4 Connector. [1]	~800 m	5 dBA	35	$ 39	$ 1,365	$ 710	--
	3.0m			6 dBA	40	$ 41	$ 1,640	$ 777	--
	3.6m			8 dBA	65	$ 41	$ 2,665	$ 1,040	--
	4.2m			9 dBA	70	$ 43	$ 3,010	$ 1,107	R
SW1B Option 1 (Phase 1)	3.0m	Along EOS of NB I680 to WB SR4 Conn. From Sta. 102+80 (conform to SW1A) to 104+80 on NB I680 + From NB I680 Sta. 109+00 to Sta 111+00. [1]	Total ~400m	5 dBA	5	$ 33	$ 165	$ 251	--
	3.6m			6 dBA	10	$ 35	$ 350	$ 301	--
	4.2m			6 dBA	15	$ 35	$ 525	$ 351	R
SW1B Option 2 (Phase 1)	2.4m	Along ROW extending about 190m northeast from Sta 102+80 of NB I680 to WB SR4 Conn. [1]	~190m	5 dBA	5	$ 33	$ 165	$ 100	NR
	3.0m			7 dBA	10	$ 35	$ 350	$ 122	
	3.6m			8 dBA	15	$ 35	$ 525	$ 145	
	4.2m			9 dBA	15	$ 37	$ 555	$ 176	
	4.8m			10 dBA	20	$ 37	$ 740	$ 199	
SW5 (Phase 2)	3.6m	Along EOS of EB SR4 Sta. 89+45 (on Morello On Ramp) to 95+30 plus along ROW from Sta 95+10 along ROW to 97+20 (includes overlap).	~800m	5 dBA	5	$ 29	$ 145	$ 1,040	--
	4.2m			6 dBA	17	$ 31	$ 527	$ 1,107	--
	4.8m			7 dBA	26	$ 31	$ 806	$ 1,175	R
SW6 (Phase 1)	4.2m	Along EOS of WB SR4 from Sta. 91+00 to 97+20.	~620m	5 dBA	5	$ 19	$ 95	$ 858	NR

LS = Line of sight not interrupted for many receivers.

(1) Note that the northern extent of these wall options at Grayson Creek coincide with a wall included for construction as part of the I-680 HOV lanes project. The need for the Grayson Creek wall extension on the I-680 HOV lane project should be verified if Phase 1 of this I-680/SR 4 interchange project proceeds with funding, design, and construction.

(2) R = Recommended for construction at this height. NR = Evaluated but not recommended.

Table 2.4-3
Phases 3 through 5 Soundwalls Preliminarily Evaluated as Feasible and Reasonable

Soundwall (Project Phase)	Alternative	Description	Length	Predicted Noise Reduction	Number of Benefited Receivers or Residences	Reasonable Allowance Per Residence ($000s)	Total Reasonable Allowance ($000s)	Estimated Cost of Soundwall ($000s)	Preliminary Recommendaton (1, 2)
SW2 (Phase 4)	2.4m	Along EOS of SB I680 Sta. 118+20 to 120+10. 1	~190m	6 dBA	10	$ 33	$ 330	$ 91	--
	3.0m			7 dBA	15	$ 33	$ 495	$ 113	--
	3.6m			8 dBA	15	$ 33	$ 495	$ 136	--
	4.2m			9 dBA	15	$ 35	$ 525	$ 159	R
SW3 (Phase 5)	1.8m	Along EOS of NB I680 Sta. 119+30 to 122+60 (could transition into hillside at north end). 1	~330m	5 dBA	2	$ 31	$ 62	$ 283	--
	2.4m			6 dBA	5	$ 33	$ 165	$ 312	--
	3.0m			7 dBA	15	$ 33	$ 495	$ 342	--
	3.6m			8 dBA	20	$ 33	$ 660	$ 455	--
	4.2m			9 dBA	20	$ 35	$ 700	$ 485	R
SW4A (Phase 4)	3.6m	Along EOS of SB I680 Sta. 124+00 to 126+70 then transition to ROW at 127+00. 2	~320m	6 dBA	3	$ 31	$ 93	$ 416	NR
	4.2m			7 dBA	4	$ 31	$ 124	$ 443	
SW4B (Phase 4)	3.6m	Along EOS of SB I680 Sta. 126+00 to 126+70 then transition to ROW at 127+00 and along ROW to 129+20 (overlapping SW4A). 2	~340m	6 dBA	3	$ 31	$ 93	$ 464	NR
	4.2m			6 dBA	3	$ 31	$ 93	$ 484	
SW4(A+B) (Phase 4)	3.6m	Along EOS of SB I680 Sta. 124+00 to 126+70 then transition to ROW at 127+00 and along ROW to 129+20 (overlapping SW4A). 2	~540m	6 dBA	6	$ 31	$ 186	$ 737	NR
	4.2m			6 dBA	7	$ 31	$ 217	$ 784	

1 - Estimated costs versus effectiveness should be re-evaluated/updated at the time Phases 3 through 5 are advanced for funding and further design work

2 - Recommended for construction (R) at this height. NR is evaluated but not recommended

Table 2.4-3
Phases 3 through 5 Soundwalls Preliminarily Evaluated as Feasible and Reasonable

Soundwall (Project Phase)	Alternative	Description	Length	Predicted Noise Reduction	Number of Benefited Receivers or Residences	Reasonable Allowance Per Residence ($000s)	Total Reasonable Allowance ($000s)	Estimated Cost of Soundwall ($000s)	Preliminary Recommendaton (1, 2)
SW7 Option 1A (Phase 4)	3.0m	Along EOS of SBI680 to EB SR4 Conn. From Sta. 110+80 to 107+70.	~310m	5 dBA	2	$ 33	$ 66	$ 314	NR
	3.6m			6 dBA	5	$ 35	$ 175	$ 416	
	4.2m			7 dBA	8	$ 35	$ 280	$ 442	
SW7 Option 1B (Phase 5)	3.0m	Along EOS of SBI680 to EB SR4 Conn. From Sta. 110+80 to 107+70 PLUS Along EOS of EB SR4 from Sta. 118+30 to 120+40.	~520m	6 dBA	3	$ 35	$ 105	$ 569	--
	3.6m			7 dBA	10	$ 35	$ 350	$ 757	--
	4.2m			8 dBA	22	$ 35	$ 770	$ 806	R
SW7 Option 2 (Phase 4)	4.2m	Along ROW of EB SR4 from Sta. 110+10 of SBI680 to EB SR4 Conn. to Sta. 108+00 (along Mobile Home Park boundary).	~220m	5 dBA	4	$ 33	$ 132	$ 224	NR
	4.8m			6 dBA	10	$ 35	$ 350	$ 253	
SW8 (Phase 4)	3.6m	Along EOS of EB SR4 Sta. 136+00 (along On Ramp) to 139+40.	~340m	5 dBA	15	$ 29	$ 435	$ 364	--
	4.2m			5 dBA	20	$ 29	$ 580	$ 405	R
SW9 (Phase 4)	3.6m	Along EOS of EB SR4 to SB SR242 Conn. From Sta. 144+00 (connect to ex. SW) extending to Project limits or ex. SW on SR242.	~230m	5 dBA	6	$ 31	$ 186	$ 299	NR (3)
	4.2m			6 dBA	20	$ 33	$ 660	$ 318	
SW10 (Phase 3)	3.6m	Along ROW of EB SR4 from Sta. 150+00 to EB Sta. 152+80	~280m	6dBA	3	$ 31	$ 93	$ 400	--
	4.2m			8 dBA	6	$ 33	$ 198	$ 426	--
	4.8m			9 dBA	6	$ 35	$ 210	$ 452	R
SW11 (Phase 3)	2.4m	Along ROW of EB SR4 from Sta. 153+40 to EB Sta. 157+00	~360m	5 dBA	9	$ 33	$ 297	$ 351	--
	3.0m			7 dBA	10	$ 35	$ 350	$ 385	--
	3.6m			8 dBA	11	$ 35	$ 385	$ 515	--
	4.2m			10 dBA	11	$ 37	$ 407	$ 548	--
	4.8m			11 dBA	11	$ 37	$ 407	$ 581	R

2 - A wall is included in the I-680 HOV lane project at this same location. This study recommends a similar wall at this same area, but extended further north and with two options (4a and 4b). These walls should be built to accommodate Phase 5 of the interchange project.

3 - SW9 is not recommended because it does not meet minimum sight distance requirements at its necessary location

increase), and the age of the dwelling units protected. The calculated reasonableness allowance provides an indication of an amount that, under the FHWA and Caltrans criteria, is a reasonable expenditure of funding to protect existing dwellings impacted by highway noise. The cost of constructing a barrier has been estimated and compared to the calculated allowance. Barriers with estimated costs falling within or very close to the estimated allowance were considered for construction as part of the project. The following summarizes the results of the barrier analysis. Locations of the soundwalls evaluated are shown in Appendix A, Figures A-1 through A-13.

2.4.5.1 Soundwalls Studied Within Phases 1 and 2 Construction Limits

The following soundwalls were studied and identified as feasible to construct, and are relatively cost-effective in terms of construction and maintenance costs. Caltrans intends to incorporate noise abatement measures in the form of soundwalls at the locations and heights summarized below. Calculations based on preliminary design data indicate that the soundwalls will reduce noise levels by 5 or more dBA at estimated costs listed in Table 2.4-2. If, during final design, conditions substantially change, soundwalls might not be provided. The final decision regarding soundwalls will be made upon completion of the project design and public involvement processes.

- **Soundwall SW1A** will be needed at the mobile home park on I-680 to replace the existing barrier that will be impacted by Phase 1 construction. The existing wall at this location (between approximately Center Avenue and Grayson Creek) was originally constructed when I-680 was widened to three through-travel lanes in each direction. In 2003–2004, the wall will be extended north across the Grayson Creek bridge as part of the construction of the I-680 HOV Lane Project. This wall will be unavoidably impacted by the proposed Phase 1 northbound I-680 to westbound SR-4 ramp, which also requires acquisition and relocation of some homes just south of the creek. **SW1A is identified as preliminarily feasible and reasonable** to replace the wall along the impacted portions of the freeway and extend it along the proposed ramp.
- **SW1B** extends this soundwall north along or across Grayson Creek. Two options are possible for SW1B at the Grayson Creek crossing. **SW1B Option 1** would provide a wall segment on the I-680 Grayson Creek bridge and a wall on the northbound I-680 to westbound ramp as it rises over Grayson Creek (see Appendix A, Figures A-10 and A-11). The height of the Option 1 wall would be

verified during final design if it is the selected as the preferred option. SW1B Option 1 would provide up to 5 to 6 dBA of traffic noise reduction at 15 homes. This wall would be constructed during Phase 1 but would be located to accommodate the potential relocation of the northbound I-680 to eastbound SR-4 connector ramp that is planned as part of Phase 5. **SW1B Option 2** would locate the required wall along the Grayson Creek banks within a narrow strip of State-owned right-of-way, which lies along the east side of the creek channel adjacent to the existing mobile home development. SW1B would provide 5 to 10 dBA noise reduction at up to 20 homes. SW1B Option 2 provides greater noise reduction at the mobile home park because the wall is closely adjacent to the existing mobile homes and more effectively shields them from highway noise. However, this wall location also blocks access and views from the mobile home park to the creek channel area (see Section 2.17) and crosses a large sewer/utility line. Because SW1B Option 2 adversely affects these existing views at Grayson Creek, soundwall **SW1B Option 1 is identified as preliminarily feasible and reasonable**. The Option 1 walls would be located along the freeway right-of-way and on the edge of the northbound I-680 to eastbound SR-4 flyover ramp.

- **Soundwall SW5** would be constructed along the eastbound direction of SR-4 (the south side of SR-4) between the Morello Avenue interchange to just north of Deerwood Drive. SW-5 would actually consist of two separate but overlapping walls: the westernmost half of the wall would be built along the edge of the freeway shoulder, while the easternmost half would be constructed along the edge of the right-of-way. The soundwall would be divided to account for the changes in topography, to ensure that the wall is placed where it most effectively intercepts the line-of-sight between traffic and the residences adjoining the freeway. A 16-foot-high barrier on the right-of-way line combined with a 14-foot-high wall at the shoulder would benefit 26 homes (providing at least a 5-dBA or more reduction in traffic noise). SW-5 was also extended west of the rest of the project's "construction limits" to benefit several more residences near Morello Avenue. **SW5 with its overlapping wall design is identified as the most effective, located from approximately Morello Avenue to north of Deerwood Drive.** This overlapping wall design protects a relatively high number of homes that are predicted to otherwise gain at least 5 dBA from freeway traffic noise.

2.4.5.2 Soundwalls Studied Within Phases 3, 4, and 5 Construction Limits

The following soundwalls were identified as feasible to construct and cost-effective in terms of construction and maintenance costs. These soundwalls should be verified at the time these phases advance for further consideration:

- **Soundwalls SW2 and SW3** would replace existing walls along both the northbound and southbound sides of I-680 over the Blum Road overpass area. The new interchange (Phases 4 and 5) expands the freeway connector ramps to potentially require removal and reconstruction of some or all of both of the existing walls to be built in this location in 2003–2004 as part of the I-680 HOV Lane Project. The south and north limits of walls SW2 and SW3 are approximately the same as for the I-680 HOV project walls. Both walls show an estimated cost below the reasonableness allowance. **These walls, identified as preliminarily feasible and reasonable, should be retained or, if impacted by construction, replaced**. It is possible that the existing walls could be partially compatible with the final design of Phases 4 and 5; therefore, at the time these phases are advanced for further consideration, the alignment of the ramps and freeway widening necessary to accommodate Phases 4 and 5 should be reviewed to determine if it can conform with the existing structures to minimize their replacement or reconstruction.
- **Soundwall SW7** would be located just east of the interchange to protect the mobile home park on Grayson Creek that faces SR-4. Three soundwall options were identified and evaluated in this area. **Option SW7-1A**, by itself would benefit the fewest residences, placing a soundwall along the edge of shoulder of the southbound I-680 to eastbound SR-4 connector. A 14-foot-high barrier would benefit up to eight residences. **Option SW7-1B** is a combination of two walls. It would include the Option 1A soundwall and an additional edge-of-shoulder soundwall (SW7-1B) along a portion of the northbound I-680 to eastbound SR-4 connector (where it connects to SR-4). At a height of 14 feet, these two walls would protect a total of 22 residences. Option SW7-1B effectively protects more residences (achieving at least a 5 dBA reduction in traffic noise). **Option 2** places a wall along the right-of-way at the northernmost edge of the mobile home property facing SR-4. A 16-foot-high wall would protect an estimated 10 homes, at a cost that is less than the estimated reasonable allowance. However, the wall at this location (SW7 Option B) is adjacent to homes and will block views. **Because the two walls included in Option SW7-1B protect the most residences at a**

reasonable cost, they are identified as preliminarily feasible and reasonable for Phases 3 through 5 when these phases are advanced for further consideration.

- **Soundwall SW8** would protect the mobile home park on SR-4 at Peralta Road, just east of Solano Way. A 14-foot-high wall along the edge of shoulder would provide at least 5 dBA reduction at 15 to 20 residences, is well within the calculated reasonable allowance. **SW8 is considered preliminarily feasible and reasonable to include in Phase 4 when that phase is advanced for further consideration.**
- **Soundwall SW10** was evaluated as part of the median widening for Phase 3 near the eastern extent of the project limits along the eastbound SR-4 right-of-way. It was evaluated connecting to the existing barrier and extending eastward to end where the terrain at the right-of-way decreases relative to the adjacent homes to a point where the barrier's effectiveness was determined to be less than 5 dBA. It would effectively protect (a 5 dBA reduction or more) 3 to 6 residences. The estimated cost to construct and install this barrier was estimated to be approximately two to four times the calculated reasonableness allowance. A previous noise study performed for the widening of SR-242 reached the same conclusion regarding number of homes protected and the noise levels with and without a soundwall. However, the area potentially protected by SW11 is nearby and similar, and the "gap" between SW10 and SW11 is due to a change in topography and short distance between homes along SR-242 and SR-4. Residents have raised concerns about freeway noise in this area. Although this wall was rejected in the past because its estimated costs fell below the calculated reasonableness budget, **SW10 should be preliminarily considered for construction with Phase 3 of the interchange project**. The costs are not substantially below the reasonableness budget, and complaints about not obtaining noise protection with previous freeway highway improvement projects for SR-242 and SR-4 have been received for many years.
- **Soundwall SW11** was evaluated along SR-4, just east of the SW10 location at the eastern extent of the Phase 3 widening. SW11 would extend along the freeway protecting some of the backyards and homes on Bayview Circle. The terrain in this area rises above the freeway traveling to the east, but there are some residences that although located above the freeway could benefit from a barrier along the right-of-way. Up to 11 residences could achieve a noise reduction of 5 to 11 dBA. This barrier would have to step up in height relative to the ground

surface at each end because of hill-like terrain in order to maintain a constant barrier top height with respect to the residential properties. The cost estimate for this barrier exceeds the calculated preliminary reasonableness allowance for the wall. However, noise levels were modeled at two residences at 75 dBA for the existing worst-case period, and are predicted to reach levels of 76 and 77 dBA at several homes (all on Bayview Circle, with backyards facing SR-4). Noise levels of 75 dBA or greater can be considered for unusual or extraordinary noise abatement strategies, where normal abatement measures are not feasible or reasonable. Residents have expressed concerns and comments about the noise levels in this area, and previous evaluations (for the SR-242 project) estimated relatively high costs for construction of the walls and whether they could be effective if placed within the State right-of-way boundaries. Given the concerns raised by local residents and the modeled noise levels exceeding the 75 dBA for consideration of unusual or extraordinary abatement measures, **this wall should be considered when Phase 3 advances for funding and design**. Because of the hilly terrain at SW10 and SW11, current, more detailed or up to date topographical information should be used to verify that SW10 and SW11 can achieve a line-of-sight barrier between homes considered in this study and the freeway.

2.4.5.3 Soundwalls Studied and Preliminarily Found Not Feasible or Reasonable Within Phases 1 and 2 Construction Limits

Within Phases 1 and 2, freeway noise levels were studied and predicted to exceed the threshold for consideration of a noise barrier along SR-4. However, evaluation of the effectiveness of the modeled barrier determined it would not protect enough residences to be considered cost-effective, as described below.

- **Soundwall SW6** was evaluated on the edge of the right-of-way on SR-4 in the westbound direction, from approximately the Morello Avenue off-ramp to the eastern extent of residential development in that area, roughly corresponding with Holiday Hills Drive. Some existing private development walls and fences protect some of the residences along SR-4, but there are no existing soundwalls within the State right-of-way in this area. **SW6** at 14 feet high on the edge of the right-of-way would benefit only seven residences. The evaluation of this wall showed effective noise reduction at those homes, but the length and the total cost of the wall is relatively high with respect to the total number of homes effectively protected. The sound reduction effectiveness of this wall is diminished because

of the distance of the freeway from the homes along Arnold Drive. (Soundwalls are generally most effective where homes are adjacent to the freeway or road producing the traffic noise, and become less effective with greater separation between the homes and the freeway or road where the traffic noise is generated.) The presence of existing barriers and fences also diminishes the effectiveness of a wall placed along the freeway. As noted in Section 2.4.1.2, a "reasonableness evaluation" is required under adopted guidelines that considers, among many criteria, the number of homes effectively protected, the date the protected homes were constructed, the predicted noise levels, and the reduction gained from the most effective barriers evaluated. A soundwall located at SW6 would have estimated costs that well exceed the calculated reasonableness allowance, which shows that the length and size of the wall can not effectively protect enough homes to reasonably justify the cost of construction and maintenance, per established criteria and guidelines for this evaluation. The overall reduction gained (in terms of number of homes that would achieve a 5 dBA or more lowering in noise levels) was determined to not be an effective investment when considering the total cost of the wall. **SW6 has been preliminarily determined to not be cost-effective or reasonable**.

2.4.5.4 Soundwalls Studied and Preliminarily Found Not Reasonable or Feasible Within Phases 3, 4, and 5 Construction Limits

Similar to Phases 1 and 2, several barriers were studied and preliminarily found to not be reasonable or feasible within Phases 3 through 5, as the number of homes that could achieve an efficient level of noise reduction was not considered cost-effective when compared to the total cost of the wall:

- **Soundwalls SW4A and SW4B** were evaluated at the north end of the project, north and south of where the BNSF railroad crosses I-680, are areas of low-density or scattered residences on the west side of the freeway. One soundwall already exists in this area as a result of the I-680 HOV Lane Project. Soundwalls SW4A and 4B, are two separate walls that overlap on the southbound direction of I-680 north of the Contra Costa Canal and south of the BNSF railroad, and were evaluated as part of Phase 4 in this area. Both walls SW4A and 4B show estimated construction costs well above the calculated reasonable allowance for cost-effective noise abatement**. Therefore, no additional soundwalls are preliminarily identified as feasible and reasonable for future phases of the project within this area.**

- **Soundwall SW9** was evaluated along the connector ramp from eastbound SR-4 to southbound SR-242. A wall along the edge of the shoulder would benefit 6 to 20 residences in the Northwood Condominium complex. However, this wall would not comply with established sight distance requirements. It would have to be installed along the edge of the eastbound SR-4 to southbound SR-242 ramp connection, shown in Figure A-7 of Appendix A. With this wall in place, drivers would have insufficient sight distance at the design speed for this ramp to meet minimum freeway design requirements. Therefore, the wall would introduce a potential safety issue for drivers, and cannot be installed. **Soundwall SW9 therefore has been preliminarily determined to not be feasible and is removed from further consideration.** This soundwall was also identified and evaluated for a previous widening project on SR-242 and the same determination was reached.

2.4.5.5 Construction Mitigation

The following measures should be implemented during project construction through requirements set for the construction contractors. The proposed measures should adequately mitigate the noise impacts at adjacent residences.

- Equip all internal combustion engine–driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Strictly prohibit unnecessary idling of internal combustion engines within 100 feet of residences.
- Avoid staging construction equipment within 200 feet of residences and locate all stationary noise-generating construction equipment, such as air compressors and portable power generators, as far as practical from noise-sensitive residences.
- Construction equipment should be required to conform to the provisions in Section 7-1.01I, Sound Control Requirements, of the latest Standard Specifications. These requirements are meant to minimize the impact from construction noise yet in no way relieve the contractor from complying with local noise ordinances.

2.5 Energy

The proposed project is designed to provide direct connections between the heaviest traveled movements at the I-680/SR-4 interchange. By improving points of

congestion at the interchange, such as eliminating the short weaving areas and providing higher-capacity ramps between the most heavily used I-680 and SR-4 connections, constrained traffic will flow more efficiently between these highways. As discussed in Section 1.2, by eliminating existing traffic bottlenecks, the proposed project would increase highway mainline volumes that will be able to flow through this point of congestion. To address the effects to transportation energy use, a simple comparison of travel characteristics and associated vehicular energy use was made to compare the proposed project phases with the No Project future conditions.

2.5.1 Affected Environment and Impacts

Energy or fuel use is directly related to the amount of miles traveled and speed or fuel efficiency of the average vehicles using the highways. The traffic analysis performed for this project evaluated changes in traffic volumes and speeds on the mainline freeways and connecting ramps for all project phases and the No Project conditions. That evaluation is based on local land use planning projected to the year 2030, and traffic modeling of the changes using a model that is consistent with regional traffic modeling by the MTC. The land use assumptions were the same for the project and No Project alternatives (i.e., the model does not forecast growth differently between alternatives, only the regional local routes that drivers will use). The traffic model provides total vehicle miles traveled for the No Project and proposed improvements within the limits of the project area. In the year 2030, a total of 1,510,980 vehicle miles traveled is projected for the No Project condition. Phases 1 and 2 are projected to have 1,521,870 vehicle miles traveled, an increase of 0.72 percent. With all five phases of the interchange completed, vehicle miles traveled through the interchange area are predicted at 1,537,970, or about 1.8 percent greater than with the No Project alternative. This is considered a minor increase and not a substantial impact. In addition, fuel efficiency improves with vehicle speeds, up to about 60 miles per hour. The project will improve average vehicle speeds through the interchange area because it will provide a relatively higher-speed direct connection between the two highways and eliminate some of the points of greatest congestion where cars are averaging relatively slow speeds, such as at the least fuel-efficient merging and weaving sections discussed earlier.

2.5.2 Cumulative Impacts

For future years, the traffic model included projected population increases and other major transportation improvements that are planned for completion in the regional

area. Therefore, cumulative growth and development in the region to the year 2030 was considered in the analysis described above.

2.5.3 Mitigation

The small increase in energy use due to the higher number of vehicles able to drive through the less-congested interchange would be at least partially offset by the more efficient traffic operations achieved by the interchange. Mitigation for energy use is not practicable to apply to a specific project other than improving traffic operations, which this project would already help to achieve.

2.6 Wetlands and Other Waters of the United States

The wetland studies were performed for all five phases of the I-680/SR-4 interchange improvements. This section discusses the location of wetlands within the vicinity of all five phases. A Wetland Delineation Report details the wetland surveys performed for the project and is available under separate cover.

2.6.1 Affected Environment

2.6.1.1 Methods

The wetland delineation study area, the area in which wetlands were surveyed and mapped ("delineated"), includes areas of existing and proposed right-of-way and estimated construction areas that could be affected by the project. The areas of jurisdictional wetlands (using the definition of 33 CFR 328.3(b)) and waters of the United States that are crossed by I-680 or SR-4 or are near the freeways for all five phases of the project are shown on Figure 2.6-1.

Potential jurisdictional wetlands and waters of the United States were delineated on April 18, 2002, using the routine on-site method described in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory 1987). In the absence of human disturbance or unusual circumstances, an area must possess indicators (characteristics) of three parameters to be considered a jurisdictional wetland: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. This method was used to delineate wetlands and other waters of the United States in the project study area.

Jurisdictional wetlands and other waters of the United States were identified within the project area in the following locations (Figure 2.6-1):

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	CC	680	32.0–36.5		
04	CC	004	16.6–23.6		

Caltrans Metric

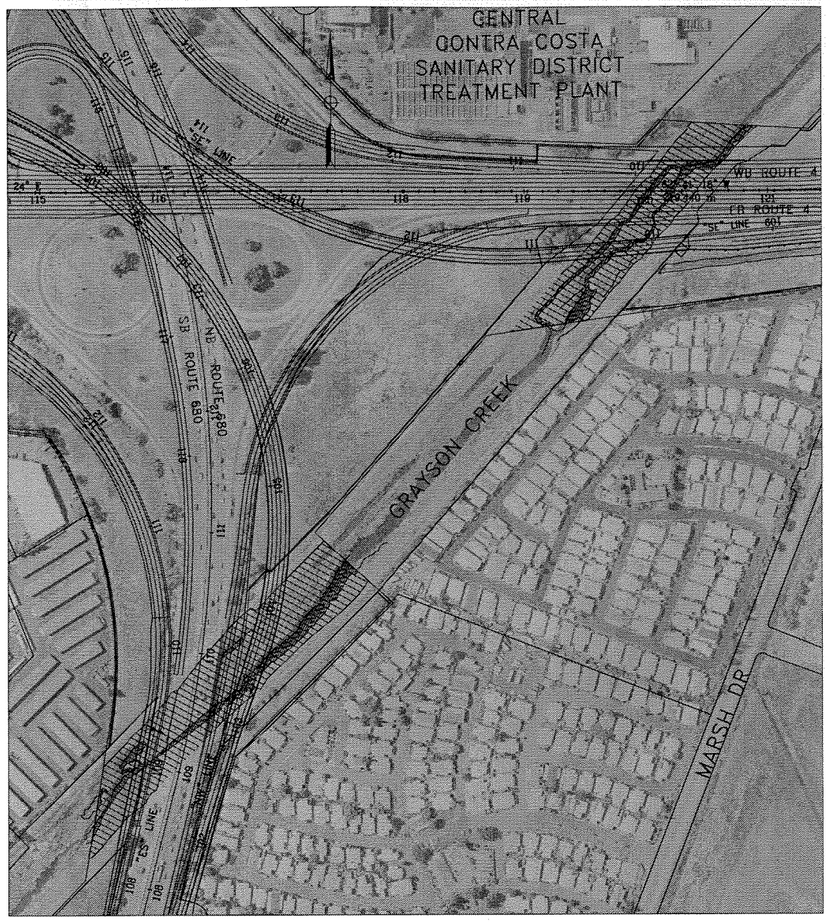
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

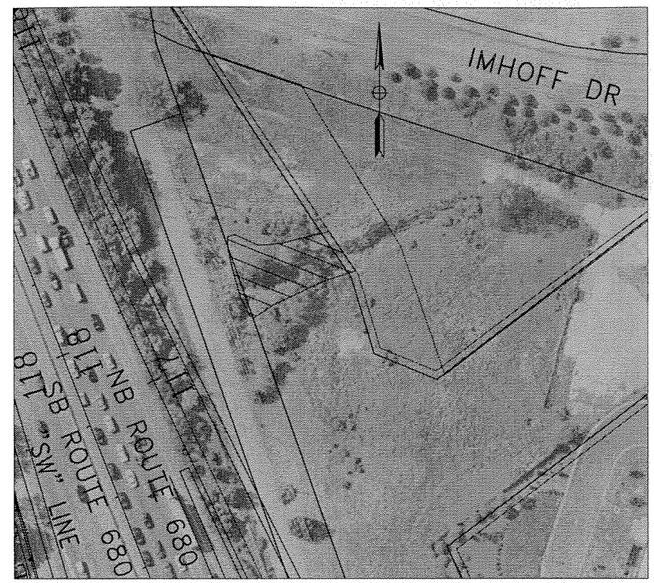
REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

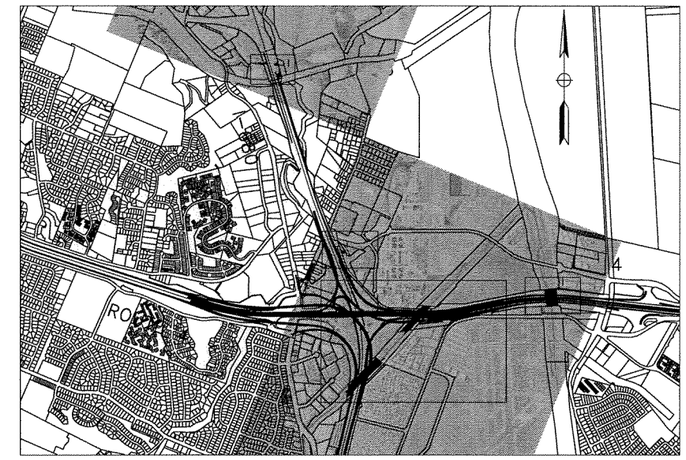
URS
500 12TH Street, Suite 200
Oakland, CA 94607-4014



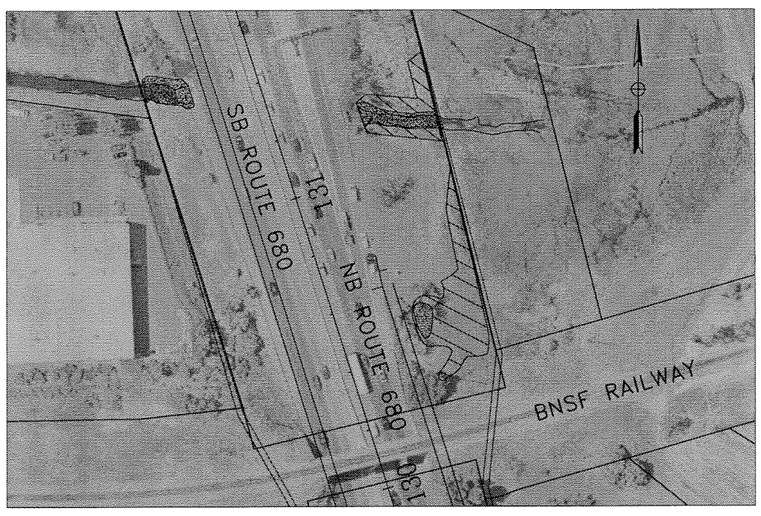
ALONG GRAYSON CREEK
FIGURE 1



NEAR IMHOFF DRIVE
FIGURE 2



KEY MAP



CHANNEL NORTH OF
BNSF RAILWAY–FIGURE 3

ALONG WALNUT CREEK
FIGURE 4

LEGEND:

WETLANDS

WATERS OF THE UNITED STATES

WETLANDS AND WATERS OF THE U.S. CROSSED OR IN VICINITY OF PHASES 1–5

FIGURE 2.6–1

Sep 20, 2005 – 11:44am
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FOR REDUCED PLANS ORIGINAL 0 20 40 60 80

- Where the northbound I-680 to westbound SR-4 ramp and the eastbound SR-4 to southbound I-680 ramp cross over Grayson Creek
- Where SR-4 crosses over Walnut Creek
- Along the northern segment of I-680 (near Blum Road and Imhoff Drive)
- In the vicinity of the BNSF railroad

The Grayson Creek Flood Control Channel and Walnut Creek include freshwater wetlands and waters of the United States. In the project area, both creeks are contained within earthen, trapezoidal flood-control channels. The low-flow portion of the channels contain water all year. Soils are Omni clay loams, deposited by runoff in the creeks. Vegetation in the Grayson Creek channel consists of annual and perennial species including flatsedge (*Cyperus rotundus*), cattails (*Typha latifolia*), rabbitsfoot grass (*Polypogon monspeliensis*), saltgrass (*Distichlis spicata*), and prickly lettuce (*Lactuca serriola*). The majority of this disturbed vegetation is hydrophytic. Vegetation in Walnut Creek where it is crossed by SR-4 includes cattails, hardstem bulrush (*Scirpus acutus*), saltgrass, Himalayan blackberry (*Rubus discolor*), and common horsetail (*Equisetum arvense*).

The flood control channel near Blum Road and Imhoff Drive has concrete retaining walls, while the channel itself is unlined. Vegetation present includes cattails, hardstem bulrush, eucalyptus (*Eucalyptus* sp.), and willow (*Salix* sp.). The wetland near the BNSF railroad is a freshwater marsh hydrologically connected to Pacheco Creek. The majority of this marsh is outside of the project area, and only a small area is near the northernmost extent of northbound I-680 where construction would begin. This wetland is dominated by cattails and bulrush.

2.6.1.2 Non-Jurisdictional Areas

Two sites were evaluated and determined to be non-jurisdictional.

The Contra Costa Canal crosses SR-4 just north of Contra Costa Canal Road. The canal is a concrete-lined channel that originates in Knightson, California, near Bethel Island, where it takes water from the Sacramento River and drains it into the Martinez Reservoir, west of the project area. This reservoir is not considered to be a jurisdictional water of the United States. Diversions of waters of the United States that are not discharged back into waters of the United States are normally not considered jurisdictional. The Contra Costa Canal is not considered jurisdictional for this project. A drainage ditch excavated in upland soils is located behind the

California Highway Patrol headquarters, north of SR-4 and west of I-680. This ditch is not considered to be jurisdictional because it catches runoff and does not divert a stream.

2.6.2 Permanent Impacts

The five project phases would result in minor permanent losses of jurisdictional wetlands, totaling 0.009 hectare (0.023 acre). The impacts by phase and location are listed in Table 2.6-1. Permanent impacts would occur where permanent structural improvements (primarily additional bridge piles) have to be placed within wetland areas to support the new structures crossing the creeks.

Table 2.6-1 Summary of Permanent and Temporary Wetlands and Other Waters of the United States Impacted by All Five Project Phases

Project Phases	Location (Type)	Permanent Fill in Hectares (acres)	Temporary Fill in Hectares (acres)
3–5	Grayson Creek / SR-4 mainline	0.001 (0.003)	0.03 (0.07)
3–5	Grayson Creek / SR-4 southeast ramp	0.001(0.003)	0.07 (0.17)
3–5	Walnut Creek / SR-4 (wetland)	0.002 (0.006)	0.12 (0.30)
1 and 2	Grayson Creek / I-680 eastbound ramp widening (wetland)	0.003 (0.007)	0.03(0.091)
1 and 2	Grayson Creek / I-680 northwest ramp (wetland)	0.002 (0.004)	0.13 (0.316)
3–5	Moorhen marsh (wetland)	0	0.01 (0.03)
3–5	Moorhen marsh (other waters of the United States)	0	0.001 (0.002)
3–5	Flood control channel near Moorhen marsh (water of the United States)	0	0.003 (0.008)
3–5	Flood control channel (wetland)	0	0.01 (0.03)
Total (All Five Project Phases)		**0.009 (0.023)**	**0.41 (1.01)**

2.6.3 Temporary and Construction-Phase Impacts

Temporary impacts to wetlands and other jurisdictional waters of the United States would occur from construction activities such as the removal and disturbance of vegetation, the installation of temporary access lanes, and the installation of temporary falsework supports. The temporary impacts for all five phases are also listed in Table 2.6-1. The duration of construction for Phases 1 and 2 is estimated at

2 or possibly 3 years. Construction of the other phases would be of similar duration but is anticipated to occur years later. Construction activities at any one location, however, would be staged within the limits of each phase. For example, the piers for Phases 1 and 2 should be able to be installed within one season, and subsequent work can continue on the elevated flyover ramps without having to re-enter the creek channels. Therefore, the duration of temporary construction activities can be limited to one seasonal period within the actual wetland areas. Construction at or within Grayson and Walnut Creeks would therefore be specified to avoid the wet season (e.g., mid-October to April) as required by permitting agencies. Installation of piers and work within the creek channels would be planned for the remaining dry months. Once work within the creek channels is completed, the channels would be avoided during the remainder of construction of the project (see Section 2.6.5).

2.6.4 Cumulative Impacts

Other local and regional transportation projects that have wetland impacts include the following.

- New Benicia-Martinez Bridge (along I-680, at the Carquinez Strait): 9.2 ha (22.8 acres)
- I-680 HOV lanes and the BNSF railroad crossing reconstruction (along I-680 between Walnut Creek and Martinez): 0.09 ha (0.22 acre)
- SR-4 East Widening Project (Railroad Avenue to west of Loveridge Road, Pittsburg): No impact to wetlands
- SR-4 East Widening Project (Loveridge Road to SR-160): 0.2 ha (0.47 acre)

Regulatory permits will be required for the proposed fill within jurisdictional wetlands and waters. Projects meeting specific conditions can be permitted by the USACE Nationwide Permit (NWP) program authorized under Section 404 of the Clean Water Act (CWA). The project activities and their impacts appear to qualify for authorization under NWP No. 14 for impacts associated with linear transportation crossings and NWP No. 33 for temporary construction, access, and dewatering impacts. The USACE would determine the Section 404 authorization following submittal of a formal application for the project.

Each of these cumulative projects have mitigation measures applied or incorporated into their design (for example, the Benicia-Martinez Bridge and the I-680 HOV lanes

have mitigated their projects' wetland impacts and have been issued regulatory approvals). The projects are also all subject to regulatory and permitting requirements imposed by the USACE, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and Regional Water Quality Control Board (RWQCB). Therefore, any potential cumulative impact of these projects is expected to be fully mitigated, and no substantial residual impacts would occur.

2.6.5 Mitigation Measures

The measures described below are proposed to avoid or minimize any potential impacts to wetlands and waters of the United States. Wetlands that exist within the potential project construction area are limited to the I-680 and SR-4 crossings over Grayson and Walnut Creeks, and a small area of marsh and flood control channel located at the northernmost segment of Phase 5 work on I-680 (just north of the BNSF railroad). The area north of the railroad may be further avoidable or disturbance could be minimized by temporarily fencing off the wetland boundary during construction, as this work is at the northernmost boundary of the project limits (this would need to be defined/confirmed during final design) Wetland fill impacts would occur where additional piers are installed for the flyover ramps proposed for the different phases. Those impacts cannot be further avoided. Temporary impacts to wetlands would also occur in construction areas. Measures to avoid or minimize these impacts are discussed below.

Construction Impact Avoidance and Minimization

In general, disturbance to existing grades and vegetation shall be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to wetland habitat. Existing ingress or egress points shall be used. Following completion of the work, the contours of the area shall be returned to preconstruction condition or better.

Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing sediment impact to the wetlands and input to waters of the United States. These devices will be placed at all locations where the likelihood of sediment input exists.

A supply of erosion control materials would be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.

All disturbed soils at each site will undergo erosion control treatment before October 31 and after construction is terminated. Treatment includes hydroseeding and sterile straw mulch. Erosion control blankets will be installed on disturbed soils on a gradient of over 30 percent.

Work within the Grayson and Walnut Creek channels will be seasonally restricted. It is expected that necessary regulatory permits will specify that no work within the channels should occur between mid-October and mid-April. Temporary construction access to and within the channels would be necessary for installation of new piers. Installation of the piers should be completed within a single year's seasonal work window (e.g., from June 1 to mid-October). This work period limitation shall be specified in the construction contracts to ensure that the construction access is considered temporary.

Permanent/Long-Term Mitigation

Permanent revegetation and tree replanting will be performed. Native plant species will be considered for revegetation. Section 2.17.5 outlines conceptual revegetation and planting concepts.

Under Federal and State guidance and rules, adverse, unavoidable impacts to wetlands and other aquatic resources require offsetting or compensatory mitigation. Generally, impacts should be offset by the creation or restoration of new in-kind resources, when practicable, in areas adjacent or contiguous to the impacted site. If on-site mitigation is not practicable, off-site mitigation should be undertaken in the same geographic area if practicable. The total impacts to wetlands are very small (0.009 ha or 0.023 acre for all five phases), and the majority of affected resources are in the Grayson and Walnut Creek channels, which are maintained for flood control and contain limited to moderate functions and values. The opportunity for on-site wetland mitigation is poor, as the flood control channels are concrete lined and are intended and maintained to efficiently pass floodwaters.

Compensatory mitigation could be achieved through use of a mitigation conservation bank (an area of wetland mitigation specifically established and maintained to compensate for impacts of one or more projects). Federal resource agency policy

guidance[10] provides, in general, preference for the use of a mitigation bank to compensate for minor aquatic resource impacts in lieu of on-site mitigation, such as where impacts consist of numerous, small impacts associated with a linear project, and are authorized under the USACE nationwide authorization program (see Section 2.6.4).

An established wetland conservation area that can provide wetland mitigation is the Springtown Natural Community Reserve, located in Livermore northwest of I-580 and Vasco Road. The Springtown Natural Community Reserve has a 65 km (40 mile) service area radius, and the I-680/SR-4 interchange project area is located within the service area, approximately 40 km (25 miles) from the reserve. As of 2005, wetland mitigation acreage is available for purchase, and, subject to approval, for use as off-site mitigation. The Springtown Natural Community Reserve is a conservation bank approved by the CDFG to sell mitigation credits for project impacts to seasonal wetlands and California tiger salamander habitat. The operators of the reserve have not sought approval from the USACE to operate as a Federal wetland bank, but the reserve has been used as a site-specific wetland mitigation area for a number of public works and private development projects. The USACE requires permit applicants that wish to use the reserve as a mitigation site to provide a specific wetland mitigation plan with their USACE Section 404 Permit application or a request for authorization under the USACE nationwide permit program. At the time the permits are applied for, an already-developed wetland mitigation area within the existing reserve would be designated for the I-680/SR-4 project.

Another mitigation source, the Muir Heritage Land Trust, is acquiring the 283 ha (700 acre) Fernandez Ranch grant project in the Franklin Ridge area, at the headwaters of Rodeo Creek (about 8 km [5 miles] west of the I-680/SR-4 interchange). The land trust will restore stock ponds, freshwater wetlands, and marshes, and the resources will be managed as a conservation bank. Similar to the process discussed for the Springtown Natural Community Reserve, use of the Muir Heritage Land Trust as mitigation for the I-680/SR-4 project would require approval at the time an application is submitted for the project to the USACE. If a mitigation bank were not available or practicable at the time permits are sought prior to construction of the project phases, the USACE can allow for use of an in-lieu fee

[10] Final policy guidance from the USACE, USEPA, National Resource Conservation Service, USFWS, and NOAA Fisheries regarding the establishment, use, and operation of mitigation banks for impacts to waters of the United States and other aquatic resources, memorandum dated December 28, 1995, and Federal guidance on the use of the TEA-21, Preference for Mitigation Banking to Fulfill Mitigation Requirements, under Section 404 of the Clean Water Act, July 11, 2003.

arrangement where payments are made to fund other restoration projects or programs. Mitigation for wetland impacts must be approved by the USACE and RWQCB following submittal of permit applications.

2.7 Vegetation and Wildlife

The area surrounding the interchange is a mix of rolling hills, urban and suburban residential and commercial development surrounding existing interchanges and highways, and creek channels and canal crossings. Within the nondeveloped areas, upland ruderal vegetation dominates and small areas of freshwater marsh are present. The upland habitat is primarily made up of ruderal, nonnative grassland but also includes ornamental plantings of nonnative shrubs along the margins of the existing highway corridor and at freeway interchanges. Herbs such as wild oats (*Avena fatua*), slender wild oats (*Avena barbata*), yellow star thistle (*Centaurea solstitialis*), and broadleaf filaree (*Erodium botrys*) are predominant. At the lowest elevations in the project area, freshwater marsh borders the low-flow channels of Grayson Creek.

2.7.1 Vegetation

2.7.1.1 Annual Grassland

Nonnative grasses that were introduced during European settlement of the Central Valley dominate the annual grasslands in the project area. Typical species include annual grasses and herbs such as wild oats, slender wild oats, yellow star thistle, and broadleaf filaree. Native annuals such as California poppy (*Eschscholzia californica*) and vetch (*Astragalus* sp.) are interspersed with nonnative species on the southwest side of SR-4.

Annual grasslands in the project study area are located between residential and commercial areas and the highways and surround the I-680/SR-4 interchange. Some of the ruderal vegetation has been mowed for weed control or for flood capacity maintenance in the stream channels. This is disturbed habitat with no or very small shrubs and isolated trees along the tops of the banks. The annual grasslands at the highway interchanges are nonnative species of annual grasses and shrubs. These areas were determined to provide no nesting habitat and only marginal foraging habitat for bird species of concern such as Lawrence's goldfinch (*Carduelis lawrencei*), tricolored blackbird (*Agelaius tricolor*), or grasshopper sparrow (*Ammodramus savannarum*).

2.7.1.2 Grayson Creek

Grayson Creek is maintained as a flood control channel in the project area. Vegetation and accumulated sediment are periodically removed to maintain the capacity of the channel. Vegetation in the channel consists of annual and perennial species including flatsedge (*Cyperus rotundus*), cattails (*Typha latifolia*), annual rabbit's foot (*Polypogon monspeliensis*), saltgrass (*Distichlis spicata*), and prickly lettuce (*Lactuca serriola*). The majority of this vegetation is hydrophytic. Wetlands in the project area are described in more detail in Section 2.6.

Immediately east of Grayson Creek is a drainage ditch that contained shallow water and wetland vegetation. Cattails are the dominant vegetation. Although vegetation potentially characteristic of wetlands was noted, the ditch has been excavated in upland soils, and does not connect to other waters of the U.S. Therefore it is not considered jurisdictional.

The aquatic vegetation in the project study area is present along the stream channels in small intermittent fringes, often in strips less than a meter (3 feet) wide and a meter long. This vegetation provides little habitat and would not provide the cover preferred by waterfowl such as the American bittern (*Botaurus lentiginosus*) or for aquatic species such as the western pond turtle (*Clemmys marmorata*). Aquatic vegetation in the marsh area north of the BNSF railroad at the Pacheco Boulevard off-ramp is mostly outside of the project study area. This marsh is large enough to provide habitat for aquatic species but will not be impacted. Small fish and many crabs were observed in the stream channel in Grayson Creek.

2.7.2 Wildlife

Common bird species such as the western meadowlark (*Sturnella neglecta*), savannah sparrow (*Passerculus sandwichensis*), killdeer (*Charadrius vociferus*), and western kingbird (*Tyrannus verticalis*) use grassland habitat. Other wildlife species such as western fence lizard (*Sceloporus occidentalis*), jackrabbit (*Lepus californicus),* and coyote (*Canis latrans*) are also typically found in grassland habitat. Raptors and small mammals forage in grassland habitat.

Bats are known to use bridge structures for roost sites but prefer vertical crevices sealed at the top, 1.2 to 3.2 centimeters (cm) (0.5 to 1.25 inches) wide, about 30.5 cm (12 inches) deep, and 3 meters (10 feet) or more above the ground. No bats or bat droppings were observed under highway structures, bridges, or in other areas.

There was no evidence of nesting birds under the bridge: no nesting materials or bird droppings were observed. The bridge does not appear to be used for or provide nesting habitat for birds. However, a survey(s) will be performed prior to construction to verify that this condition has not changed. If evidence of use is detected from the preconstruction survey, exclusionary devices would be installed prior to March 1.

2.7.3 Permanent and Temporary Impacts

The project also includes reconstruction of loop ramps at the I-680/SR-4 interchange to allow for the minor expansion of the pavement to accommodate the new lanes and new collector-distributor roads. Landscaped vegetation in the median and along the sides of the right-of-way will be removed. The interchange and its associated connecting highways already exist, and the project would not introduce any new barriers to wildlife movement. These impacts are not considered adverse or substantial. Following completion of construction, areas within the interchange that are not landscaped will be seeded for erosion control.

2.7.4 Cumulative Impacts

Other projects in the regional area, along SR-4 in eastern Contra Costa County and on I-680 at the Benicia-Carquinez Bridge, are relatively distant and do not affect overlapping areas of vegetation or wildlife habitat. Construction of the proposed I-680/SR-4 Interchange Improvement Project phases will overlap a portion of the I-680 HOV Lane Project. Construction of the I-680 HOV Lane Project in 2004–2005 has already removed vegetation and common grassland habitat in the median and along the sides of the right-of-way, as well as the interchange loop ramps. The I-680 HOV Lane Project will reseed and revegetate areas of the interchange to minimize erosion, and landscaping will be provided in areas of the interchange that will not be impacted in the near future by the proposed I-680/SR-4 project phases, as appropriate. The I-680/SR-4 project phases will affect revegetated grassland areas impacted previously by the HOV lane construction, but this overlapping affect would be limited to common grassland habitat that would be restored following completion of the project phases. No adverse, cumulative loss of habitat or wildlife impacts is predicted.

2.7.5 Mitigation Measures

Some trees in the project area may need to be removed to allow for construction. Vegetation along I-680 within the project area has already been removed for

construction of the I-680 HOV Lane Project. At least 15 oak trees (*Quercus lobata* and *Quercus berberidifolia*) greater than 6.5 inches in diameter at breast height (DBH) may have to be removed in the vicinity of the on- and off-ramps at Pacheco Boulevard. These trees are listed in Table 2.7-1.

Table 2.7-1 Potentially Impacted Oak Trees

No.	Common Name	Scientific Name	Circumference in inches at 4.5 feet (DBH)	Diameter in inches at 4.5 feet (DBH)	Comments
1	Valley Oak	*Quercus lobata*	63.5	20	On slope just outside right-of-way
2	Valley Oak	*Quercus lobata*	66	21	On slope just outside right-of-way
3	Valley Oak	*Quercus lobata*	42	13	On slope just outside right-of-way
4	Scrub Oak	*Quercus berberidifolia*	33	10.5	In right-of-way next to westbound SR-4
5	Scrub Oak	*Quercus berberidifolia*	73	23	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
6	Scrub Oak	*Quercus berberidifolia*	33	10.5	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
7	Scrub Oak	*Quercus berberidifolia*	36	11.5	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
8	Scrub Oak	*Quercus berberidifolia*	42	13	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
9	Scrub Oak	*Quercus berberidifolia*	38	12	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
10	Scrub Oak	*Quercus berberidifolia*	48	15	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
11	Scrub Oak	*Quercus berberidifolia*	Greater than 20	Greater than 6.5	Not measured due to nearby homeless camp. In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd., southwest corner
12	Scrub Oak	*Quercus berberidifolia*	Greater than 20	Greater than 6.5	Not measured due to location in busy/dangerous interchange, about 100 yards from No. 10
13	Scrub Oak	*Quercus berberidifolia*	Greater than 20	Greater than 6.5	Not measured due to location in busy/dangerous interchange, about 100 yards from No. 10
14	Scrub Oak	*Quercus berberidifolia*	Greater than 20	Greater than 6.5	Not measured due to location in busy/dangerous interchange, about 100 yards from No. 10
15	Valley Oak	*Quercus lobata*	25	8	In cloverleaf-like interchange between eastbound SR-4 and Pacheco Blvd, southwest corner

Source: URS survey, January 30, 2003.

Loss of nesting habitat trees of any special-status species discovered during preconstruction surveys shall be mitigated by preserving those trees or ones similar on the site that can produce substitute nesting habitat. Removal of potential nest trees will occur between September and January to avoid the nesting season. If it is infeasible to preserve the required habitat, then replacement trees shall be installed as part of the project landscaping. Tree replacement should occur at a minimum of a 3:1 ratio or greater to compensate for possible tree mortality. Trees that replace lost nesting habitat should be the same species as those removed and installed in a minimum of 57-liter (15-gallon) containers.

Impacts to wildlife and vegetation are not considered substantial, and no specific mitigation is proposed. However, in October of each construction year and at project completion, slopes and graded areas would be reseeded for erosion control. Conceptual landscaping for the project is discussed in Section 2.17.

2.8 Threatened and Endangered Species

This section evaluates special-status species that occur or are likely to occur within the project study area. Plants or animals may be considered to have "special status" due to declining populations, vulnerability to habitat change, or restricted distributions. For the purpose of this document, special-status species include plant and animal species that have varying degrees of legal protection (as "threatened" or "endangered") under the California and Federal Endangered Species Acts (ESAs) and CEQA. Management and protection of natural resources is a shared responsibility of the USFWS, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), and the CDFG. These agencies are required under separate Federal and State legislation to conduct a detailed review of projects that may affect special-status plant or animal species. Plants and animals identified as Federal species of concern do not yet have legal protection, nor have they been listed or proposed for listing as a candidate species. Species of concern is an informal term that is used for species that have suffered extensive habitat loss and declining population trends.

Study methods for special-status species consisted of a review of current databases, inventories, agency lists, documentation of existing habitats, and focused surveys.

2.8.1 Affected Environment

The study area is a largely built environment, with habitat that has been disturbed as described in Sections 2.6 and 2.7. Surveys were conducted for species with the potential to occur in the study area, and the results are described below.

2.8.1.1 Methods

A combined natural environment study was conducted for the study area for Phases 1 through 5 of the I-680/SR-4 Interchange Improvement Project (URS 2003). Database records for recorded occurrences of species were searched within a 16-km (10-mile) radius of the project study area. Field surveys were performed in April, May, and September 2002 for the existing and proposed right-of-way for the project and

possible construction staging areas. This was the study area for evaluation of biological impacts.

2.8.1.2 Plant Species

Focused botanical surveys were conducted according to the USFWS, CDFG, and California Native Plant Society guidelines to determine presence or absence of the special-status plants. Of the 44 special-status plant species that potentially occur within a 16-km (10-mile) radius of the greater study area (covering Phases 1 through 5), only two had the potential to occur in the habitat types present in the project vicinity: Contra Costa goldfields (*Lasthenia conjugens*) and alkali milk-vetch (*Astragalus tener* var. *tener*).

Contra Costa Goldfields

Contra Costa goldfields is an annual herb in the sunflower family (Asteraceae) that blooms from March to June and is endemic (limited) to California. It is ranked by the California Native Plant Society as extremely rare (CNPS 2001) and listed as endangered under the Federal ESA (listed June 18, 1997; 62 FR 33029). It usually occurs in wetlands, often vernal pools, but is occasionally found in mesic grasslands (CDFG 2002a). Surveys conducted in April and May 2002 did not document sightings of any Contra Costa goldfields in the study area. The last known occurrence of the species near the project area was recorded in 1946 (CDFG 2003).

Alkali Milk-Vetch

Alkali milk-vetch is an annual herb in the pea family (Fabaceae) that blooms from June through October and is endemic (limited) to California. It is a USFWS species of concern and ranked by California Native Plant Society as extremely rare. Alkali milk-vetch usually occurs in wetlands but is occasionally found in mesic sites on fine-textured, alkali soils, on alkaline substrate under vernally flooded conditions, in playa, and in vernal-pool habitats (CDFG 2002a). Alkali milk-vetch has not been recorded in Contra Costa County but was identified in Solano County at a site with similar soils. Therefore, the 2002 surveys conducted for this project sought to identify whether alkali milk-vetch was present in the project area. No alkali milk-vetch was found.

2.8.1.3 Fish and Wildlife Species

The natural environment study (URS 2003) conducted for the proposed project documented animal and bird species (or evidence thereof) in the study area. The study area was also examined for sightings or evidence of bats under highway

structures, bridges, and other areas. Bats are known to use bridge structures for roost sites but prefer vertical crevices that are sealed at the top and 3 meters (10 feet) or more above the ground. No special-status mammals or birds were observed in the study area, but the following species are known to occur in the project vicinity.

California Red-Legged Frog

The California red-legged frog (*Rana aurora draytonii*) (CRLF) was listed in May 1996 as threatened under the Federal ESA (61 FR 25813). The CRLF has been designated as a CDFG species of special concern and a protected species under the California Fish and Game Code. These Federal and State designations provide specific protection for the frog and its habitat.

The proposed project location is in the current known range of the CRLF. No occurrences of CRLF have been documented within a 1.6-km (1-mile) radius of the proposed project location. Furthermore, during a September 2002 field survey, no CRLF were observed and no suitable habitat was found in any of the proposed phases of the project study area. The California Natural Diversity Data Base contains five documented occurrences of CRLF within an 8-km (5-mile) radius of the project, primarily in undeveloped areas such as Briones Regional Park (CDFG 2002a).

The project study area may have once contained suitable habitat for CRLF in Grayson and Walnut Creeks. However, channelization for flood control, the lack of a riparian canopy, and limited pockets of emergent vegetation in the channelized creeks has compromised the quality of these habitats. The lack of shade creates habitat for nonnative, warm-water fish, and the lack of cover would subject the CRLF to predation from the fish and crustaceans. These habitat modifications are not compatible with the requirements of the CRLF. The habitat modifications, lack of adequate, continuous riparian cover, and lack of suitable habitat within 1.6 km (1 mile) of the project study area make it unlikely that CRLF would use these streams as movement corridors to and from foraging and breeding areas.

Informal consultation with the USFWS concurred with the conclusion that the project is unlikely to result in the take of the CRLF. USFWS correspondence is included in Chapter 3.

Central Valley ESU Steelhead and Central Valley Chinook

California Central Valley Evolutionary Significant Unit (ESU) steelhead (*Oncorhynchus mykiss*) was listed as threatened on March 19, 1998 (63 FR 13347).

This ESU occupies the Sacramento and San Joaquin Rivers and their tributaries, excluding San Francisco and San Pablo bays.

Steelhead are native to the northern Pacific Ocean and in North America are found in coastal streams from Alaska to San Diego County, California (Moyle 1976; Busby et al. 1996). Because steelhead are present year-round, sufficient water flow and cool temperatures are also necessary year-round.

The Central Valley and its tributaries of the Sacramento River support several distinct runs of the chinook salmon (*O. tshawytscha*). The fall/late fall run of the chinook is the most likely to potentially use the area's tributaries. The Central Valley fall/late fall run ESU was designated by NOAA Fisheries as a candidate for listing on September 16, 1999.

Central Valley ESU steelhead and chinook salmon have been seen in Walnut Creek and are considered by NOAA Fisheries to be present. During the walking surveys to evaluate habitat and biological resources on April 18, May 11, and September 9, 2002, no steelhead or salmon were observed in Walnut or Grayson creeks. Steelhead were observed in Walnut Creek, above the project study area, in March 2001 by NOAA Fisheries personnel (Campbell 2002). According to NOAA Fisheries, the steelhead and chinook salmon could use Walnut Creek as a migration corridor to potential spawning grounds in headwaters.

2.8.2 Permanent and Construction Impacts

No threatened or endangered plant and animal species for which surveys were conducted in 2002 were found in the project study area. Therefore, no permanent or construction impacts to Contra Costa goldfields, alkali milk-vetch, or the California red-legged frog are expected to result from this project.

The proposed project has the potential to impact Central Valley ESU steelhead by impeding or blocking passage in Walnut Creek. The project could also impact steelhead downstream of the project study area by putting sediment, debris, or pollutants into waters. Sediment can directly affect steelhead by abrading skin and clogging gills or impact the aquatic invertebrates that juvenile steelhead feed on. Other adverse impacts include the potential for adverse changes in water flow. The avoidance measures discussed below would be implemented for the proposed project to ensure that no adverse impacts occur.

2.8.3 Cumulative Impacts

No sensitive species issues or impacts were identified for the various SR-4 projects that could not be avoided. Along the I-680 corridor, the completed or under-construction projects (I-680 HOV lanes and Benicia-Martinez Bridge) all have avoidance and minimization measures and mitigation plans incorporated into or required of the project design.

The study area for Phases 3 through 5 was surveyed in conjunction with the biological studies completed for Phases 1 and 2. Steelhead and salmon are the only special-status species with the potential to be impacted by Phases 3 through 5. Avoidance and mitigation measures outlined for Phases 1 and 2 would apply to the future interchange phases. With the proposed mitigation and avoidance measures, no adverse cumulative impacts to special-status species would occur.

2.8.4 Mitigation Measures

Measures were developed specifically to avoid or minimize any potential impacts to Central Valley ESU steelhead and chinook salmon. These measures, summarized below, were submitted to NOAA Fisheries for review in October 2004. NOAA Fisheries commented and requested minor additions. The correspondence regarding that consultation is provided in Appendix H.

- All work would be conducted during the dry season (June 1 through October 31).
- Work would only occur in a dry channel. If it is necessary to conduct work in a live stream, the work space shall be isolated to avoid construction activities in flowing water. The proposed project shall not dewater the entire stream and shall allow fish passage past the project area. Adequate water depth and channel width must be maintained at all times for fish passage. Prior to construction activities the workspace will be isolated from flowing water to prevent sedimentation and turbidity and avoid effects to fish. The diversion shall remain in place during the project, then be removed immediately after work is complete, in a manner that will allow flow to resume with the least disturbance to the substrate.
- If a project requires dewatering any area, either a pump shall remove water to an upland disposal site, or a filtering system shall be used to collect the water and return clear water to the creek. The pump intake shall be fitted with a fish exclusion device that meets NOAA Fisheries fish screening criteria (refer to

http://www.nwr.noaa.gov/1salmon/salmesa/pubs/swrscrng.pdf or an equivalent source).

- All materials placed in stream, such as pilings and retaining walls, shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.
- All construction materials and fill will be stored and contained in a designated area that is located away from channel areas to prevent inadvertent transport of materials into the adjacent stream channel.
- Disturbance to existing grades and vegetation will be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to streambank or stream channel habitat as much as possible. When possible, existing ingress or egress points shall be used and/or work performed from the top of the creek banks. Following completion of the work, the contours of the creek bed and creek flows shall be returned to preconstruction condition or better with an emphasis on creating easy fish passage through the area. Obvious barriers to fish passage should be removed to facilitate upstream movement.
- Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, "Aqua Dam"[11], or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water, and of detaining sediment laden water on-site. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials would be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.
- All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be disposed of at an approved disposal site. All petroleum products chemicals, silt, fine soils, and any substance or material deleterious to listed species shall not be allowed to pass into, or be placed where it can pass into the stream channel. There will be no sidecasting of material into any waterway.

[11] Or equivalent device. Information available at www.aquadam.com.

- Any soils within the active channel that are disturbed, moved, or uncovered shall be tested for chemical contaminants. If such soils are found to be contaminated at levels that are deleterious to aquatic life, including salmonids, those soils shall be removed from the area and disposed of in an appropriate upland or off-site facility.
- Fueling, cleaning or maintenance of equipment would be prohibited except in designated areas located as far from the creek as possible. In addition, the contractor would maintain adequate materials onsite for containment and cleanup of any spills.
- After construction and prior to October 31, all disturbed soils at each site would undergo erosion control treatment consisting of temporary seeding, straw mulch, or other measures pursuant to a Storm Water Pollution Prevention Plan (SWPPP) approved by the Regional Water Quality Control Board. Any disturbed soils on a gradient of over 30 percent would also have an erosion control blanket installed. Permanent revegetation or tree replanting should then take place in small openings in the erosion control blanket, with suitable species that are compatible with native vegetation.
- During dewatering activities a fisheries biologist shall be present to salvage chinook and steelhead individuals, should they be present. Fish will be netted, placed in a bucket of water and immediately moved to a downstream portion of the creek. Records of species, relative size, and number individuals shall be kept. Periodic checks of the work area shall occur to ensure that salmonids have not re-entered the work area.

2.9 Geology

2.9.1 Affected Environment

2.9.1.1 Regional Setting

The project area is located within the San Francisco Bay region, at the northern end of the Diablo Range of the northern Coast Ranges geomorphic province. The Coast Ranges are a north/northwest-to-northwest-trending series of mountains and intervening valleys extending for 960 km (600 miles) from the Oregon border, south to the Santa Ynez River near Santa Barbara. Drainage within the Coast Ranges predominantly follows the northwest-to-southeast geologic structural formation. In the project vicinity, however, the subsurface geologic structure rotates to a more east-west orientation, which is consistent with the west-flowing Sacramento River.

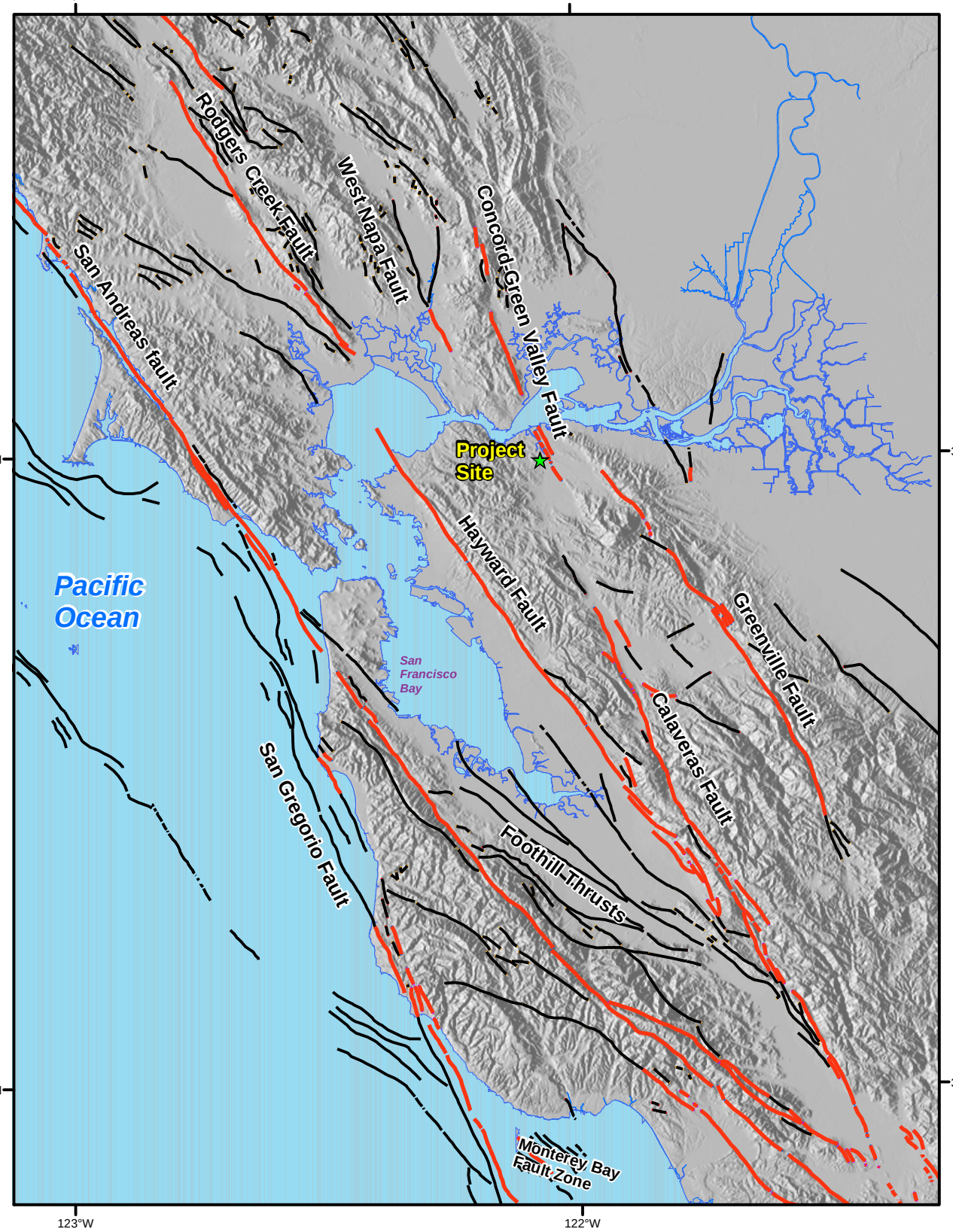
The Bay region is located on the boundary between the North American and Pacific tectonic plates. The Pacific plate is moving northwest relative to North America across a plate boundary oriented in a north-northwest direction that is approximately 100 km wide (60 miles). This zone encompasses all of the major active faults in Northern California (Figure 2.9-1). The average relative motion across this plate boundary amounts to 35 to 38 millimeters (1.4 to 1.5 inches) per year, with the majority of this motion occurring during large earthquakes (Working Group on California Earthquake Probabilities 1999). Geologically, this region is one of the most active in the world, highlighted by the number of large, damaging earthquakes that have occurred during historical time. Major earthquakes have occurred along the margins of the Bay on the San Andreas and Hayward faults in 1836, 1838, 1868, and 1906 (Bakun 1999). Some slip also occurs as a seismic fault creep (i.e., fault movement that does not generate earthquakes) on the Hayward, Concord, and Calaveras faults (Galehouse 1992).

2.9.1.2 Site Geology

The project site is located on the southern side of the Sacramento River, on the western side of Ygnacio Valley. South and east of the intersection, the project is located on a flat, low-lying alluvial plain situated between 4 and 12 meters (13 to 39 feet) above mean sea level. To the north and west is the undulating topography of the East Bay Hills.

The project site is underlain by a sequence of marine and estuarine sediments of Tertiary and Cretaceous age (Graymer et al. 1994). These rocks dip moderately to the west and include sandstones, siltstones, and shales. At the eastern extent of the area these rocks include sandstones, siltstones, shales, and conglomerates belonging to the Cretaceous-age Great Valley Group. To the west, these rocks are overlain by Paleocene-age Vine Hill sandstone, which in turn is overlain by Upper Paleocene to Lower Eocene age Las Juntas shale, and then the interbedded sandstones and shales of the Muir, Escobar, Sobrante, and Briones Sandstones. These sedimentary rocks are all generally soft and weathered, producing rounded outcrops and gentle rolling topography. Occasional harder sand and conglomeratic beds form prominent outcrop ridges. The shales and sands are prone to extensive slaking under moist conditions, which can lead to extensive erosion.

The project site is situated in an area of unconsolidated Holocene alluvium and estuarine Bay Mud, ranging from fine-grained carbonaceous silt and clay to medium-grained fine sand, silt, and clay with a few thin beds of coarser sand (Helley and



Legend

- Holocene (Active) faults
- Pre-Holocene faults

0 25 50 Miles

0 25 50 Kilometers

N

URS	Project No. 26812934 I-680/SR-4 Interchange Improvement Project	MAJOR ACTIVE FAULTS IN THE PROJECT AREA	Figure 2.9-1

URS Corporation L:\Projects\State_Route_4_Interstate_680_interchange\Mxd\BayArea faults.mxd Name: dhwrigh0

Graymer 1997). This is underlain by weakly consolidated Late Pleistocene alluvium consisting of slightly weathered, interbedded clay, silt, sand, and gravel. This alluvium has been deposited over Pleistocene Old Bay Mud, a sequence of water-saturated estuarine carbonaceous clay and silty clay. Logs of test borings indicate that these unconsolidated deposits are at least 18 meters (60 feet) thick beneath the interchange.

The interchange is located on soils of the Altamont-Diablo-Fontana association, well-drained clays and silty clay loams that formed in materials eroded from soft, fine-grained sandstone and shale on slopes of 9 to 75 percent on the foothills north and east of Mount Diablo. These soils are moderately alkaline and have low permeability. The interchange includes an area of Altamont clay. Runoff is slow to medium when this soil is disturbed, and the hazard from erosion is considered slight to moderate (Welch 1977). The soil has a high shrink-swell potential, has a medium to low shear strength, and is susceptible to piping. It also exhibits medium compressibility and therefore has fair-to-good compaction characteristics.

Several of the other soils that underlie the project area, including Clear Lake clay, Omni clay loam, and Millshom clay, are classified as having high shrink-swell potential. The Sycamore silty clay, Positas loam, and Lodo clay loam have a moderate shrink-swell potential (Welch 1977).

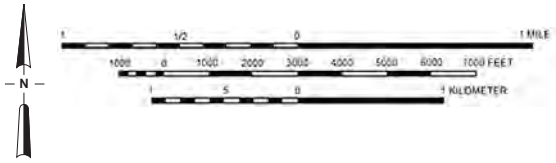
2.9.1.3 Geologic Hazards

This section summarizes the potential geologic hazards in the project area.

Surface Fault Rupture

Surface fault rupture is a slip on a fault plane that has propagated upward to, and offset or disturbed, the earth's surface. The Concord fault is the closest active fault to the project (Figure 2.9-2). The fault crosses SR-4 where it intersects Walnut Creek, immediately north of Buchanan Field Airport. Although the Concord fault has not experienced surface rupture in historic time, geologic evidence suggests that the fault can rupture during large earthquakes, causing lateral displacements of about a meter (3 feet) or more at the surface. Displacements for previous events on the fault have not been quantified, but rupture of the fault alone is expected to produce a moment magnitude (**M**) 6.5 earthquake. Rupture of the Green Valley fault to the north is expected to produce a **M** 6.9 earthquake (Working Group on Northern California Earthquake Potential 1996). Using empirical relations of Wells and Coppersmith (1994), these magnitudes yield expected displacements of 0.9 to 1.6 meters (3 to 5 feet).

Source: California Geological Survey



LEGEND

Project Limits

URS	Project No. 26812934 I-680/SR-4 Interchange Improvement Project	ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE	Figure 2.9-2

26812934.32101/080103/gos

Earthquake Shaking

Strong earthquake ground shaking is likely the most important seismic hazard that can be expected anywhere in the Bay Area. A deterministic seismic hazard map indicates that this area may experience ground motions of 0.6 g (acceleration equivalent to 60 percent of the force of gravity) or higher (Mualchin 1996).

Flooding and Shallow Groundwater

The project site is located in the northern part of the Ygnacio Valley, a fluvial basin that drains north into the Carquinez Strait. The project crosses the main drainage, Walnut Creek, and one of the main tributaries, Grayson Creek. The confluence of these two streams is located approximately 0.75 km (0.5 mile) north of the project. Smaller tributaries to Grayson Creek flow from the hills to the west and merge with Grayson Creek about 1.5 km (1 mile) south of the I-680/SR-4 interchange. The southern and eastern parts of the project (where I-680 and SR-4 cross Grayson and Walnut Creeks) are located in the Federal Emergency Management Agency (FEMA) 100-year flood zones.

Liquefaction and Lateral Spreading

Liquefaction is the phenomenon during which loose, saturated, cohesionless soils temporarily lose shear strength during strong ground shaking. Lateral spreading occurs when soil liquefies and flows out of a cut face. A map of liquefaction susceptibility in the seven-county Bay Area was used to assess risk for the project site (Knudsen et al. 2000). The majority of flat locations around the Bay are in areas of soft, potentially liquefiable soils. The liquefaction potential beneath the majority of the project site is classified as high, particularly the southern and eastern portions of the project where Holocene alluvial fan deposits beneath the project site have shallow groundwater and are expected to liquefy at ground accelerations of 0.3 to 0.5 g (Knudsen et al. 2000). The western and northern portions of the project are located on bedrock and therefore have a very low liquefaction potential.

Subsidence

Land surface subsidence can result from both natural and human-made phenomena, including tectonic deformations, seismically induced liquefaction, soil consolidation, and dewatering (e.g., lowered groundwater table). Sections of I-680 immediately north of the project area in the Pacheco Slough vicinity have had major differential settlement problems resulting in subsidence of the road surface. However, no site-specific information or observations of subsidence within the project limits exist.

Expansive Soils

The expansion and shrinking action of some soils can result in differential ground movements. The road surface on the eastbound lanes of SR-4 east of Pacheco Boulevard experienced heave in 1985. This heave was the result of swelling as pyrite in underlying shales was oxidized to gypsum, with a consequent eightfold increase in volume. This situation arose when the original excavation exposed pyrite-bearing clayey shale. Excavation exposing further pyrite-bearing shale could lead to further swelling and heaving.

Landslides

No mapped landslides exist within the project area. Much of the project area, from the I-680/SR-4 interchange south and east, is in an area of relatively flat topography, therefore the hazard from slope movement is negligible. The areas of the project that cut through the undulating topography to the north and west of the interchange may be subject to minor stone fall or slumping as the exposed sandstone and shale is weakened by weathering.

Several small soil slides were reported at the SR-4/SR-242 interchange in 1978. According to Caltrans Geotechnical/Materials files, these were the result of inadequate compaction in fill material.

Tsunami and Seiche

A tsunami (Japanese word meaning “harbor wave”) is a water wave or a series of waves generated by an earthquake-induced displacement of the surface of the ocean or other body of water. Tsunami inundation would not be a hazard at the project site.

A seiche is a periodic oscillation or sloshing of water in a water body or basin such as the San Francisco Bay. No large reservoirs are adjacent to the project site; therefore, no hazard from seiche inundation is predicted.

2.9.2 Permanent Impacts

The potential impacts to the geologic environment from the proposed project are presented below.

2.9.2.1 Fault Rupture

The project could potentially be exposed to surface faulting. The Concord fault crosses SR-4 near the eastern margin of the project (Figure 2.9-2). A large earthquake on the Concord fault could result in surface rupture involving a 0.9 to 1.6

meters (3 to 5 feet) or more lateral displacement at the ground surface, possibly disrupting the roadway along SR-4, east of the interchange with I-680.

2.9.2.2 Earthquake Shaking

The Bay Area is seismically active, and all sites in the region have a reasonably high potential of experiencing strong earthquake shaking in the future (Working Group on California Earthquake Probabilities 1999). Elements of the project such as the flyover connectors or any elevated ramps could be exposed to strong ground shaking. A potential exists for substantial damage to engineered structures and risk of injury or loss of life at incorrectly designed or constructed facilities.

2.9.2.3 Liquefaction and Lateral Spreading

The potential for liquefaction at the project site is considered high because the project is in an area of potentially liquefiable soils. A potential exists for damage of structures.

2.9.2.4 Subsidence

Although subsidence is ongoing in areas of the San Francisco Bay, it does not appear to pose a substantial hazard during the lifetime of the project.

2.9.2.5 Expansive Soils

Expansive soil behavior is associated with wetting and drying of soils containing mixed-layer clays and can lead to structural damage. The high groundwater table in the project area indicates that soils in this vicinity are permanently saturated, therefore there is a very low risk of expansive soil behavior.

2.9.2.6 Landsliding

The majority of the project is on flat topography, although several steep road cuts along I-680 and SR-4, west and north of the interchange, may be subject to rock fall and slumping. Slumping has the potential to cause a range of impacts from minor structural damage (impacts from rock fall) to moderate damage to road surfaces and embankments.

2.9.3 Temporary and Construction-Phase Impacts

Excavation and exposure of pyrite-bearing shales located in the western part of the project area may lead to swelling and heaving as pyrite is oxidized to gypsum during construction. In addition, exposure of native and engineered soils during construction

activities makes them particularly prone to erosion due to rainfall run off, even on gentle and moderate slopes.

2.9.4 Cumulative Impacts

No cumulative geohazard impacts were identified.

2.9.5 Mitigation Measures

The following measures are recommended for the design and construction of the proposed project. The measures would apply to any of the future phases that may be undertaken in conjunction with this project. These recommendations are based on the preliminary studies conducted to identify geologic conditions and impacts of the project.

Fault Rupture and Subsidence

- Any proposed engineering design would have to be carried out in accordance with Caltrans Seismic Design Criteria and the regulations detailed in the Alquist-Priolo Earthquake Fault Zoning Act. This will involve detailed, site-specific subsurface geologic investigations to accurately locate the active trace(s) of the fault.
- Potential surface deformation resulting from aseismic creep can be mitigated by a regular maintenance program to repair the road surface, curbs, and other engineered facilities. Annual inspection should be carried out to assess ongoing creep damage.

Earthquake Shaking

- Roadways and bridges will have to be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for seismic zone 4.
- To satisfy the provisions of the 1998 California Building Code, the proposed phase facilities will have to be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedance in 50 years). Bridges will have to be designed in accordance with the latest Caltrans Seismic Design Criteria.

Liquefaction and Lateral Spreading

- Site-specific exploratory borings and accompanying laboratory testing during or prior to final design of the project will be required to delineate any potentially liquefiable materials. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction potential or the engineering design will have to incorporate pile foundations that extend beyond potentially liquefiable deposits.

Expansive Soil

- Site-specific borings and testing should include investigation for subsurface materials that might contribute to heaving. To prevent heaving, pyritic shales should be overexcavated and replaced with fill that will isolate the remaining rock from either air or water.

Landsliding

- Site-specific geologic and geotechnical investigations and laboratory testing, as needed during the final design/PS&E phase, will determine the stability of slopes and their parent material. Using these data, appropriate slope-strengthening and stabilizing designs can be developed and this impact avoided or minimized.

Erosion

- Soil and slope stability measures can prevent or reduce erosion. Erosion of soils during construction can be minimized using temporary hydroseeding to provide a vegetation cover or straw bales, visquine plastic slope cover, and temporary drainage measures to prevent excessive slope runoff. These measures are addressed in more detail in the *Water Quality Report, Interstate 680/State Route 4 Interchange Improvements, Contra Costa County, CA* (URS 2002).

2.10 Floodplains

A floodplain evaluation was performed to determine if the proposed project would encroach on a base 100-year floodplain. In addition, a location hydraulic study was performed that focused on the evaluation of the 100-year flood profile for Grayson and Walnut Creeks where they are crossed by the proposed project phases. A model was used to analyze the effects of all five phases of the proposed project. The purpose of the study was to evaluate the impacts of the project's development within the local floodplain.

2.10.1 Affected Environment

The whole project would be located within the five types of flood zone areas as designated by FEMA's Flood Insurance Rate Map. This is the official map used by FEMA to outline the areas of special flood hazard applicable to a community. The majority of the project, that portion along SR-4 east and west of the I-680 interchange, would be located within a FEMA-designated "Zone C;" Zones X, B, and C are designated areas defined by FEMA as having minimal to moderate flood hazard (for example, residential homeowners are not required by insurance companies to obtain flood hazard policies within these zones). The project would also be constructed in a portion of a "Zone A4" area, which can be inundated by 100-year floods, 0.3 to 0.9 meters (1 to 3 feet), and has base flood elevations and flood factors determined. The flyover ramps for Phases 1 and 2, and the segments of Phases 3 through 5 where the connector ramps and SR-4 median widening cross over the Grayson Creek channel area will be located in a Zone A4 area. North of SR-4, just north and south of the Grayson Creek channel, portions of Phases 3 through 5 would cross over a Zone A area, which is within the 100-year floodplain but has no base flood elevations determined by FEMA. A small portion of the alignment south of SR-4 on I-680 crosses over a "Zone B" area, which is an area between limits of 100-year flood and 500-year flood. Thus, the 100-year flows are not contained within the Grayson Creek channel for the study reach. Floodplain information indicates that under existing conditions, the 100-year flood event would overtop the banks of Grayson Creek and inundate portions of I-680 south of the interchange and SR-4 east of the interchange. This condition already exists and will continue regardless of any changes associated with construction of any of the five phases of the proposed interchange improvements.

Based on FEMA's Flood Insurance Study and maps, the predicted flood overflow of a Base Flood would inundate the mobile home park southeast of the I-680/SR-4 interchange, in addition to the Central Contra Costa Sanitary District Treatment Plant. Again, this could occur without any of the proposed interchange phased improvements. The flooded area would extend from Mobile Drive to the south to Marsh Drive to the east to SR-4 at the northern end.

The existing Grayson Creek channel upstream of Pacheco Boulevard only has the capacity for a 25-year storm. The City of Pleasant Hill is currently the lead agency working with the Contra Costa County Flood Control and Water Conservation District, USACE, and City of Walnut Creek on providing additional runoff storage capacity while leaving Grayson and Walnut Creeks in a natural state. This may

involve construction of a detention basin that would prevent the Grayson Creek 100-year floodplain from affecting the City of Pleasant Hill. This project is estimated for completion in 2012, if or when funding is provided. The project would alleviate the flooding concerns in the vicinity of the I-680/SR-4 interchange. However, because it is only planned and not funded, it is not considered to offset any changes in flooding that might occur with the proposed five phases of improvements for the I-680/SR-4 interchange.

Grayson Creek was modified as part of the Walnut Creek Project, a USACE program to address the increased runoff caused by the high rate of development in Contra Costa County during the 1950s and 1960s. This project included channel shaping, concrete channel lining, improved bridge designs, new culverts and culvert entrances, and levee improvement and construction. Grayson Creek was also modified with construction of 100-year levees along portions of its reach.

Contra Costa County has adopted flood prevention ordinances that provide for development within FEMA-designated flood zones (Contra Costa County 1996). These ordinances are implemented to reduce the risks of flooding and ensure compliance with Federal regulations governing the National Flood Insurance Program. The county has also established planning objectives regarding potential development within flood zones. Any development within the county's jurisdiction would have to comply with these requirements and goals.

Additional requirements governing floodplain development exist at the Federal level. Executive Order 11988, issued on May 24, 1977, describes requirements for evaluation of proposed projects that may encroach upon floodplains. To implement Executive Order 11988, the FHWA issued the *Federal-Aid Highway Program Manual* (FHPM) 6-7-3-2, "Location and Hydraulic Design of Encroachment on Floodplains" on November 15, 1979 (FHWA 1979). Procedures and guidelines provided in Caltrans' *Local Program Manual – Manual III* (1983), which interpret Executive Order 11988 and FHPM 6-7-3-2, were followed to prepare separate analysis of the floodplain in the project area. The Floodplain Risk Assessment and Location Hydraulic Study Report for the I-680/SR-4 project were prepared in April 2004 to comply with Executive Order 11988 and FHPM 6-7-3-2.

2.10.2 Permanent Impacts

Based on the floodplain and location hydraulic studies performed for this project, the proposed highway improvements will not have a substantial impact on Grayson and Walnut Creeks floodplain encroachments.

2.10.2.1 Longitudinal Encroachment

As defined by FHWA, a longitudinal encroachment is an action within the limits of the base floodplain that is longitudinal to the normal direction of the floodplain. This highway improvement is not considered longitudinal to the 100-year floodplain or the high-tide waters of the identified floodplain. Therefore, this project would not be considered a longitudinal encroachment.

2.10.2.2 Incompatible Floodplain Development

Incompatible floodplain development is defined as development that is not consistent with a community floodplain development plan. This project would not support any incompatible floodplain development. The project is limited to highway improvements outside the main channel of Grayson Creek.

2.10.2.3 Significant Floodplain Encroachment and Project-Created Flooding Risks

A significant[12] encroachment is defined in the FHPM (FHWA 1979) as a highway encroachment that would cause one or more of the following impacts during construction or flooding: (1) interruption of emergency vehicles or evacuation routes, (2) creation of a significant risk, and (3) creation of a significant adverse impact on natural and beneficial values. The risk would be an increase in the elevation of the base flood levels.

A floodplain evaluation was performed to determine if the proposed project would encroach on a base 100-year floodplain. In addition, a location hydraulic study was performed that focused on the evaluation of the 100-year flood profile for Grayson Creek. As described in Section 2.10.1, the existing interchange is located within the 100-year base floodplain. The location hydraulic study examined flooding and potential project impacts in the immediate vicinity of the project and upstream areas. Effects to the existing base flood conditions from the five project phases would be as follows:

[12] The reference to “significant” is applied here consistent with the FHPM definition for floodplain encroachment and is not used with regard to NEPA.

- Phases 1 and 2: These phases will add new piers within the Grayson and Walnut Creek channels. The predicted maximum change in floodwater elevation is minimal, about 2 cm (approximately 1 inch) at the maximum point of change upstream of Pacheco Boulevard.
- Phase 3: The SR-4 median will be used for expansion of the traffic lanes. No additional water surface elevation changes as a result of Phase 3 are predicted.
- Phase 4: The I-680 southbound to SR-4 eastbound ramp would be constructed above the base floodwater surface elevation. This new bridge does not impact the base flood elevation.
- Phase 5: A new westbound SR-4 to northbound I-680 connector will be built with required auxiliary lanes and SR-4 bridge widening. With all five phases complete, the base floodwater surface elevation is predicted to increase by 0.08 meter (3.5 inches) at the SR-4 and southeast ramp bridges, 0.07 meter (2.7 inches) at the northwest ramp and I-680 bridges, and 0.06 meter (2.4 inches) at the Pacheco Boulevard bridge.

The location hydraulic study concluded that flood risk already exists in this area and that changes due to the interchange project would be negligible (a total of about 2 cm [1 inch] near Pacheco Boulevard) following completion of the first four phases of the interchange improvements. The maximum (cumulative) change at completion of Phase 5 results in a predicted 0.09 meter (3.5 inch) increase in the flood level upstream of the bridges. Thus, some areas surrounding the interchange are already subject to flooding, and the north and south Grayson Creek levees are subject to overtopping as a result of existing conditions. The north levee of Grayson Creek was already increased in height during construction of the I-680 HOV Lane Project to accommodate the changes in the flood surface elevation from both the HOV lane project and all the phases of the proposed interchange improvements. Therefore, no additional change or risk would occur on the north side of Grayson Creek as a result of the proposed project. Water elevations south of the creek during a flood event could increase by a maximum of 2 cm (1 inch) at the point of greatest change, near Pacheco Boulevard, with the first four phases in place, and by up to 0.09 meter (3.5 inches) when Phase 5 is completed. The Contra Costa County Flood Control and Water Conservation District was consulted about these changes and concurred that a minor amount of fill could be placed and compacted on the top of the existing maintenance road just upstream of the interchange as necessary to increase existing levee height to offset the changes. This action would be coordinated between CCTA

and the Contra Costa Flood Control and Water Conservation District. This fill would be added to an existing disturbed and already maintained access roadway, on a levee that has been determined in the studies for this project to not meet any local or Federal historic criteria and to not support any sensitive biological resources. The placement of fill would not have an adverse environmental impact.

In addition, as part of the hydraulic studies for this project, the existing levee elevations were also reviewed upstream of the I-680 Grayson Creek bridges and were compared with the 100-year flood elevations. The Grayson Creek channel upstream of the project area also does not have the capacity to convey the 100-year flood, and existing levees will overtop during such an event with or without the proposed interchange improvements. The spilled flows would flank around the existing levees, and consequently the 100-year flood levels would not reach the I-680 Grayson Creek bridges and decking. Because of this condition, the project's changes to floodwater elevations would not impact the ability of the existing bridge structure's capacity to pass floodwaters, and the hydraulic study determined that the proposed new bridge structures need to be designed only to maintain current flow capacity.

The project phases would not cause a significant change in floodplain encroachment, introduce new project-created flooding risks, or result in new flood conditions that might impair emergency routes or service.

2.10.2.4 Natural and Beneficial Floodplain Values

No significant impacts to the natural and beneficial floodplain values have been identified. Natural and beneficial floodplain values within the project area would include the presence of vegetation and natural habitat (including wetlands areas) and fish passage. The project will have minimal impact on the Grayson and Walnut Creek habitats and fish passage, as discussed in the natural environment sections of this report. All environmental impacts would be a result of construction activities and would be mitigated with standard measures such as revegetation and best management practices (BMPs).

2.10.2.5 Encroachment of a Regulatory Floodway[13]

The project would not substantially change flood heights where base flood elevations have been established, based on the preliminary definition of the project and the

[13] A regulatory floodway is a floodplain area designated and reserved by a Federal, State, or local authority to allow or maintain unobstructed flood flows within 0.3 meter (1 foot) of the designated flood elevations.

anticipated structure types. The base flood elevation would not be substantially changed within Grayson Creek, as described in Section 2.10.1.

2.10.3 Construction and Other Temporary Impacts

No substantial impacts to floodplains are expected during construction.

2.10.4 Cumulative Impacts

Other planned projects that could contribute to a cumulative floodplain risk are the I-680 HOV Lane Project and potential growth in the immediate interchange project area.

A floodplain analysis and location hydraulic study for the I-680 HOV Lane Project concluded that the existing bridge structure is adequate to pass the 100-year flood, but there could be some minor flood impacts from overtopping of Grayson Creek, upstream of the freeway. The I-680 HOV Lane Project includes raising the north levee of Grayson Creek between the I-680 bridges and the Pacheco Boulevard bridge to meet existing (pre-interchange project) flood water elevations (WRECO 2002).

No planned or approved development projects of a size that could affect floodplain conditions have been identified in the project vicinity. Development of Buchanan Field Airport for non-airport use could impact existing floodplain conditions depending on its design and mitigation. However, conversion of the airport has only been reviewed at a conceptual level and has not been analyzed in any detail. Whether the airport project might advance is not known, and therefore possible cumulative impacts to local flooding cannot be addressed.

2.10.5 Mitigation Measures

Improvements to the levee height to offset project-related increases in flood levels would be carried out by Contra Costa County and CCTA. No additional floodplain impacts are identified based on the determination that restrictions upstream of the project area would control flood flows in the project area.

2.11 Section 4(f) Parks, Recreational Areas, Wildlife and Waterfowl Refuges, and Wild and Scenic Rivers

Section 4(f) of the Department of Transportation Act of 1966, codified in Federal law at 49 United States Code 303, declares that “it is the policy of the United States

Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl, and historic sites."

Section 4(f) defines applicable properties as publicly owned park lands, recreation areas, wildlife and waterfowl refuges, and historic sites. A transportation project that could affect a property or resource protected under Section 4(f) may be approved only if it is determined that there is no other prudent and feasible alternative to using that land, and if the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

In general, a Section 4(f) use occurs with a Caltrans-approved project or program when: (1) Section 4(f) land is permanently incorporated into a transportation facility; (2) when there is a temporary occupancy of Section 4(f) land that is adverse in terms of the Section 4(f) preservation purposes as determined by specified criteria (3 CFR 771.135[p][7]); and (3) when Section 4(f) land is not incorporated into the transportation project, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired (constructive use) (23 CFR 771.135[p][1] and [2]).

The Contra Costa Canal, which was determined to meet the criteria of the National Register of Historic Places (NRHP), is crossed at two locations by the existing I-680 and SR-4 freeways within the project limits. Minor work would be required at the existing crossings. The proposed project would have no effect on the canal (see Sections 2.18.1.2 through 2.18.1.4).

At Grayson Creek, there is a gravel access road that runs alongside the creek channel for maintenance vehicles from the Contra Costa County Flood Control and Water Conservation District. The maintenance road is also incidentally used by walkers and runners but is not signed, managed, or otherwise designated for such use. The primary or major purpose of the road is for maintenance access by district vehicles and personnel. The maintenance road is not considered a resource under the definition of Section 4(f). No adverse impacts to a Section 4(f) property or resource would occur from any of the project phases.

2.12 Hydrology, Water Quality and Storm Water Runoff

This section discusses hydrology, water quality, and storm water runoff drainage issues. Floodplains are discussed and evaluated in Section 2.10.

2.12.1 Affected Environment

2.12.1.1 Surface Water Resources

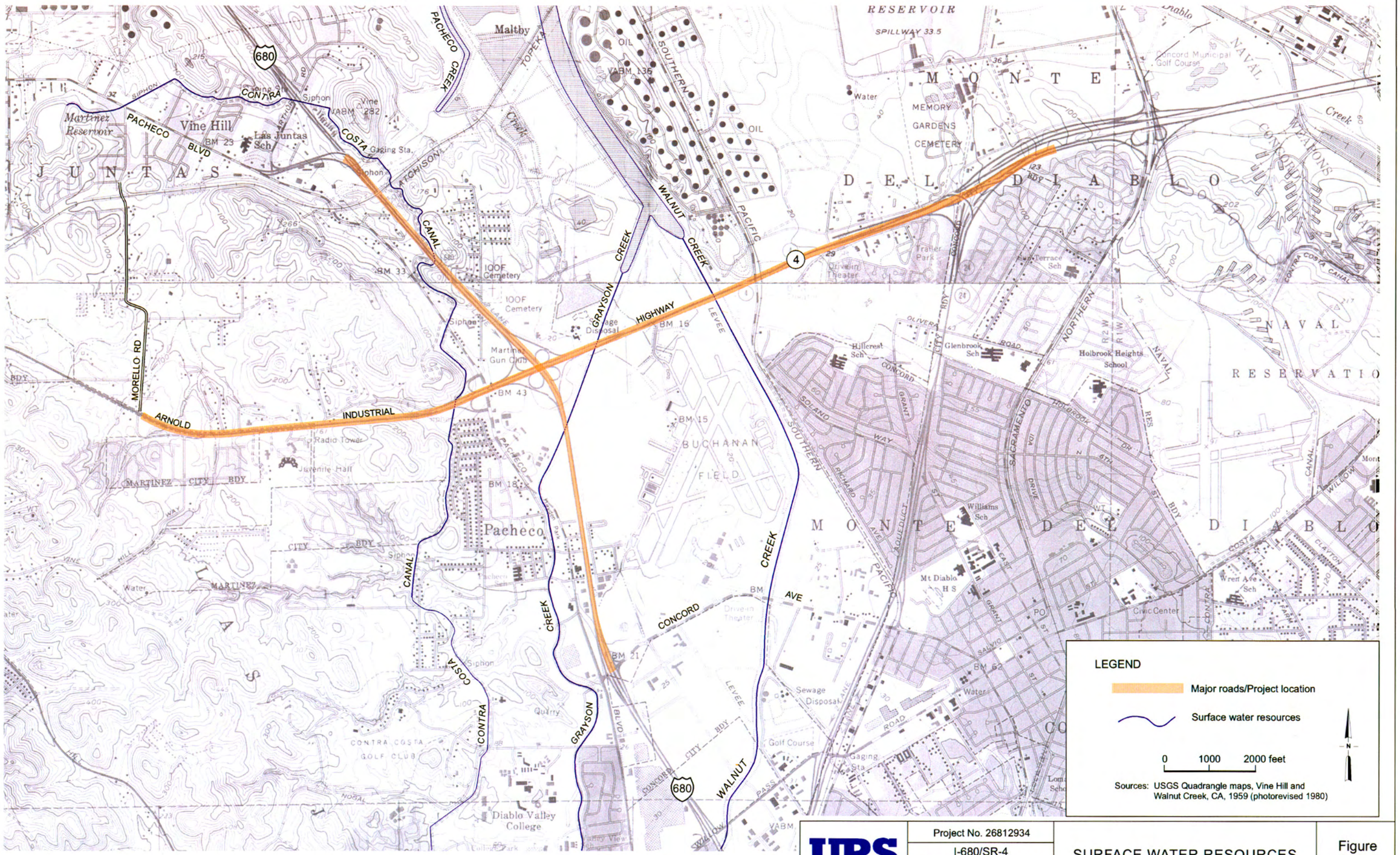
Surface water in the general vicinity of the project consists of Grayson Creek, Walnut Creek, and the Contra Costa Canal (Figure 2.12-1). Grayson Creek flows from southwest to northeast, first crossing I-680 south of the I-680/SR-4 interchange, then crossing SR-4 east of the interchange. Grayson Creek flows into Pacheco Creek, which ultimately drains into Suisun Bay in the north. Walnut Creek flows in a northerly direction to Suisun Bay and has tributaries of Las Trampas Creek, Tice Creek, San Ramon Creek, and Pine Creek. The Contra Costa Canal is owned by the U.S. Bureau of Reclamation and is operated by Contra Costa County. The canal runs generally north-south on the east side of I-680, flows under the freeway in an enclosed culvert just north of the I-680/SR-4 interchange, and continues in a northerly direction to the Martinez Reservoir and filtration plants.

Water Supply

The primary water supplier to the project area, the Contra Costa Water District, gets the majority of its water from the Sacramento-San Joaquin Delta via the Contra Costa Canal. The Contra Costa Canal draws water from Rock Slough near Oakley, Old River near Discovery Bay, and Mallard Slough in Bay Point (www.ccwater.com/waterquality/where.html). The Contra Costa Water District serves approximately 430,000 people throughout the northern, central, and eastern Contra Costa County with customers including 10 major industries, 36 smaller industries, and approximately 50 agricultural users (CCWD 2000).

Existing Surface Water Quality

Surface water samples from Walnut Creek and its two main tributaries, Las Trampas and San Ramon creeks, indicated good water quality in that the results met most water quality criteria for aquatic life (RWQCB 1994). The California Department of Water Resources Water Data Information System for Walnut Creek at SR-4 and Pine Creek, a tributary to Walnut Creek, indicate that the water quality is generally within the municipal water objectives set forth in the Basin Plan for San Francisco Bay and is less than USEPA's ambient water quality criteria. The data suggest that nitrate (NO_3) occasionally exceeds the available water quality criteria for municipal use.



URS	Project No. 26812934 I-680/SR-4 Interchange Improvement Project	SURFACE WATER RESOURCES	Figure 2.12-1

26812934.03800/080103/gos

Furthermore, based on typical values for total dissolved solids, surface water ranges from medium to hard water.

The Central Contra Costa Sanitation District monitors water quality in Suisun Bay in compliance with its National Pollutant Discharge Elimination System (NPDES) permit. Water quality data for Suisun Bay are shown in Table 2.12-1. Table 2.12-2 shows metals data collected by the Regional Monitoring Program in Suisun Bay near Pacheco Creek. Some metals common in highway runoff including copper and nickel occasionally exceed Bay water quality objectives. Table 2.12-3 shows constituents in storm water runoff from I-680 at locations just south of the Benicia-Martinez Bridge. Concentrations of lead, copper, chromium, and zinc (common in highway runoff) measured at these locations along I-680 are typical of monitoring measurements along other Bay Area highways (e.g., Highway 101 and other segments of I-680) (Caltrans 1998).

2.12.1.2 Groundwater Resources

The interchange area is located over the Ygnacio Valley portion of the Livermore groundwater basin (DWR 1980). Drilling records show depths to groundwater in the vicinity of the project (Concord, Martinez, Pleasant Hill, and Walnut Creek) averaging 5.3 meters (17.38 feet) (www.greggdrilling.com/water_table_n.html). This average is consistent with data from the U.S. Geological Survey that indicate groundwater depths have ranged from 2.17 to 6.32 meters (7.13 to 20.75 feet) in the Ygnacio and Clayton Valley areas from 1958 to the present (www.waterdata.usgs.gov/ca/nwis/gwlevels).

Limited groundwater data are available in the project vicinity. Groundwater resources in the Contra Costa Water District service area do not supply substantial amounts of water to meet or augment raw water demands. Of the three discernable groundwater sources in the vicinity of the project – Ygnacio, Clayton, and the Pittsburg/Antioch areas – only the Clayton area produces appreciable amounts of groundwater. The Contra Costa Water District does not monitor groundwater levels or quality but estimates that approximately 3,000 acre-feet per year is pumped from groundwater wells owned by private individuals, industries, and public water utilities (CCWD 2000). Groundwater resources in the area do not represent a sole source aquifer (www.epa.gov/safewater/swp/ssa/reg9.html).

Table 2.12-1 Suisun Bay Water Quality

Station No.	Sample Type	Station ID	Time (AM)	Oil and Gasoline	Grease	Algae and Other Microscopic Materials	Atmospheric Odor	Turbidity	Color	Sampling Depth (cm [inches])
C1	Grab	Center	0914	None	None	None	None	(NTU)	Light yellow	10 (4)
C2	Grab	West	0912	None	None	None	None	29	Light yellow	10 (4)
C3	Grab	North	0908	None	None	None	None	16	Light yellow	10 (4)
C4	Grab	East	0909	None	None	None	None	19	Light yellow	10 (4)
C5	Grab	South	0911	None	None	None	None	21	Light yellow	10 (4)
C8	Grab	Control	0916	None	None	None	None	25	Light yellow	10 (4)

Station No.	Station ID	Total Coliform (mpn/100 mL)	pH	Temp °C	DO (mg/L)	DO Saturation %	NH_2 as N (mg/L)	Non-Diss NH_2 as N (mg/L)	Salinity (g/kg)	Dissolved sulfides (mg/L)	Conductivity µmhos/cm
C1	Center	210	7.3	11.1	10.8	99.1	0.13	0.001	4.4	<0.1	7,860
C2	West	1700	7.4	10.5	10.4	92.9	0.34	0.001	4.8	<0.1	8,660
C3	North	220	7.4	10.3	10.3	94.1	0.23	0.001	4.4	<0.1	7,930
C4	East	130	7.4	10.2	10.4	95.9	0.15	0.001	4.4	<0.1	8,000
C5	South	300	7.4	10.5	10.5	95.6	0.15	0.001	5.0	<0.1	8,880
C6	Control	300	7.4	10.0	10.4	94.7	0.17	0.001	4.6	<0.1	8,200

Source: Central Contra Costa Sanitation District 1998.
Notes: Data are for samples taken January 13, 1998.

DO = Dissolved oxygen
g/kg = grams per kilogram
mg/L = milligrams per liter
mpn/100 mL = most probable number per 100 milliliters
N = Nitrogen
NTU = Nephelometric turbidity unit
µmhos/cm = micromhos per centimeter

Table 2.12-2 Concentrations of Total Metals Collected Near Pacheco Creek, 1996-2000

Date	Silver (µg/L)	Arsenic (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Copper (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Lead (µg/L)	Selenium (µg/L)	Zinc (µg/L)
02/13/96	0.009	1.95	0.02	9.6	4.6	0.009	7.1	0.9	0.14	8.4
04/24/96	0.004	1.37	0.02	3.3	2.6	0.006	2.8	0.5	0.12	3.3
07/22/96	0.006	2.61	0.05	5.6	3.8	0.011	5.3	1.2	0.16	5.3
01/28/97	NA	3.16	0.04	17.95	7.6	0.0298	16.6	1.78	0.15	13.5
04/23/97	NA	2.98	0.06	11.47	5.7	0.0199	9.9	**	0.25	13.5
08/05/97	NA	3.55	0.06	12.3	4.4	0.0145	6.3	**	0.21	9.8
02/3/98	0.017	2.8	0.05	13.4	5.1	0.0121	6	1.21	0.21	12.9
04/15/98	0.008	1.72	0.02	6	3.4	0.0073	4	0.58	0.32	5.6
07/28/98	0.014	3.7	0.05	13.97	7.7	0.0237	11.9	1.67	0.22	21
02/10/99	0.007	1.8	0.024	7.03	4.4	b 0.0100	8.5	1.15	0.09	6
04/20/99	0.008	1.79	0.041	20.99	8.1	b 0.0286	13	2.67	e 0.05	17.3
07/20/99	0.009	2.8	0.043	122.18	4.3	b 0.0105	5.5	0.92	0.22	5.8
02/8/00	NA	2.28	NA	NA	NA	b 0.0162	NA	NA	ND	NA
07/18/00	NA	3.41	NA	NA	NA	Q	NA	NA	0.129	NA
Water Quality Objectives	2.3***	36*	9.3*	11*	2.9**	0.025**	8.3**	5.6*	71**	58*

Source: SFEI 1996–2000 (data downloaded from Web site)

* San Francisco Bay Basin Plan Objective (4-day average)
** USEPA National Toxics Rule (4-day average)
*** Instantaneous maximum

b = blank contamination
e = estimated value
Q = outside the QA limit
µg/L = micrograms per liter

Table 2.12-3 Storm Water Runoff Analysis at Various Locations in I-680 Just South of the Benicia Bridge

Constituent	Location					Detection Limit
	1	2	3	4	5	
Total recoverable petroleum hydrocarbons	ND	ND	ND	ND	2.1	1.0 mg/L (ppm)
Lead	0.0082	0.0035	0.015	NA	0.014	0.0020 mg/L
Copper	0.029	0.023	0.034	NA	0.027	0.0020 mg/L
Chromium	ND	ND	0.0096	NA	0.0052	0.0050 mg/L
Zinc	0.081	0.047	0.093	NA	0.087	0.010 mg/L

Source: Caltrans 1998.

mg/L = milligrams per liter
NA = not applicable
ND = not detected
ppm = parts per million

Wellhead Protection

Wellhead protection is a preventive program designed to protect public water supply wells. The goal of wellhead protection is to prevent contaminants from entering public water supply wells by managing the land that contributes water to the wells. Because the I-680/SR-4 interchange is in an area that does not have a public water supply from groundwater wells, planning for wellhead protection is not necessary.

Groundwater Quality

Groundwater is not monitored by any agency in Contra Costa County, primarily because the majority of the county gets its water from the Contra Costa Canal. Water quality in the Ygnacio Valley Basin is generally poor and has been limited primarily to agricultural uses. The RWQCB Basin Plan lists municipal, industrial process, industrial service, and agriculture as potential but not existing beneficial uses of that water body. Groundwater quality in the Clayton Valley Basin is generally better than in the Ygnacio Valley Basin; however, municipal wells in the basin were replaced by Mallard Reservoir. The Basin Plan lists municipal water supply as the only existing beneficial use.

2.12.1.3 Regulatory Setting

Federal and State Regulations

The project site is within the jurisdiction of the San Francisco Bay RWQCB (Region 2). The San Francisco Bay RWQCB has the authority to implement water quality

protection standards through the issuance of permits for discharge to waters at locations within its jurisdiction. Water quality objectives for the San Francisco Bay estuarine system is specified in *The Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan) prepared by the San Francisco Bay RWQCB in compliance with the Federal CWA and the State Porter-Cologne Water Quality Control Act. The Basin Plan establishes water quality objectives and implementation programs to meet stated objectives and to protect the beneficial uses of water in the San Francisco Bay basin. Because the project site is located within the San Francisco Bay RWQCB's jurisdiction, all discharges to surface water or groundwater are subject to the Basin Plan requirements (RWQCB 1995).

The NPDES permit system was established in the CWA to regulate municipal and industrial discharges to surface waters of the United States. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. In accordance with NPDES regulations to minimize the potential effects of construction runoff on receiving water quality, the State requires any construction activity affecting 0.4 ha (1 acre) or more to obtain a General Construction Activity Stormwater Permit.

Permit applicants are required to prepare a SWPPP and implement BMPs to reduce construction effects on receiving water quality by implementing erosion control measures. Because construction of the proposed project would disturb more than 0.4 ha (1 acre), the project would be subject to these permit requirements. In addition, 1997 revisions to the original 1992 general permit clarified that all construction activity, including small construction sites (0.4 to 2 ha [1 to 5 acres]) and sites under 2 ha (5 acres) that are part of a larger common plan must obtain a General Permit.

In 1999, Caltrans was issued an NPDES statewide permit (Order No. 99-06 DWQ) that covers Caltrans' highways, highway-related properties, facilities, and activities, such as maintenance stations, roadside rest areas, weigh stations, Park and Ride lots, and construction sites. In addition, it also covers both wet- and dry-weather discharges from storm water conveyance systems. In general, Caltrans is required to reduce pollutants in storm water discharges to the Maximum Extent Practicable. For discharges from a construction site, toxic pollutants must be reduced using the Best Available Technology economically feasible, and conventional pollutants must be reduced using the Best Conventional Technology.

Caltrans has a revised Storm Water Management Plan (May 2001) that includes new and revised BMP categories.

Local Regulations

The Contra Costa County General Plan contains the principle statement concerning the county's goal and desires concerning land use and is designed to serve as the basis for development decision making (Contra Costa County 1996). General Plan policies include measures to protect and maintain riparian zones that are applicable to the proposed project.

2.12.2 Permanent Impacts

The following summarizes potential project impacts.

2.12.2.1 Surface Water

Drainage and runoff patterns would be affected but not adversely impacted. The proposed project crosses the 100-year floodplain of Grayson Creek. The Grayson Creek crossings would be constructed to allow the runoff from this event to pass through, maintaining approximately the same drainage patterns. Floodplain impacts are discussed in Section 2.10.

2.12.2.2 Storm Water Runoff Volume and Quality

Storm water runoff volumes from the project area are expected to increase due to the increase in impervious surfaces. However, this additional runoff is not anticipated to exceed the capacity of drainage systems in the area. Storm water from the I-680/SR-4 Interchange Improvement Project would drain into Grayson and Walnut Creeks and Contra Costa Canal as well as storm drain systems in the area. This storm water would ultimately discharge to Suisun Bay.

Street and highway storm water runoff can, in some instances, adversely affect receiving water quality (FHWA 1990). The nature of these impacts depends on the uses and flow rate or volume of the receiving water, rainfall characteristics, and street or highway characteristics. In general, heavy metals associated with vehicle tire and brake wear, oil and grease, and air emissions are the primary toxic pollutants associated with transportation corridors.

2.12.3 Construction and Other Temporary Impacts

During construction there is the risk of temporary adverse impacts due to increased erosion that could eventually be transported into nearby creeks and storm drains with

storm runoff. Storm water runoff could drain into Grayson Creek, Walnut Creek, or the Contra Costa Canal, and eventually be transported to Suisun Bay. Soil erosion could, especially during heavy rainfall, increase suspended solids, dissolved solids, and organic pollutants in nearby creeks. These conditions can persist until completion of construction activities and implementation of landscaping and other long-term erosion control measures (described in Section 2.12.3).

Fueling or maintenance of construction vehicles would occur in the project area during construction. Accidental spills or releases of fuels, oils, or other potentially toxic materials and possibly sanitary wastes could be a concern during construction activities. An accidental release of these materials may pose a threat to water quality if contaminants enter storm drains, Grayson Creek, Walnut Creek, or the Contra Costa Canal.

The project does not involve substantial excavations that could affect groundwater resources. Some excavation would be required to set the footing of the piers that support the flyovers, and some excavation could be involved with the location of the new connector roads, but the project is primarily located aboveground and would involve placement of fill. In addition, groundwater resources in the area do not represent a sole source aquifer.

2.12.4 Cumulative Impacts

2.12.4.1 Surface Water

All projects are required to incorporate water quality measures to prevent water pollution within and outside project areas. Other projects in the regional area include the new Benicia-Martinez Bridge and highway widening on SR-4 in eastern Contra Costa County. These projects would not affect runoff in the immediate vicinity of the I-680/SR-4 interchange but would ultimately contribute runoff to the Carquinez Strait. Each of these projects includes mitigation and control measures. The I-680 HOV Lane Project, which will to a great extent use existing paved areas on I-680, will be completed by the time any phases of the interchange improvement project are under construction, and the increases in pollutant loadings and changes in water quality of receiving waters are expected to be minor. No other major developments are approved in the project area. For these reasons and because the interchange improvement project will incorporate water quality control measures during and after construction, cumulative impacts from construction and the changes in pavement area are not expected to result in an adverse cumulative impact to water quality.

2.12.4.2 Groundwater

No cumulative groundwater impacts are expected from the limited excavation and subsurface impacts from the interchange improvement project phases.

2.12.5 Mitigation Measures

2.12.5.1 Construction

Construction activities could increase suspended solids, dissolved solids, and organic pollutants in nearby creeks or the Contra Costa Canal. These conditions could likely persist until completion of construction activities and long-term erosion control measures have been implemented. Since this project has a soil disturbance of 0.4 ha (1 acre) or more, this project shall adhere to the conditions of the NPDES Permit for Construction Activities (Order No. 9-08-DWQ, NPDES No. CAS000002), which is incorporated by reference to the Caltrans NPDES Permit, Storm Water Discharges from Caltrans Properties, Facilities, and Activities (Order No. 99-06-DWQ, NPDES No. CAS000003). Filing of a Notice of Intent is not required, as a Notification of Construction under Caltrans NPDES Permit has replaced it. To comply with the conditions of the Caltrans NPDES Permit and to address the temporary water quality impacts resulting from the construction activities of this project, Standard Special Provision 07-345 will be included in the Plans, Specifications, and Estimates. This SSP will address water pollution control work and the implementation of a SWPPP during construction.

Construction best management practices are temporary BMPs that Caltrans contractors would implement to meet Best Available Technology/Best Conventional Technology for construction projects. The selected construction site BMPs would be consistent with those practices to achieve compliance with requirements of the State of California NPDES General Permit for Storm Water Discharges Associated with Construction Activities.

Construction BMPs that have been identified in the project's Storm Water Data Report (May 2005) include the use of vegetated swales to minimize velocity and erosive conditions and revegetation of slopes to reduce erosion and sediment loads. Other construction BMPs that may be set forth in the SWPPP include using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter storm drain systems or surface water; developing and implementing a spill prevention and cleanup plan; installing traps, filters, or other devices at drop inlets to

prevent contaminants from entering storm drains; and using barriers such as straw bales or plastic to minimize the amount of uncontrolled runoff that could enter drains or surface water. Because of piling operations, construction dewatering BMPs will also be included in the SWPPP and implemented during construction to prevent any non–storm water from entering into waterways or environmentally sensitive areas.

Erosion control measures would be developed as part of the SWPPP and applied to exposed areas during construction. Erosion control measures may include the trapping of sediments within the construction area by placing barriers such as straw bales, sandbags, or gravel barriers at the perimeter of downstream drainage points. Other methods of minimizing erosion impacts include limiting the amount and length of exposure of graded soil, hydromulching and hydroseeding (applying a mixture of mulch, seed, and fertilizer), and other soil protection measures such as straw mulch or compaction.

The overall mitigation structure for water quality impacts is a condition of the NPDES permit, other planning agreements, and the expected need for county storm water management programs. Implementation details for all BMPs would be developed and incorporated into the SWPPP, project design, and operations before project construction. With proper implementation of these measures and compliance with the new NPDES permit, short-term construction-related water quality impacts would be avoided or minimized.

2.12.5.2 Long Term

The project design will incorporate Design Pollution Prevention (DPP) BMPs. DPP BMPs are intended to stabilize soil and prevent contaminants and soil from entering storm water runoff. Another category of BMPs called Permanent Treatment BMPs are intended to treat storm water runoff and remove contaminants and sediments that have already entered the runoff. The project's NPDES permit will likely stipulate that Permanent Treatment BMPs to control pollutant discharges be considered and implemented for all new or reconstructed facilities. Permanent Treatment BMPs that are generally considered are infiltration basins, detention basins, and biofiltration swales/strips.

Although design plans for the interchange have not been finalized, the use of existing biofiltration swales will likely be the primary Permanent Treatment BMP. An existing biofiltration swale already exists in the southwestern corner of the interchange area, adjacent to Grayson Creek, and treats runoff from portions of the

western half of the interchange area. This swale will remain in place with the interchange project modifications. Additional drainage areas that can be used as biofiltration swales have been identified in the Storm Water Data Report along most of both sides of SR-4 within the project limits and on short segments of I-680. The swales will be designed to also minimize velocity and erosive conditions. New and existing slopes that are disturbed will be vegetated, and an erosion control plan will be developed. Outlet protection/energy dissipation devices consisting of flared end sections and rock slope protection will be provided at all newly constructed outlets to reduce velocities and prevent scouring and sediment resuspension.

The use of large infiltration or detention basins is generally not considered feasible for modifying or controlling large storm events because of the lack of necessary right-of-way in the interchange area. The only area identified for a potential small detention basin (or swale area) is west of I-680 and south of Grayson Creek. This basin or swale can be considered during final design, but the use of the biofiltration measures discussed above is considered more feasible and practicable.

Existing storm sewer subcatchments within the project site drain directly into drainage inlets, which lead to deep trunk storm sewer systems. These systems drain directly to Grayson Creek. Storm water treatment of these systems was considered, but to construct a new treatment facility and to reconstruct large portions of the existing storm sewer system to divert storm water to a treatment facility was determined to be cost-prohibitive.

2.13 Farmlands/Agricultural Lands

2.13.1 Affected Environment

Contra Costa County ranks 38th among 58 counties in agricultural production in the State of California, which represents only approximately 0.3 percent of the State's total production. In 2001, Contra Costa County produced $97.5 million in agricultural commodities (Contra Costa County Farm Bureau). Although Central Contra Costa County once supported large farmland areas, agricultural uses are now relatively limited. Within the project study area, no agricultural uses occur.

2.13.2 Permanent, Temporary, and Cumulative Impacts

No impacts to agricultural resources would take place because no active agricultural lands occur within the project area.

2.13.3 Mitigation Measures

No agricultural lands would be affected by the project.

2.14 Community Impacts (Social, Economic) and Environmental Justice

The selected community impact assessment study area (study area) represents a logical area around the existing and proposed right-of-way where direct project impacts would most likely occur (Figure 2.14-1). The study area primarily includes large portions of the unincorporated areas of Vine Hill and Pacheco in Contra Costa County. It also incorporates the northeastern portion of the City of Martinez.

Census data obtained for the study area are at the Census Tract (CT) level. Although the CTs cover areas larger than the study area described, they most closely and comprehensively represent the area. Census Tracts selected to describe the study area include CT 3200.02, CT 3211.01, CT 3212, and CT 3270 (see Figure 2.1-1). In addition to the census data for the census tracts, data for the entire Contra Costa County (Study Region) are used.

2.14.1 Affected Environment

2.14.1.1 Population

The study area represents roughly 2.8 percent of Contra Costa County's population. According to the 2000 U.S. Census, Contra Costa County had a population of 948,816. This represents an 18 percent increase from the 1990 population count. Similarly, the study area (based on CT-level data) experienced a 17 percent population increase between 1990 and 2000, from 24,216 to 26,963. Within the study area, the most growth was experienced in CT 3200.02, an area that encompasses the entire northern portion of the project area (north of SR-4, stretching from Pine St. on the west to Solano Way on the east). Between 1990 and 2000, the population in CT 3200.02 grew by 31 percent. Growth in CT 3212 was 11 percent and in CT 3270 was 7.5 percent. In CT 3211.01, the population decreased from 6,769 in 1990 to 6,526 in 2000.

2.14.1.2 Age

For the most part, the age composition of the study area population reflects the regional age composition. Over 50 percent of people fall between the ages of 25 and 64. CT 3270, however, has a greater percentage of senior citizens (15.2 percent) than the County average of 11.3 percent.

2.14.1.3 Race/Ethnicity

Compared to the racial compositions of the Study Region, the study area has a greater percentage of whites and a lower percentage of African American persons. The study area also has fewer persons who identify themselves as Hispanic or Latino. CT 3270 is a clear exception, with nearly one-quarter of its residents being of Hispanic or Latino heritage.

2.14.1.4 Income and Poverty

Median income levels for the study area are comparable, on average, with the County figure (see Table 2.14-1). The median household incomes within CT 3200.02 and CT 3211.01 are much greater than those of CT 3212 or CT 3270, which are below the average for the Study Region. Per capita income from 1990 also demonstrates this trend. While poverty levels are generally below the regional average in CT 3200.02 and CT 3211.01, they appear to be higher than the regional averages in both CT 3212 and CT 3270. For example, 5.4 percent of families and 7.6 percent of individuals in Contra Costa County live below the poverty line, compared with 10.2 percent of families and 13 percent of individuals in CT 3212. CT 3270 is closer to the regional averages but also falls below the regional thresholds.

Table 2.14-1 Income in 2000

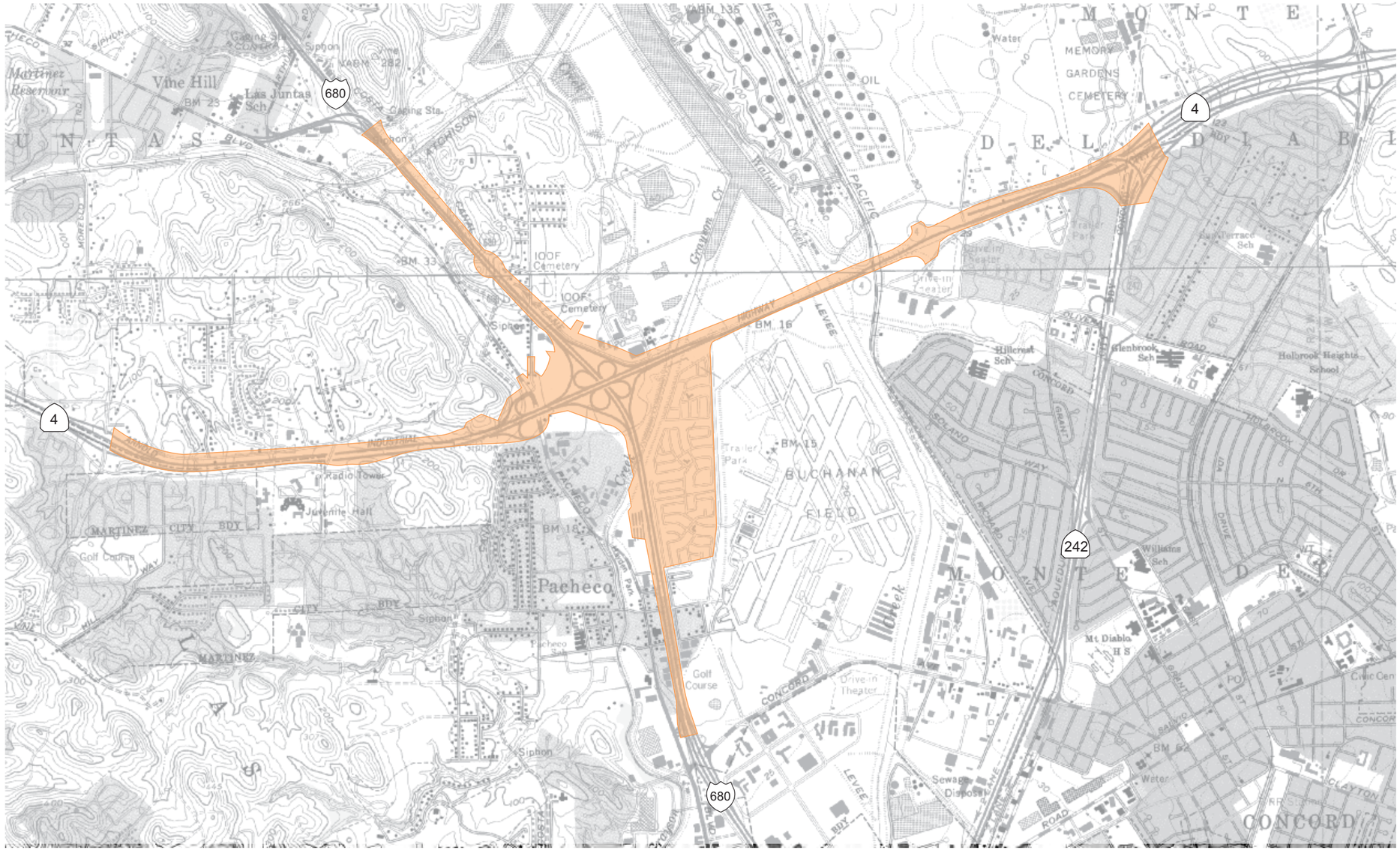
Attribute	Contra Costa County	CT 3200.02	CT 3211.01	CT 3212	CT 3270
Median household income (in $)	63,675	68,446	67,128	54,882	42,063
Per capita income (in $)	30,615	30,839	28,597	28,576	18,891
Number of persons below poverty level	71,575	467	183	680	706

Source: U.S. Census 2000 (STF3), http://factfinder.census.gov

2.14.1.5 Housing

The 2000 U.S. Census reports that 354,577 total housing units exist in the Study Region, of which 344,129 are occupied. The vacancy rate is approximately 2.9 percent, which indicates a generally high demand for housing. According to the County General Plan, the County had a vacancy rate of 2.7 percent in 1988. The U.S. Census data indicates that the median home value in Contra Costa County was $267,800, and the median household income was $63,675.

By comparison, the study area had a total of 11,129 housing units, of which 10,884 units were occupied in 2000, an average vacancy rate of 2.3 percent. The median



Source: USGS 7.5 min. Quadrangle Maps, Walnut Creek and Port Chicago, CA, 1959

LEGEND

Community Impact Assessment Study Area

URS	Project No. 26812934 I-680/SR-4 Interchange Improvement Project	COMMUNITY IMPACT ASSESSMENT STUDY AREA	Figure 2.14-1

26812934.31300/080103/gos

home value in the study area, $223,625 in 2000, was slightly lower than the Study Region.

2.14.1.6 Employment and Unemployment

The services industry employs about 32 percent of the workers in Contra Costa County. Between 1999 and 2006, County forecasts estimate that 27,600 jobs will be added in the business, health, and other service areas (ABAG Projections 2002). Other major employment sectors for the County include retail trade, auto repair, amusement and recreation, and social services. Retail trade is projected to grow by 11.4 percent by 2006.

The unemployment rate in the County has averaged about 3.3 percent over the past 5 years, which is less than the State average (5.5 percent) over the same period. Currently, the State unemployment rate is slightly below its average (5.3 percent), while the County unemployment rate remains at 3.3 percent.

The unemployment rate in the study area has mirrored that of the County over the past 15 years and continues to do so. Data for the Pacheco and Vine Hill communities indicate that the study area unemployment rate (2.8 percent) is slightly lower than that of the Study Region. The study area seems to maintain a strong dependency on the services sector. Based on ABAG projections to the year 2025, job growth will outpace population growth (ABAG Projections 2002).

2.14.1.7 Transportation to Work

Over 65 percent of the total population over 16 years of age in Contra Costa County was employed in 2000. Of the 442,008 people who commuted to work, only 9 percent took public transportation. By contrast, 83.7 percent either drove alone or carpooled. The average commute time for county residents in 2000 was 34.4 minutes. ABAG projections to the year 2025 indicate that job growth in the County would exceed population growth by approximately 10 percent. This pattern is reflected in the study area, except for CT 3211.01, where the population growth is expected to outpace employment growth by 3.3 percent (ABAG Projections 2002). In the study area, the average commute time for residents, approximately 29 minutes, was less than that of the county, due in part to the study area's proximity to the highway network. In 2000, the mean commute time was 29.4 minutes for CT 3200.02, 28 minutes for CT 3211.01, 31.7 minutes for CT 3212, and 27.2 minutes for CT 3270. However, without improvements to the local transportation network, the expected employment growth in the area may lead to longer commute times.

2.14.2 Community Services and Facilities

2.14.2.1 Schools

Although no schools exist within the study area, at least eight public schools from the Martinez Unified School District and the Mt. Diablo Unified School District serve residents in the project vicinity. The four elementary schools for the area are John Muir Elementary School (205 Vista Way), Morello Park Elementary School (244 Morello Ave.), Las Juntas Elementary School (4105 Pacheco Boulevard), and Sun Terrace Elementary School (2448 Floyd Lane). The two middle schools in the area are Martinez Junior High School (1600 Court St.) and Glenbrook Middle School (2351 Olivera Road). The two high schools for the area are Alhambra Senior High School (150 E St.) and Montecito High School (600 F St.).

2.14.2.2 Parks and Recreation

The study area contains three large community parks: Holiday Highlands Park, located at Fig Tree Lane and Eastwoodbury Lane in Martinez; Hillcrest Community Park, at Olivera Road and Grant St. in Concord; and Sun Terrace Park, located at Vancouver Way and Montreal Circle in Concord.

Other parks are located outside of the study area but within the general vicinity. They include Morello School Park, at Morello Avenue and Morello Park Drive; Bayview Circle Park in Concord at Bayview Circle; Mountain View Park at Parkway Drive in Martinez; and John Muir Park at Vista Way in Martinez.

2.14.2.3 Park and Ride Lots

Park and ride lots help encourage transit use and carpooling. Bay Area Rapid Transit (BART) operates 12 lots with more than 11,800 free parking spaces for BART customers. Caltrans operates 13 Park and Ride lots in the county, providing more than 660 spaces. These spaces are primarily used as staging areas for cars and vanpools. Caltrans operates one Park and Ride lot in the study area along Blum Road, immediately north of the I-680/SR-4 interchange. A majority of the commuters who use this lot travel southbound on I-680, according to a July 2003 CCTA survey. The survey also indicated that most of the commuters use the lot and carpool five times per week.

2.14.3 Permanent Impacts

2.14.3.1 Household Impacts

The proposed project would involve relocating utility lines along SR-4 and Berry Drive. Due to the large diameter of a sanitary sewer line that would have to be

moved and the limited right-of-way, approximately 365 meters (1,200 feet) of sewer line would be relocated close to the adjacent mobile home community, the Concord Cascade Mobile Home Park. This option would require a 70-meter (230-foot) easement and acquisition of property encompassing five to seven mobile homes (see Table 2.14-2 and Figure 2.14-2). Alternative options were also considered. However, because of the large diameter of the sanitary sewer line, a different design alternative would have required that the utility line be rerouted around the perimeter of the mobile home community, adjacent to Buchanan Airfield. This option was deemed both impractical and cost prohibitive.

Based on current real estate information for Central Contra Costa County, there appear to be sufficient single-family homes for sale and rent to relocate the affected households. A survey of mobile home listings in November 2002 indicated that a sufficient number of mobile homes are available for sale, including homes within the Concord Cascade Mobile Home Park community. The State relocation assistance services and payment program would accommodate any impacts due to relocation. A summary of relocation benefits is provided in Appendix D.

2.14.3.2 Commercial Impacts

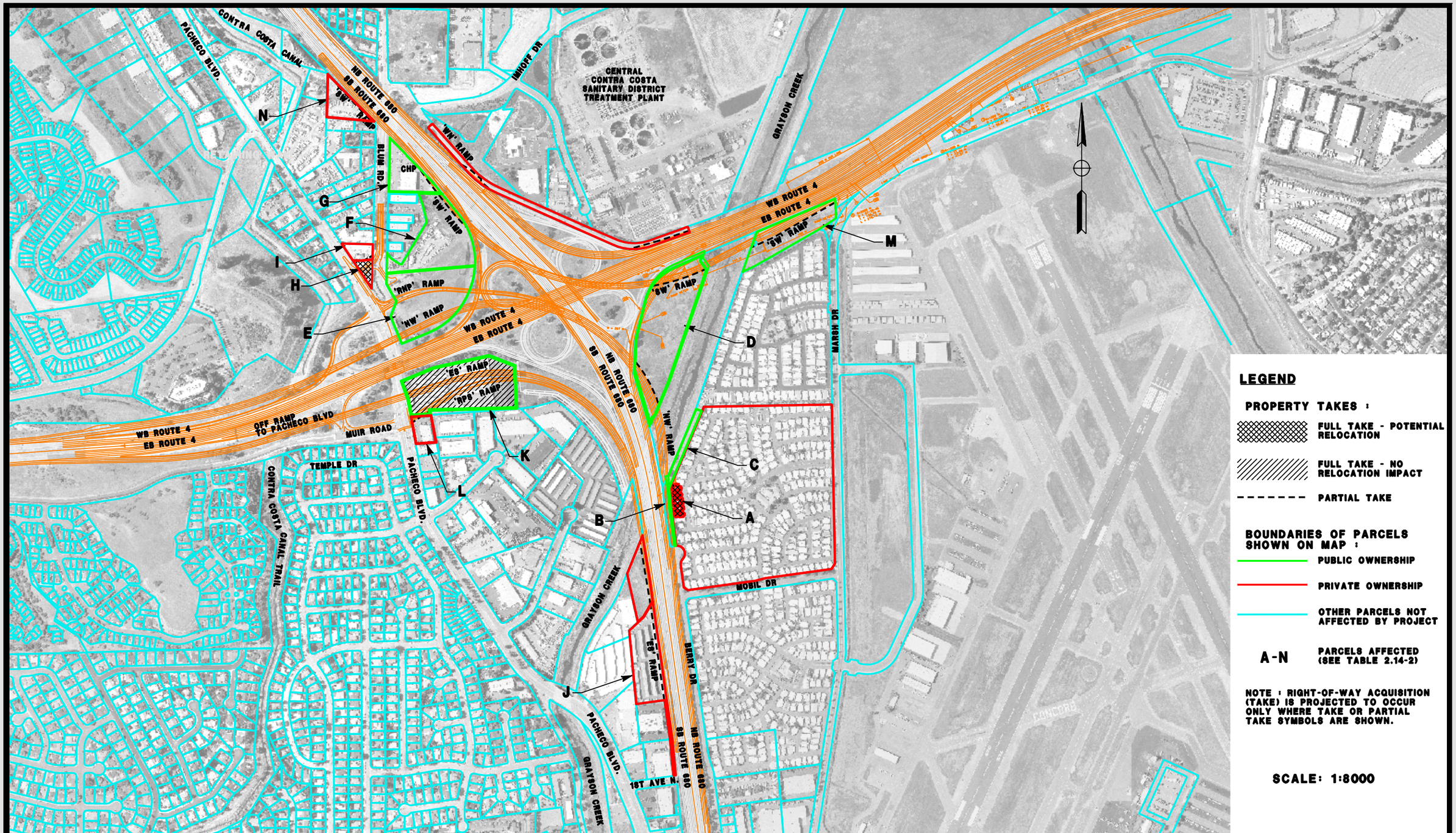
One auto accessory business, Campways Truck Accessory World at 4999 Pacheco Boulevard, could be displaced if the slip ramp is built. The property would be required for the relocation of Blum Road. While this business primarily serves local clientele, Campways Truck Accessory World stores can be found at multiple locations in Northern California. Commercial properties are available in the Study Region for the relocation of the affected business.

A second business would be impacted in the study area. A Pacheco Mini Storage and U-Haul facility located at 5146 Pacheco Boulevard is currently operated on land owned by Caltrans. The lease has a 2-year term and will expire before project construction would commence. Therefore, although the current business would be displaced, no relocation is anticipated per the terms of the lease.

The proposed project could impact the parking areas of three parcels. Acquisition of a portion of a parcel, or “partial take,” would be necessary on the northwestern corner of the parcel of an auto parts business located at 5166 Pacheco Boulevard would impact approximately three customer parking spaces. Additional parking in front of the store would not be affected; however, the loss of a few parking spaces would likely have some economic impact for the business. Another potential parking impact

Table 2.14-2 Properties Potentially Impacted by the I-680/SR-4 Interchange Project Right-of-Way

Property	APN#	Street Address	Land Use Designation	Current Property Use	Impact Description	Affected by Slip Ramps?	Phase
A	125-020-058	245 Aria Drive	Residential	Concord Cascade Mobile Home Park	5-7 homes alongside highway likely relocated due to utility line displacement	No	1
B	125-020-040	NO ADDRESS	Commercial	Vacant (Narrow road), west border of A	Full take to move utility line	No	1
C	125-020-056	NO ADDRESS	Commercial	Shown as vacant public lot adjacent to mobile home park and north of B	Partial take; no effect to residents or businesses	No	1
D	125-020-043	Arnold Industrial Way	Commercial	Vacant	Possibly partial takes, either side; no effects	No	1, 4
E	159-150-011	Arnold Industrial Way	Commercial Responsibility	Park & Ride Lot and some temporary buildings near the highway	Parcel is affected by Phase 1 ramp, and parking area is crossed by slip ramp. The parking area will be modified to compensate for construction impacts.	Yes	1
F	159-150-032	5041 Blum Rd.	Commercial	Business - B&D Trailers and Wells Cargo RVs	Partial take on property's eastern edge – no commercial impact anticipated	No	1
G	159-150-021	5001 Blum Rd.	Commercial	CHP office and lot	Partial take in eastern side lot along highway – possible parking impact	No	1
H	159-210-024	4999 Pacheco Blvd.	Garage	Business - Campways Truck Accessory World	Full take; relocation would occur due to NB I-680 to WB SR-4 slip ramp	Yes	1
I	159-210-041	5036 Blum Rd.	Garage	Business - The Bug Stop – Auto Repair (Service and Sales)	Small partial take on SE corner with NB I-680 to WB SR-4 slip ramp – no business impact	Yes	1
J	125-240-029	95 N. First Avenue	Commercial	Business - Mini Warehouse / Public Storage	Partial take along eastern property border with SB I-680 may affect structures	No	2
K	125-220-021	5146 Pacheco Blvd.	Commercial Mini-Storage	Business - Pacheco Mini Storage & U-Haul storage units	Full take of Caltrans-owned property with WB SR-4 to SB I-680 connector; private lease will expire.	No (Caltrans parcel; lease will expire)	2
L	125-220-002	5166 Pacheco Blvd.	Commercial Store	Business - Monument Car Parts	Partial take of NW corner of property – potential commercial parking impact	Yes	2
M	125-020-055	Arnold Industrial Way	Commercial	Vacant	Partial take; no impact	No	4
N	159-210-032	4961 Pacheco Blvd.	Commercial	Business - Hardcastle's RV Center - RV Storage Yard	Retaining wall will be built to mitigate any impacts to eastern property boundary with SB I-680	No	4



URS
1333 BROADWAY, SUITE 800
OAKLAND, CA. 94612

Contra Costa Transportation Authority

I-680/Rte4
Project Area Resources Potentially Affected

Figure 2.14-2

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may occur at 4961 Pacheco Boulevard, a large recreational vehicle (RV) storage yard. Moving an existing retaining wall from I-680 may impact some spaces for parked RVs. However, the impact and its magnitude would depend on the design features of the retaining wall. Finally, some parking spaces for California Highway Patrol vehicles located along I-680 at 5001 Blum Road may be eliminated with the highway improvements planned for I-680. Caltrans has consulted with the CHP regarding these impacts, which are not likely to be substantial.

Each of these commercial impacts are shown in Figure 2.14-2 and described in Table 2.14-2. Table 2.14-2 identifies how the parcels are impacted with respect to each project phase and whether the slip ramps affect the parcels listed.

2.14.3.3 Environmental Justice

FHWA and Caltrans use the Federal Department of Health and Human Services poverty guidelines to define low income, which is $18,100 for a family of four. The average household income in the study area exceeds this level. Even in the portion of the study area with the lowest average household income (CT 3270), the average income is $42,063, more than double the defined low-income threshold. A minority community is defined as a distinct population that is composed of *predominantly* one or more racial or ethnic group(s) that is nonwhite. As Table 2.14-3 indicates, the study area population is predominantly white (over 70 percent of the population in each of the four Census Tracts). As the population analysis indicates that no low-income or minority communities would be impacted disproportionately by the proposed project, no low-income or minority groups were contacted to participate in the project planning process.

Because less than 25 percent of people in any one geographic area within the study area claim Hispanic/Latino descent, and even less identify themselves as Asian, African American, or another race, the project would not disproportionately impact a minority community.

As no minority or low-income populations would be adversely impacted by the proposed project, the proposed project is not subject to the provisions of Executive Order 12898.

Table 2.14-3 Racial/Ethnic Composition of the Study Area in 2000

Racial Group	Contra Costa County	CT 3200.02	CT 3211.01	CT 3212	CT 3270
Total Population	948,816	8,225	6,526	5,249	6,963
White	621,490 (65.5)*	6,525 (79.3%)*	5,244 (80.4%)*	3,809 (72.6%)*	5,037 (72.3%)*
African-American	88,813 (9.4%)*	202 (2.5%)*	239 (3.7%)*	176 (3.4%)*	239 (3.4%)*
American Indian and Alaskan Native	5,830 (0.6%)*	67 (0.8%)*	44 (0.7%)*	30 (0.6%)*	96 (1.4%)*
Asian	103,993 (11%)*	764 (9.3%)*	461 (7.1%)*	782 (14.9%)*	418 (6.0%)*
Native Hawaiian or Other Pacific Islander	3,466 (0.4%)*	17 (0.2%)*	21 (0.3%)*	12 (0.2%)*	62 (0.9%)*
Other Race	76,510 (8.1%)*	263 (3.2%)*	213 (3.3%)*	139 (2.6%)*	768 (11%)*
Two or More Races	48,714 (5.1%)*	387 (4.7%)*	304 (4.7%)*	301 (5.7%)*	343 (4.9%)*
Hispanic or Latino (of any race)	167,776 (17.7%)*	827 (10.1%)*	677 (10.4%)*	569 (10.8%)*	1,660 (23.8%)*

Source: U.S. Census 2000, http://factfinder.census.gov
* Percentage of total population represented

2.14.4 Community Cohesion

The proposed project would not change any existing community boundaries. Although Blum Road would be relocated for the project, the realignment would occur in a commercial/industrial area and would not disrupt any local neighborhoods. The realignment would not adversely affect access to existing properties.

2.14.5 Employment and Unemployment

The relocation of an auto accessory business on Pacheco Boulevard is likely to have a minimal impact on employment. The business is small, with few employees, and has other locations in Northern California. Any impacts to overall employment in the area are likely to be small and short-lived. Commercial properties are available in the Study Region for the relocation of the affected business.

The closure of Pacheco Mini Storage and U-Haul on Pacheco Boulevard is not likely to have unanticipated adverse impacts on employment within the community. The

facility is currently operated on land owned by Caltrans. The lease has a 2-year term and will expire before project construction would commence. Although the business would be displaced, the closure is anticipated and the lease will not be renewed.

2.14.6 Construction and Other Temporary Impacts

Certain areas of the Park and Ride lot on Blum Road would be blocked off during various phases of project construction, but proper construction staging should keep this to a minimum. Most public parking would be maintained through the project, with an ultimate increase in parking spaces in the second half of Phase 1.

The creeks would be temporarily impacted due to footing construction of the large bridge columns and some utility relocation. Construction noise will occur, including from activities such as pile driving. Traffic would be detoured throughout construction due to the relocation of utilities, construction of bridges, highway widening, and other activities. Nighttime closures of highways and streets can be expected due to bridge falsework erection and installation of sign bridges. Other traffic detouring and delays can be expected.

2.14.7 Cumulative Impacts

The proposed project is not expected to contribute to any cumulative impacts in the vicinity.

2.14.8 Mitigation and Avoidance Measures

Relocation assistance payments and counseling will be provided to persons and businesses in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Policies Act, as amended, to ensure adequate relocation and a decent, safe, and sanitary home for displaced residents. All eligible displacees will be entitled to moving expenses. All benefits and services will be provided equitably to all residential and business relocatees without regard to race, color, religion, age, national origins and disability as specified under Title VI of the Civil Rights Act of 1964.

Mitigation measures for the loss of homes and an area business would be adopted and finalized by CCTA and Caltrans. Appropriate mitigation may involve compensation for the cost of comparable units in the vicinity. Displacees would also be entitled to moving expenses. The Caltrans Relocation Assistance Program, as established by Federal and State law, would provide relocation assistance to the displacees. To the

extent possible, the aim will be to relocate households and the commercial property as close to the existing locations as possible.

A limited loss of property may be required within the existing parking areas for up to two area businesses and the California Highway Patrol, but business operations would not be affected. Public parking would be maintained throughout the project vicinity. While areas of the Caltrans Park and Ride lot may be affected by project construction, steps would be taken during the project construction phases to ensure that a net loss of parking is avoided. Any portions of the property impacted by construction would be fenced off and include appropriate signage. Circulation and access in the area would also be maintained.

2.15 Utilities and Emergency Services

2.15.1 Affected Environment

2.15.1.1 Utilities

Utilities in the project area include natural gas and electricity (Pacific Gas and Electric Company [PG&E]), telephone (SBC), water and sewer system (Central Contra Costa County Sanitary District), and solid waste (Contra Costa County and the City of Martinez). Petroleum lines are owned by Santa Fe Pacific and Tosco. Utility easements are located within the immediate project vicinity. The study area for affected utilities consists of the four census tracts affected by the project (Table 2.14-1).

2.15.1.2 Law Enforcement

Public safety services are divided by city/county jurisdiction. All unincorporated areas within the study area are served by the Contra Costa County Sheriff's Department. The Sheriff's Department is responsible for the county portions of the study area, and the City of Martinez Police Department is responsible for the city portions. The CHP has statewide enforcement authority on county and State highways.

The Sheriff's Department has an office on Muir Road west of the I-680/SR-4 interchange. Sheriff's officers can access SR-4 from Muir Road at the on- and off-ramps located just west of Pacheco Boulevard and at the Morello Avenue/SR-4 interchange west of the project. The CHP office is located off of Blum Road, adjacent to southbound I-680 on the north side of the interchange. CHP officers can

access the freeway system by taking Blum Road to Pacheco Boulevard and using the existing ramps at Pacheco Boulevard, located on the north and south sides of SR-4, to enter the freeway. The next-nearest access ramps to the freeways are at Concord Avenue to the south and at Pacheco Boulevard to the north of the BNSF railroad crossing.

2.15.1.3 Fire Protection

No fire stations are located within the study area. The Contra Costa County Fire Department's Stations 9 and 13 serve the study area. Station 9, which provides services to all of Pacheco and part of Vine Hill, is located at 209 Center Avenue in Pacheco. Station 13 provides service to the remaining portions of Vine Hill and northeastern Martinez.

2.15.1.4 Hospitals

Three area hospitals have been identified: Contra Costa Regional Medical Center, located at 2500 Alhambra Avenue in Martinez; Kaiser Foundation Hospital at 200 Muir Road in Pacheco; and the Mount Diablo Medical Center at 2540 East Street in Concord.

2.15.2 Permanent Impacts

The proposed project would call for the movement of utility lines along SR-4 and Berry Drive, including an 84-inch-diameter sanitary sewer line, gas, and electric lines. Due to the large diameter of the sanitary sewer line and the limited right-of-way, approximately 365 meters (1,200 feet) of the sanitary sewer line would have to be relocated very close to the adjacent mobile home community, the Concord Cascade Mobile Home Park. The relocation of the utility lines would not cause any change in service or accessibility to the local service area.

As noted in Section 2.15.1.2, the CHP has an office off of Blum Road and the Contra Costa County Sheriff has an office on Muir Road. Both law enforcement agencies use the existing ramps from Pacheco Boulevard and Muir Road to access SR-4 and I-680. With the installation of the I-680/SR-4 connectors under Phases 1 and 2, freeway access would remain the same except for the elimination of the northbound I-680 to SR-4 loop ramp and the eastbound SR-4 to southbound I-680 diagonal ramp. Slip ramps proposed for Phases 1 and 2 and conceptually approved by FHWA would maintain access between the freeway system and Pacheco Boulevard for these two directional movements, although the on- and off-ramps would provide access to and from the direct connectors to I-680 instead of SR-4. Phases 1 and 2 without slip

ramps would change access between northbound I-680 and Pacheco Boulevard and between the Muir Road/Pacheco Boulevard area and southbound I-680. CHP and Sheriff's officers could still use Pacheco Boulevard to reach the Concord Avenue/I-680 interchange or Muir Road to reach the Morello Avenue/SR-4 interchange, but the greater travel distance would increase their response time.

2.15.3 Temporary Impacts

During construction, no utility and emergency services would be interrupted. All service impacts would be avoided.

2.15.4 Cumulative Impacts

The proposed project would not contribute to any cumulative impacts to utilities or emergency services in the project area.

2.15.5 Mitigation Measures

The contractor would notify emergency service providers of the proposed dates of the construction of the overall project work and utility relocation work.

2.16 Traffic and Transportation

2.16.1 Affected Environment

The existing I-680/SR-4 interchange provides important connections between Contra Costa County's regional freeway networks and provides access between the freeway system and important local roads. Figure 1-2 shows the network of roadways, which are summarized below.

- **I-680** is a north-south freeway through central Contra Costa County, connecting I-80 at Cordelia to the north with Interstates 101 and 280 in San Jose to the south. Within the project area, I-680 has six free-flow lanes in each direction. In 2003, construction began on the southbound Marina Vista to North Main Street segment and the northbound SR-242 to Marina Vista segment to add an additional lane in the median that will be designated for HOV use.
- **SR-4** is an east-west freeway connecting I-80 at the City of Hercules to the west with SR-160 and the City of Oakley to the east. SR-4 has two mixed-flow lanes in each direction through the I-680 interchange area, widening to three mixed-

flow lanes in each direction west of the Pacheco Boulevard ramps. The CCTA 2004 Countywide Transportation Plan proposes adding a mixed-flow lane in each direction on SR-4 between SR-242 and Morello Avenue (2001 RTP, ID # 21079.) In addition, the 2001 RTP (ID # 21033) calls for HOV lanes between the I-680/SR-4 interchange and the SR-4 /SR-242 interchange.

- **Pacheco Boulevard** is a north-south arterial east of and parallel to I-680. It extends from Martinez to the City of Pleasant Hill, where it becomes Contra Costa Boulevard at its intersection with Concord Avenue. Connecting on-and off-ramps between SR-4 and Pacheco Boulevard are located to the west of I-680. Pacheco Boulevard is one lane in each direction north of SR-4 and two through-lanes south of SR-4.
- **Arnold Drive** is an east-west collector road parallel and to the north of SR-4, extending between Howe Road to the west and Pacheco Boulevard to the east. It is one lane in each direction.
- **Muir Road** is an east-west collector road parallel to and south of SR-4, extending between Center Avenue in the west and Pacheco Boulevard to the east. Muir Road is one lane in each direction.

Although this project emphasizes the regional problems and importance at the I-680 and SR-4 connections, the Pacheco Boulevard interchange to the immediate west of I-680 has been identified by local concerns as an important regional freeway access point. Hook ramps provide on and off access between SR-4 and Pacheco Boulevard. Within the project area, Pacheco Boulevard serves a mix of local businesses in the unincorporated portion of the county. The next closest connection to a regional freeway is near Arthur Road to the north and near Chilpancingo Parkway to the south. In addition to business and commercial freeway access, the Pacheco Boulevard ramps are used by the California Highway Patrol and the County Sheriff to enter the freeway from the regional facility on Blum Road. There is also a Park and Ride lot on Blum Road, and a survey of users indicates that the users originate from within and outside the county, and use the Pacheco Boulevard ramps.

Traffic analyses express operating conditions using a number of different parameters, but level of service is the most common. Level of service, or LOS, expresses how well a roadway or intersection is operating, based on the available capacity and the volume of predicted traffic. It is expressed in a scale of A to F, with A being the best or free-flow conditions. Predicted LOS for most of the I-680 and SR-4 freeway and connecting ramps is D to F, indicating congested conditions and delays. As described

in Section 1.2, especially poor operating conditions exist at the ramp junctions and at the relatively short weaving sections between on- and off-ramps, which cause backups of traffic onto the freeway mainline sections. Eastbound SR-4 to southbound I-680 also operates poorly, with most sections of the highway at LOS F. Existing and predicted traffic volumes are shown in Appendix I.

2.16.2 Permanent Impacts

The proposed project would improve the level of service at the majority of ramp junctions. All ramp junctions operating at unacceptable service levels in the year 2030 No Project conditions would either improve to acceptable service levels or be eliminated by the proposed project. Since the proposed project would eliminate several existing bottlenecks, it would result in an increase in mainline freeway volumes, and some ramp merge/diverge locations would operate at worse service levels in 2030. Under the 2030 with project conditions, the merge between northbound I-680 and the Burnett Avenue on-ramp during the peak evening hour and the merge between the southbound I-680 and the westbound SR-4 on-ramp during the morning peak hour would operate at LOS E. All other ramp junctions would operate at acceptable LOS D or better. The eastbound off-ramp from SR-4 to Morello Avenue would decline from LOS C to LOS D. Overall, traffic capacity and flow would improve, and no substantial traffic impacts are identified.

2.16.3 Temporary Impacts

Construction would result in some disruptions to traffic flow. A construction staging plan is developed for all highway improvement projects and would address temporary lane changes and traffic diversions. There is a potential for temporary increased delays during construction, and temporary diversions may have some impact to local traffic conditions.

2.16.4 Cumulative Impacts

No cumulative impacts have been identified.

2.16.5 Mitigation Measures

Construction of Phases 1 and 2 is anticipated over a 2-year period. Caltrans will require the contractor to include measures to avoid and minimize regional and local traffic disruption through notification of upcoming work and posting of detour or closure plans.

2.17 Visual/Aesthetics

This section describes the visual setting, impacts, and proposed mitigation measures for the project study area.

2.17.1 Methodology

The viewsheds, or areas from which the proposed project would be visible to the public, were defined by review of the existing interchange to determine locations and distances from which the interchange can be seen. On-site evaluations were conducted on May 21 and October 10, 2002, and on January 11, 2003.

The visual environment was subsequently assessed for views from sensitive receptors (adjacent residential properties, public access trails, and a recreational park in the vicinity), representing a range of views of the interchange. Views from roadways (motorists' perspective) were also examined in assessing visual effects. From these vantage points, the visual character of the project area was assessed based on vividness (memorability of landscape components), intactness (visual integrity of landscape), and unity (visual coherence and compositional harmony). These criteria are set forth in the Visual Impact Assessment for Highway Projects (FHWA 1983). Viewer sensitivity was estimated based on the use of the viewshed.

Views within the project area are limited except at higher elevations and along roadway corridors. Views from more distant locations, such as the slopes of Mount Diablo and the hills to the west of the project, are relatively far away and the distant or noticeable details of the existing highway structures are not distinct. Fifteen locations were photographed and two Key Views were identified as relatively representative of the visual environment affected by the project. The first is a view from the intersection of Riley Drive and Temple Drive looking northeast toward eastbound SR-4 behind trees and residential structures (View #10). This view is dominated by one-story single-family residences, trees, shrubs, and utility poles and lines. The second Key View is from the levee facing northwest across the Grayson Creek flood control channel toward the I-680/SR-4 interchange (View #11). Views from this position are of the riparian corridor, grassy slopes across the channel, and trees/shrubs. The Key View locations and directions are shown in Figure 2.17-1. The two Key Views are shown in Figures 2.17-2 and 2.17-3.

2.17.2 Affected Environment

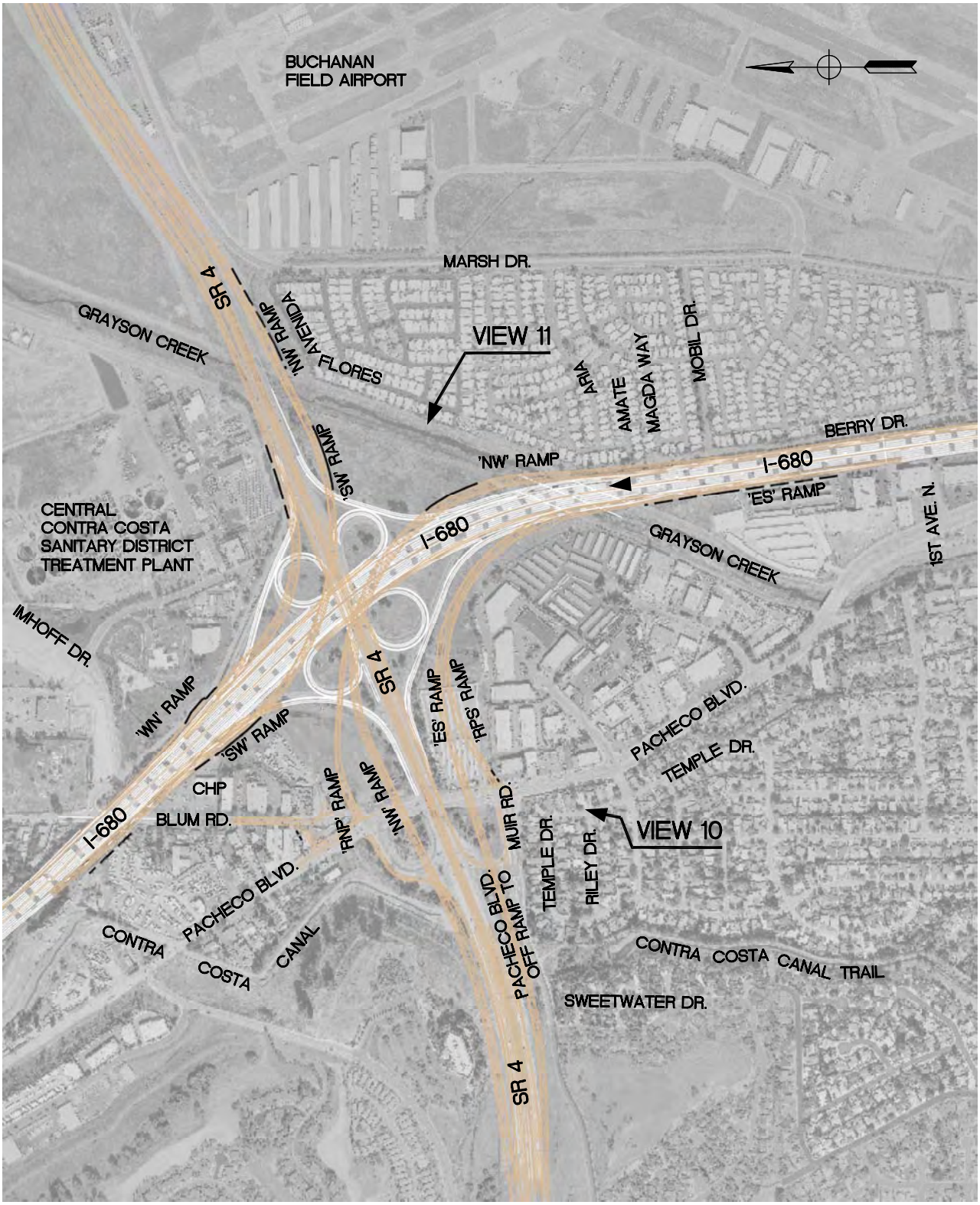
The I-680/SR-4-interchange is located on flat terrain above the San Ramon Valley. From the study area, Mount Diablo and its foothills are visible from a distance to the east, and Franklin Ridge and Briones Hills can be seen to the west. Mount Diablo and Franklin Ridge are the two most important scenic visual resources within the viewshed.

The project area is a largely built environment dominated by various forms of urban structures, the interchange and the Buchanan Field being the most prominent. I-680 south of the interchange and SR-4 west of the interchange are heavily landscaped with trees and shrubs, while other parts of the highways in the study area are more rural with a combination of grassy slopes and occasional trees. Neither I-680 nor SR-4 is designated as a California Scenic Highway. However, portions of I-680 and SR-4 are classified as Landscaped Freeways.

The natural landscape has been altered over time in all of the surrounding flat terrain areas of the proposed project. With the exception of the distant regional hills, all vistas reveal introduced and mixed plant species that are planned individually for each commercial or residential property. Consequently, there is little overall existing unity or cohesion in terms of landscaping patterns.

Grayson Creek crosses I-680 and SR-4 in the southeast quadrant of the project site. Although it is a gated flood control channel and is not formally open to the public, access is achieved through individual mobile home properties that border the levee. The course of the channel runs parallel to the mobile home properties, crossing I-680 to the west. Contra Costa Canal follows I-680, crossing the BNSF Railroad and SR-4 at the Pacheco on- and off-ramps. Contra Costa Canal begins at Muir Road and follows the Canal southward. Users of the trail can see SR-4 where it intersects with Muir Road.

The visual characters of the two Key Views (View #10 and View #11) are rated as low and moderate-high, respectively. View #10 has low vividness with limited memorability, and low intactness because the integrity of the visual environment is fragmented by encroaching human structures (see Figure 2.17-2). View #10 also has a low unity rating as utility poles/lines and the view of the highway fragment the visual environment. In contrast, because of the natural elements in the urbanized environment, View #11 is rated moderate for vividness, moderate for intactness, and high for utility (Figure 2.17-3).



LEGEND:

▲ Views 10 and 11

	Project No. 26812934 I-680/SR 4 INTERCHANGE IMPROVEMENT PROJECT	LOCATION AND DIRECTION OF KEY VIEWS 10 AND 11	FIGURE 2.17-1

Jun 30, 2004 - 10:17am
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VIEW 10A: Existing View of Temple Drive to I-680/SR4 Interchange

VIEW 10B: Photosimulation of Proposed Project on Temple Drive

	Project No. 26812934 I-680/SR 4 INTERCHANGE IMPROVEMENT PROJECT	PHOTOSIMULATION OF KEY VIEW No.10	FIGURE 2.17-2

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VIEW 11A: Existing View of I-680/SR4 Interchange from Avenida Flores Mobile Homes

VIEW 11B: Photosimulation of Proposed Project on I-680/SR4 Interchange from Avenida Flores Mobile Homes

	Project No. 26812934 I-680/SR 4 INTERCHANGE IMPROVEMENT PROJECT	PHOTOSIMULATION OF KEY VIEW No.11	FIGURE 2.17-3

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2.17.3 Permanent and Temporary Impacts

The proposed project would not result in substantial adverse visual impacts. Views within the project area are limited by urban structures and vegetation, except at higher elevations and through roadway corridors. Impacts that are expected to result from the proposed project are described in the following paragraphs.

During construction, which would last approximately 18–24 months per phase, viewers would generally see materials, equipment, workers, and the operations of construction equipment. Impacts of construction are unavoidable but would be temporary. Motorists and pedestrians would be exposed briefly to construction activities while passing through construction zones. Residents would be exposed on a more continuous basis. The installation of soundwalls during the early stages of construction would reduce both the noise and visual impacts to residents.

As a result of the construction planned during Phase 1 of the project, the loop ramp in the northeast quadrant of the interchange would be replaced with a new ramp connecting northbound I-680 to westbound SR-4 and the Pacheco Boulevard off-ramp. Motorists would see less of the pavement and more landscaped area where the loop ramp currently exists. In its place, the new Phase 1 connector would create an additional horizontal structure directly above the existing I-680 and SR-4 highway and overcrossing structures. This impact would not be substantial because from any vantage point the new structure would be visible by motorists for less than one second more than the current SR-4 overcrossing, and would not substantially impair existing views of the surrounding area.

Additional pavement may also be visible in areas where travel lanes transition to the ramp. From southbound I-680, the views of Mount Diablo, which are currently unobstructed, would be partially blocked for approximately four seconds, or slightly longer if a traffic delay occurred on southbound I-680. Motorists on the ramp connecting northbound I-680 with eastbound SR-4 will have elevated views of the surrounding terrain to the north and east. To the west, existing views of Grayson Creek below would be briefly blocked by a soundwall. A similar structure and effect would appear on the new NB I-680 to WB SR-4 ramp. Although other long range views may be briefly blocked, no substantial adverse effects are anticipated.

Mobile home residents on Avenida Flores (in the mobile home residential area in the southwest quadrant of the interchange) would have views of the northwest connector

after the completion of Phase 1. Views of Franklin Ridge would also be partially blocked by the project (Figure 2.17-3).

Phase 2 construction would include removal of the diagonal connecting ramp in the southwest quadrant, addition of a ramp connecting eastbound SR-4 with southbound I-680, and the Pacheco Boulevard on-ramp to southbound I-680. Residents of the Temple Drive neighborhood in the southwest quadrant of the interchange would be able to see the east-to-south connector ramp, which will appear above the existing terrain and may be seen beyond the roofs of residences in this neighborhood (Figure 2.17-2). Users of the Contra Costa Canal Trail, in the vicinity of its northern terminus at Muir Road, would see the southeast connector ramp when looking to the north/northeast (toward the existing highways). Where the structures for Phases 1 and 2 are visible, there would be potential glare and lighting impacts from visibility of the cars at night, and any potential safety lighting of the freeway ramps. While the original visual character of the view from these locations would be changed permanently, adverse visual impacts would be mitigated.

Figures A-1 through A-13 in Appendix A show the locations of soundwalls in the project area. Wherever a soundwall is ultimately installed, it would be constructed to maintain the design integrity of the surrounding area; however, the character of the view would change. Where space permits, shrubs and vines would be planted in front of the soundwalls to mitigate for the changes to the visual character of the area. In areas where vines or shrubs cannot be planted, the perceived visual impact would be reduced with the implementation of texture, color and pattern applied to the surface walls. The aesthetic treatment applied would be similar to existing walls within the corridor to provide a sense of unity and cohesiveness.

2.17.4 Cumulative Impacts

Within the viewshed of the interchange, the other regional project that would affect visual resources is the completion of the I-680 HOV Lane Project. Since the area is highly urbanized and has been altered many times, this project would not have a substantially adverse cumulative impact on visual characteristics of the area. The addition of HOV lanes on I-680 required removal of all vegetation in the median as well as within the four loop ramps of the interchange. (The I-680 HOV Lane Project required a relocation, or shift outward, of the loop ramps.) The construction of Phases 1 through 5 of the proposed project would have the cumulative effect of removing additional areas of vegetation within the right-of-way, primarily along

SR-4. However, no vegetation remains in the median of SR-4 in the interchange area, limiting this impact to clearance of shrub and groundcover vegetation along connector ramps and the outer edges of SR-4. These changes would not contribute to additional adverse cumulative impacts.

2.17.5 Mitigation Measures

The following measures are recommended for the proposed project. These measures would be developed in detail in landscaping plans for the project, during the project design phase.

- Design and place landscaping along areas disturbed by construction to screen the roadway and associated vehicles. Categories of landscaping have been initially identified at a conceptual level for the project right-of-way in the visual resources technical report. These categories identify general areas suitable for varying heights of ground cover and shrubs, trees, grasses and wildflowers (for erosion control), and vines (potentially for soundwalls). An actual planting design would be developed during the overall design stage of project planning. New and replacement planting will be carried out within State right-of-way in conformance with Caltrans standards for types of species, setback clearances, and maintenance criteria. Native plant species will be considered. In areas where direct replacement planting is not possible due to setback requirements, planting would be placed within interchange areas. The planting design will conform to FAA standards for height restrictions in and around Buchanan Field Airport.
- Slope rounding techniques would be utilized to integrate the structures into the landscape by sculpting the earth so that it follows the horizontal direction and the gradient of the slopes of the ramps, and by making the transitions from the flat areas to the slopes gradual in appearance.
- To avoid or minimize impacts on adjacent properties, retaining walls will be constructed. The walls' color and textures will match existing walls within the project limits.
- Limit and design lighting to minimize light intrusion into adjacent areas. Include landscaping, where space allows, to help screen lighting from vehicles to residential areas adjacent to the freeways.

Soundwalls are proposed for noise abatement purposes. Walls will be similar in design and treated with aesthetic finishes to be consistent with existing walls within

the project limits and along the I-680/SR-4 corridor. Soundwalls and retaining walls will be reviewed during project development for installation of planting where adequate space is available and maintenance is feasible. Vine plantings at even intervals along the soundwalls would be planted as a minimum mitigation measure (where space allows) to reduce the walls' visual dominance and glare and to deter graffiti.

2.18 Historical Resources

The historic resources evaluation report prepared for this project details the history of development in the Contra Costa area, including the formation of the initial Mexican land grants, early settlement by Europeans, expansion of agriculture and industry, the development of the region's infrastructure, and expansion of residential housing (JRP 2003). The following briefly summarizes that background. All elements of the built environment within the project's defined Area of Potential Effect (APE) were evaluated, and one feature (the Contra Costa Canal) was identified as potentially eligible for listing in the NRHP.

2.18.1 Affected Environment

2.18.1.1 Historical Background

Early Historical Background

Formal ownership of lands in the Contra Costa County area began with Mexican government land grants for cattle operations in the early to mid 1800s. European settlement primarily occurred after the beginning of the California Gold Rush in 1848. The town of Pacheco was established in 1853 on lands purchased between Grayson and Walnut Creeks, and quickly became one of the busiest and more prosperous towns in the county. Traffic passed through Pacheco on the way to Martinez, and the then-navigable Pacheco Creek provided a water route for shipping agricultural products. However, being in the confluence of Grayson and Walnut Creeks subjected Pacheco to severe flooding, ruining plowed fields and filling Pacheco Creek with silt. Many businesses relocated to the new town of Concord, built on higher ground, and Pacheco's importance as a shipping center ended by the close of the 19th century.

Commerce and Agriculture

Agriculture was the major economic base for the county during the 19th century. Early settlers harvested wild hay to support the large "rancho" livestock operations

transitioned to cultivated grain production, particularly wheat. Both Martinez and Pacheco were major shipping points for California's Central Valley and Sacramento-San Joaquin River Delta wheat producers. Following the decline of the wheat industry in the late 1800s due to overproduction, farmers converted fields to orchards and vineyards, and much of the land in the project area was agricultural until the expansion of residential development primarily after World War II. Other early businesses in the Pacheco and Martinez area included the Contra Costa Gazette newspaper, hotels, and the Grand Casino.

Residential and Community Development

Although agricultural use continued to dominate into the Great Depression period, by the 1920s, landowners were beginning to sell agricultural lands to subdivision developers. During and following the war, families associated with the military increased the demand for housing. Subdivisions such as Beckett Acres, which is within this project's APE, is an example of the small residences and street patterns that typified these newly expanding suburbs of the Bay Area. These homes, built in the mid 1950s, represented single-family dwellings with relatively similar layout plans and construction. The overall increase in homes prompted the construction of community services such as the Pleasant Hill Shopping Center and Diablo Valley College.

Transportation

The project area's initial roadway network began with simple paved roads connecting Martinez and Pacheco, followed by the Arnold Industrial Highway, the predecessor to SR-4. Envisioned to connect agricultural and industrial uses, the highway opened to traffic in 1939. The original Arnold Industrial Highway portion of SR-4 (including through the project area) was upgraded in segments between 1967 and 1981. I-680 was initially completed in 1961 with four lanes in each direction, with a cloverleaf connection at SR-4.

Water Resource Infrastructure

Three water conveyance features are within the project's APE: Walnut and Grayson Creeks, and the Contra Costa Canal. The State Division of Highways designed SR-4 to cross through the lower floodplain of Walnut Creek and was concerned about flood risks. During construction in 1938 and 1939, a portion of Walnut Creek was channeled and the Walnut Creek Levee was constructed to help confine floodwaters. The Grayson Creek Levee was constructed sometime between 1947 and 1959 for the same purpose. The Contra Costa Canal is a component of the U.S. Bureau of

Reclamation's Central Valley Project (CVP). The canal crosses the project's APE twice, once under I-680 in the northern portion of the APE and the other in the western extent of SR-4. The CVP was designed as a statewide system of canals, reservoirs, and transfer systems that would serve as a storage and distribution system. Construction of the overall system began in 1931 with emphasis on job creation under the New Deal program implemented by President Franklin D. Roosevelt. The CVP had five major components: the Shasta Dam, Delta-Mendota Canal, Friant Dam, Friant-Kern Canal, and the Contra Costa Canal. The 46-mile-long Contra Costa Canal was designed to deliver water to farms, industries, and homes in the Sacramento-San Joaquin River Delta and northern Contra Costa County. With a period of significance from 1937, the start of the original construction of the canal, to 1951, when permanent water supply contracts for water deliveries were signed, the canal has provided a necessary supply of freshwater to meet the growing municipal and industrial demand of an expanding Contra Costa County, while continuing to serve the region's diminishing agriculture economy. Its completion also essentially solved the problem of saltwater intrusion to groundwater resources in eastern Contra Costa. The Contra Costa Canal is of historic significance (at the State level) as an original and integral unit of the CVP and at the local level for its importance in the economic and industrial development of the eastern portion of the county.

2.18.1.2 Historical Resource Investigations

A study area, defined as the APE, was used to inventory and evaluate the potential significance of architectural or other built resources. The APE extended one parcel back surrounding the proposed right-of-way for each of the alternatives and was expanded to include parcels that might be used for construction.

Before field surveys were conducted, various listings of properties on the California Historic Resources Inventory System were reviewed for previous determinations of eligible or ineligible resources at the Federal, State, or local level. Historic context and site-specific research on individual properties was conducted at the California State Library; Shields Library at the University of California, Davis; the Caltrans headquarters library in Sacramento; the Caltrans District 4 Maps and Plans Office; the Contra Costa County Assessor's Office and Recorder's Office; and the county library. Personal interviews were also conducted. The Caltrans Historic Bridge Survey was reviewed. Background research was performed on building ages through real estate databases and review of area maps. Letters were sent to regional historical societies requesting information.

A survey was performed to account for all buildings and structures within the APE. This determined in part which buildings and structures were potentially over 45 years of age (i.e., constructed before 1957) or otherwise exhibited characteristics potentially meeting the criteria for listing in the NRHP or the California Register of Historic Resources (CRHR). Resources over 45 years of age were recorded individually with extensive field notes and individual photographs. Of the 170 parcels within the APE, 23 contained buildings or structures constructed before 1957. None of the properties less than 45 years in the APE were recorded as they were determined to not exhibit features of exceptional significance required for further evaluation.

2.18.1.3 Historical Resources

One property within the APE has been determined eligible for listing in the NRHP. Eligibility requires that a resource have both integrity to a discrete period of significance and historical significance under one of four specific criteria. The Contra Costa Canal was determined to meet the criteria for listing in the NRHP at the State level under Criterion A for its association with "events that have made a significant contribution to the broad patterns of our history" and at the local level under Criterion A for its association with the development of eastern Contra Costa County. It is associated with the construction and operation of the CVP, and with the industrial and economic development of eastern Contra Costa County during the period of 1937 through 1951.

No other buildings and structures within the APE were determined to meet the NRHP or CRHR criteria. None of the levees, highway bridges, and residential or nonresidential buildings was determined to qualify.

2.18.1.4 Permanent and Construction Impacts

The only property that meets the criteria for listing in the NRHP and CRHR is the Contra Costa Canal. Anticipated construction actions at the Contra Costa Canal are described in Section 1.3.2. This project's Historic Property Survey Report describes the findings and conclusions for the canal and concludes that the project would have no effect on historic properties. No part of the canal will be destroyed or damaged by the project. The two sections of the canal that pass beneath SR-4 and I-680 were already altered from their original condition by modernization of the two routes over the past 40 years. The proposed project will cause no additional change to the original condition of the canal at either location; rather, it will simply add modern sections to structures in the canal that have been previously altered and modernized.

No other properties affected by the project were determined to be eligible or partially eligible for listing in the NRHP or CRHR. No other adverse impacts to protected historic properties would occur from project phases.

2.18.2 Cumulative Impacts

No cumulative impacts have been identified.

2.18.3 Mitigation Measures

No adverse impacts to historic resources were identified.

2.19 Archaeological Resources

An archaeological survey report and historic property survey report were prepared for the proposed project to comply with the applicable sections of the National Historic Preservation Act and the implementing regulations of the Advisory Council on Historic Preservation. The following summarizes the reports and findings.

2.19.1 Affected Environment

2.19.1.1 Early Inhabitants

The earliest period of human occupation of the Bay Area is unknown, although evidence indicates presence in the greater regional area (e.g., as far north as Clear Lake) between 5,000 and 10,000 years ago. A precise chronology has not been established, and the cultural relationship of inhabitants of the Bay Area to more interior populations is not firmly known. However, the patterns of occupation have been generally grouped into three concepts: the Windmiller (approximately 4500 to 2,500 years ago, or early middle horizon), Berkeley (2,500 to 1,500 years ago, or middle horizon), and Augustine Patterns (1,500 to 150 years ago or late prehistoric). Each period typifies characteristics of the use of food sources, tools, burials, and artifact remains, and indicates patterns of occupation by people that established trade networks and generally collected, gathered, and hunted a wide variety of food.

2.19.1.2 Ethnography

The study area is located in the traditional territories of the Bay Miwok and the Costanoan peoples. Evidence suggests the ancestors of the Miwok settled in the vicinity of the project area during the Middle Horizon of California prehistory. The territory of the Bay Miwok (Saclan tribelet according to Levy 1978b or Tatcan

tribelet according to Milliken 1995) stretched from Walnut Creek to the delta region of the Sacramento and San Joaquin rivers. Upon contact with the Spanish, the Bay Miwok were the first of the Eastern Miwok to have some members converted to Christianity. The word Costanoan was applied by the Spanish to the natives living along the coastal regions in the area, although eight languages were spoken among the Costanoans. In the project area, a single tribelet of Costanoans spoke Carquin/Karkin. Levy (1978a) suggests the ancestors of the Costanoans settled in the San Francisco Bay Area around A.D. 500.

Euroamerican contact with the Bay Miwok first occurred during a series of Spanish expeditions into the area between 1769 and 1776. By 1806 to 1810 most of the Indians from the inner Bay Area had already been baptized, and peoples who lived farther from the missions began to experience the same events and processes that earlier caused the first migration to the missions, particularly famine and diseases such as measles and syphilis. The Mexican Period was marked by secularization as the Spanish-colonial mission system collapsed and their lands fell out of mission control. Many Costanoans and Miwok formed multiethnic communities around the Bay Area in an attempt to maintain some aspects of their traditional lifestyle. These communities gradually shrank in size. By 1845 most land holdings were within large ranchos.

2.19.1.3 Archaeological Investigations

An APE was also established for archaeological resources. Unlike the historic resources APE that considers properties outside of the project's proposed right-of-way, the archeological APE was defined to encompass areas that construction would occur, including areas where construction crews may use for temporary staging. Therefore, the archaeological APE covers the project's existing and proposed right-of-way and temporary construction areas that might be used by the contractor.

A search of pervious surveys and known records of sites was performed for areas in and surrounding the archaeological APE. These included a record search at the Northwest Information Center of the California Historical Resources Information Center at Sonoma State University. Seven previous surveys yielded negative findings, no archaeological sites were recorded within the APE, and two historic properties were identified within 1.6 km (1 mile). The previous survey results were reviewed prior to this project's field survey.

An intensive survey was conducted of the entire archeological APE by qualified archaeologists. No evidence of cultural materials was found.

2.19.1.4 Consultation

In addition to consulting the California Historical Resources Information Center for previous surveys and archaeological records, the Native American Heritage Commission was contacted. No sacred lands were identified in the project's APE, and a list of individuals and groups with potentially special knowledge of the project area was provided. Letters were sent to these groups and individuals. Those contacted had no additional information concerning potential sacred lands within the project area, but several individuals expressed interest in being contacted if resources are encountered during construction. One individual not identified by the Native American Heritage Commission wrote a letter expressing concern about a site located southeast of the interchange toward the Buchanan Field Airport vicinity, and requested an investigation should disturbance of the site be necessary. The site is recorded as containing artifacts and a burial but is outside of the APE. No evidence of this site was observed during the archaeological survey for the project.

2.19.2 Permanent and Temporary Impacts

Review of previous records and the results of the archaeological survey of the project's archeological APE found no evidence of prehistoric or historic materials, evidence of archaeological deposits, or indications of occupation. No adverse impacts to these resources were identified.

2.19.3 Cumulative Impacts

No cumulative impacts to archeological resources were identified in the project area.

2.19.4 Mitigation Measures

No further archaeological work is necessary within the current project APE. If, in the future, the project expands to include unsurveyed lands, then additional archaeological work may be necessary. Likewise, if cultural materials are encountered during ground-disturbing activity associated with this project, all work in the vicinity of the discovery must halt until a qualified archaeologist makes an assessment of the find and follows the proper protocol for the specific type of cultural material. Special note should be made regarding this stop work requirement in the area outside of the APE, southeast of the I-680/SR-4 interchange toward Buchanan Field Airport, consistent with the concern expressed about a known site in that area.

Chapter 3 Required Approvals and Coordination

3.1 Permits and Approvals

A number of public agencies are involved in the review and oversight of the proposed I-680/SR-4 Interchange Improvement Project, as summarized below.

Because the proposed project has Federal funding and involves modifications to an interstate freeway, Caltrans and the FHWA have review and oversight authority. As noted in Section 1.3, FHWA must issue final approval of the slip ramps that are described for Phases 1 and 2.

In addition to the above lead agencies, other regulatory authorities are involved in the review of the EA/IS and in some cases have regulatory jurisdiction that requires a separate permit or approval for the proposed project. These agencies and their roles are briefly summarized below. Relevant copies of agency consultation are included in Appendix H.

- **U.S. Fish and Wildlife Service.** The USFWS reviews projects consistent with Section 7 of the Federal ESA of 1973, focusing on identified or potential impacts to protected plant and wildlife species. Consultation with USFWS is also required under the Federal Fish and Wildlife Coordination Act for any impacts to a stream or water body (such as Grayson Creek). Coordination on this project involved the request for, and review of, any information on endangered and threatened species in the project region. Informal consultation was completed with the USFWS regarding potential impacts to the California red-legged frog; concurrence was received with the conclusion that the project is unlikely to result in a take of the species.
- **U.S. Army Corps of Engineers.** Any filling of wetlands or impacts to the waters of the United States or navigable waters requires permit review and approval by the USACE consistent with Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. All five phases of the interchange improvements would permanently fill approximately 0.09 ha (0.023 acre) of wetland at Grayson Greek and Walnut Creeks. It would temporarily impact another 1.01 acres of wetlands at Grayson and Walnut Creeks and a flood control channel. The project appears

to qualify for a Nationwide Permit authorization. An application to the USACE would be completed and submitted during final design of the project.

- **NOAA Fisheries.** Central Valley steelhead ESU and chinook salmon individuals have been occasionally sighted in Grayson and Walnut Creeks, and the project includes mitigation and construction measures to avoid impacts to these species. The consultation with NOAA on these species is included in Appendix H, and the avoidance measures are discussed in Appendix C.
- **Section 106, National Historic Preservation Act.** Federally funded transportation projects must follow FHWA and Caltrans procedures for historic preservation. A Programmatic Agreement for compliance with Section 106 of the National Historic Preservation Act, as it pertains to Federally funded or sponsored highway projects in California, became effective January 1, 2004. This agreement stipulates new procedures and passes additional authority to Caltrans for identification, evaluation, documentation, and consultation. Studies for this project identified the Contra Costa Canal as potentially eligible for inclusion in the NRHP, and the State Historic Preservation Officer (SHPO) concurred (see Appendix H). The evaluation of the proposed project concluded that there would be no effect on the Contra Costa Canal or any other historic property.
- **California Department of Fish and Game.** Sections 1600–1606 of the California Fish and Game Code give CDFG regulatory permit authority over construction or fill activities proposed within the bed, channel, and banks of all streams, rivers, and lakes. Alteration of these features may require submission of a Streambed Alteration Notification and approval by CDFG. If needed, CDFG review or permit approval (at Grayson and Walnut Creeks) would be completed during final design of the project.
- **Regional Water Quality Control Board and State Water Resources Control Board.** Any permit issued by the USACE will stipulate that the state must provide a certification or waiver of water quality consistent with Section 401 of the Federal CWA. The RWQCB and State Water Resources Control Board will review the USACE's proposed permit and the project when considering approval of this water quality certification. In addition, the 1992 amendments to the CWA require that a project that involves the disturbance of 0.4 ha (1 acre) or more must be covered by an NPDES storm water permit. Applications for these permits/approvals would be completed during final design of the project.

Chapter 4 List of Preparers

This document and its related technical studies were prepared under the supervision of Caltrans District 4. The PDT was responsible for oversight of the project, consisting of members from Caltrans, FHWA, CCTA, and Contra Costa Public Works Department.

Key PDT Members

- Jerry Morgan, Project Manager, District 4 Design
- John Chang, Project Manager (through Summer 2003), District 4 Design
- Bonnita Chow, Senior Transportation Engineer, Caltrans District 4 Design
- John Poon and JB Reynoso, Transportation Engineers, Caltrans District 4 Design
- Barney Wong, District 4 Branch Chief, Contra Costa /Solano Counties
- Joe Robinson, District 4, Associate Environmental Planner, Contra Costa/Solano Counties
- Steve Healow, FHWA Area Engineer
- R.C. Slovensky, FHWA
- Susan Miller, Engineering Manager, Contra Costa Transportation Authority
- Hank Haugse, Nolte and Associates (consultant to CCTA)
- Al Schall, Contra Costa County Department of Public Works
- Scott Kelsey, Project Manager, URS Corporation
- Sujan Punyamurthula, Assistant Project Manager, URS Corporation
- Jeff Zimmerman, Environmental Manager, URS Corporation

Individuals Involved in Caltrans Oversight and Environmental Study Review

- Andre Nguyen, Senior Environmental Engineer – Reviewed: Noise and Air Quality

- Tim Mehta, Senior Environmental Engineer, Office of Environmental Engineering – Reviewed: Water Quality and Phase I Site Assessment/Hazardous Materials
- Grant Wilcox, Office Chief, Geotechnical – Reviewed: Geology
- Elizabeth Krase, Branch Chief, Architectural History, Office of Cultural Resources – Reviewed: Historic Resources
- Elizabeth McKee, Branch Chief, Archaeology, Office of Cultural Resources Studies – Reviewed: Archaeological and Historic Properties
- Ahmad Hashemi, Senior Environmental Planner – Reviewed: Wetlands and Natural Environment
- Joe Robinson, Associate Environmental Planner, Contra Costa/Solano Counties – Reviewed: Community Impacts

Individuals Involved in Environmental Document Preparation

The following key consulting team staff (and their summary qualifications) were responsible for the preparation of the environmental document, and its supporting studies and reports:

Sandy Davidson, B.S., Forest Management Science. Experience in natural resource management and water quality. Contribution: Hydrology and Water Quality Study Report.

Clark Fenton, Ph.D., Neotectonics and Paleoseismicity. Experience in geology and geologic hazards. Contribution: Geologic Hazards Report.

Brian Hatoff, M.A., Anthropology. Experience in cultural resource management. Contribution: Senior reviewer and manager of Cultural Resources Studies.

Manisha Kothari, M.S. Foreign Service. Experience in relocation, socioeconomic, and environmental document preparation. Contribution: Community impact assessment and environmental document coordination.

Rosemary Laird, M.A., Marine Science. Experience in biological survey preparation. Contribution: Natural Environment Study and California Red-Legged Frog Assessment.

Steve Leach, M.A., Vegetation Ecology. Experience in conducting biological impact assessments. Contribution: Managed biological resources studies and reports.

Corinna Lu, M.A., Geography. Experience in conducting biological surveys and research. Contribution: Wetlands Study.

Chris Lee, B.A., Anthropology. Experience in performing cultural resource assessments. Contribution: Archaeological and Historic Properties Survey Report.

Joe Morgan, B.S., Chemistry. Experience in environmental document preparation and hazardous materials management. Contribution: Phase 1 Site Assessment.

Walter Thistlewaite, Ph.D., Environmental Health Sciences. Experience in environmental science policy and land use impact assessment. Contribution: Land Use assessment.

Geoff Thornton, B.S. Biochemistry. Experience in air quality and energy impact analysis. Contribution: Energy Report.

Cheri Velzy, B.S., Meteorology. Experience in air quality analysis. Contribution: Air Quality Report.

Jeff Zimmerman, B.S., Conservation of Natural Resources. Experience in environmental documentation and CEQA/NEPA process. Contribution: Environmental and document project manager.

Technical reports and project support were provided by subcontractors to URS. The following individuals contributed to the EIS/EIR:

Haygood and Associates

Leah Haygood, specialist in landscape architecture and visual impact assessment. Contribution: Visual Impact Assessment Report.

Charlene Saito, specialist in visual simulations and impact assessment. Contribution: Assistance on Visual Impact Assessment Report.

Illingworth & Rodkin Inc.

James Reyff, specialist in noise and air quality assessment. Contribution: Noise Impact Report.

Michael Thill, specialist in noise assessment. Contribution: Assisted on Noise Impact Assessment and Report.

JRP Historical Consulting Services

Stephen Mikesell, M.A., History. Contribution: Prepared the Historic Architectural Survey Report / Historic Resource Evaluation Report.

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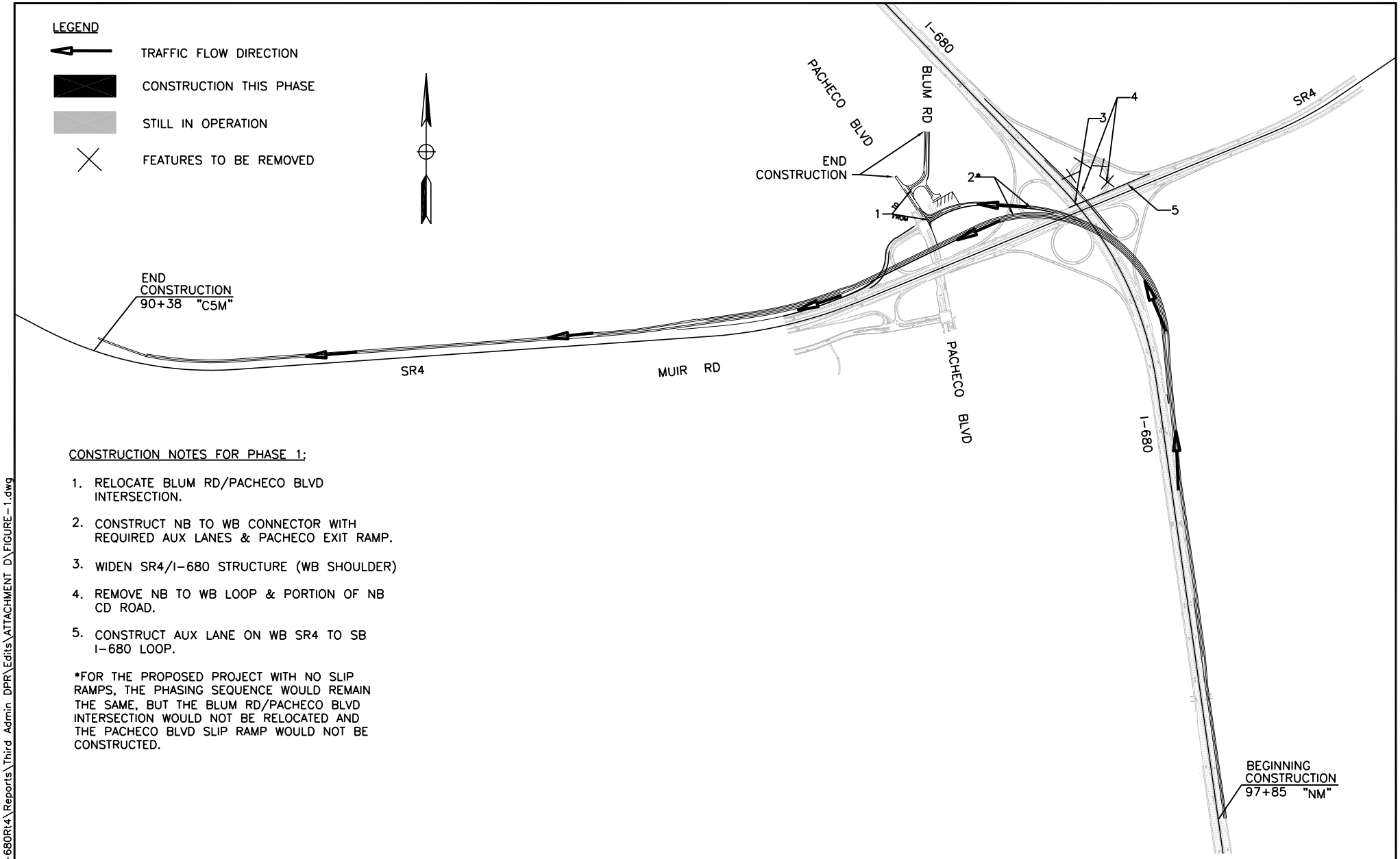
Chapter 6 List of Technical Studies

The following technical studies were prepared to support this environmental document:

- Air Quality Impact Assessment, August 2003
- Archaeological Survey Report, October 2004
- California Red-Legged Frog Site Assessment, February 2003
- Community Impact Assessment (includes Draft Relocation Statement), January 2003
- Geological Impact Assessment, June 2003
- Historic Property Survey Report, October 2004 (includes Area of Potential Effect maps signed in July 2004)
- Historic Resource Evaluation Report, March 2004
- Location Hydraulic Study Report, April 2004
- Natural Environment Study Report, April 2003
- Noise Impact Study, June 2004
- Phase I Environmental Site Assessment, December 2002
- Storm Water Data Report, November 2004
- Traffic Analysis Report, June 2004
- Visual Resources Impact Report, January 2005
- Water Quality Report, December 2002
- Wetland Delineation Report, April 2003

Appendix A Project Phases and Details

This appendix contains two sets of figures that illustrate the project area. Figures A-i through A-v show schematics of each phase of construction. Keymap Figure A-K and Figures A-1 through A-13 show all of the project phases overlaid on background aerial photos.



CONSTRUCTION NOTES FOR PHASE 1:

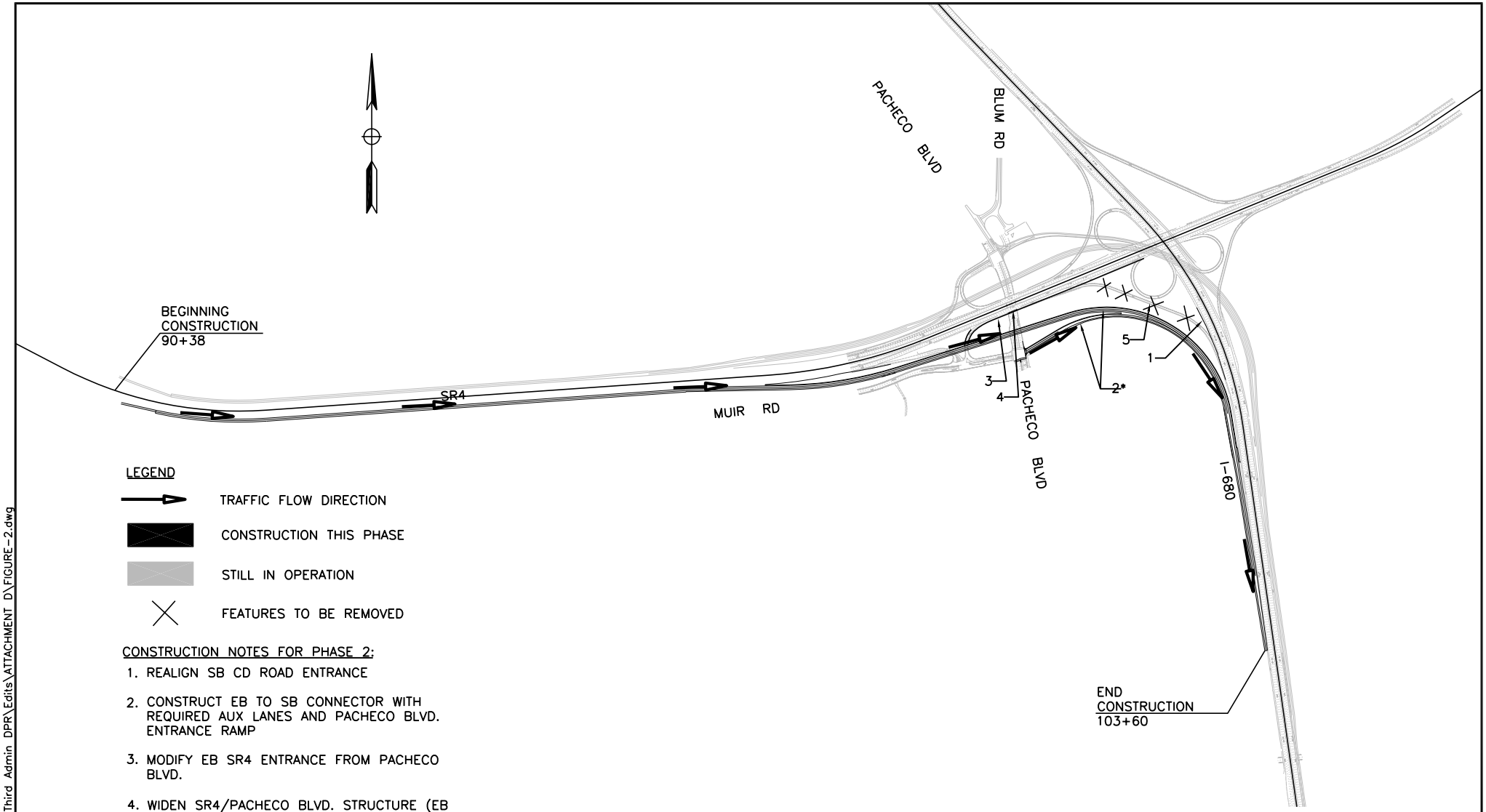
1. RELOCATE BLUM RD/PACHECO BLVD INTERSECTION.
2. CONSTRUCT NB TO WB CONNECTOR WITH REQUIRED AUX LANES & PACHECO EXIT RAMP.
3. WIDEN SR4/I-680 STRUCTURE (WB SHOULDER)
4. REMOVE NB TO WB LOOP & PORTION OF NB CD ROAD.
5. CONSTRUCT AUX LANE ON WB SR4 TO SB I-680 LOOP.

*FOR THE PROPOSED PROJECT WITH NO SLIP RAMPS, THE PHASING SEQUENCE WOULD REMAIN THE SAME, BUT THE BLUM RD/PACHECO BLVD INTERSECTION WOULD NOT BE RELOCATED AND THE PACHECO BLVD SLIP RAMP WOULD NOT BE CONSTRUCTED.

NOT TO SCALE

Project No. 26812933	PHASE 1	FIGURE
I-680/SR 4 INTERCHANGE PRELIMINARY PHASING	NORTHBOUND TO WESTBOUND CONNECTOR	A-i

X:\x_tss\ZIP\x_trans\I-680Rt4\Reports\Third Admin DPR\Edits\ATTACHMENT D\FIGURE-1.dwg



LEGEND

TRAFFIC FLOW DIRECTION

CONSTRUCTION THIS PHASE

STILL IN OPERATION

FEATURES TO BE REMOVED

CONSTRUCTION NOTES FOR PHASE 2:

1. REALIGN SB CD ROAD ENTRANCE
2. CONSTRUCT EB TO SB CONNECTOR WITH REQUIRED AUX LANES AND PACHECO BLVD. ENTRANCE RAMP
3. MODIFY EB SR4 ENTRANCE FROM PACHECO BLVD.
4. WIDEN SR4/PACHECO BLVD. STRUCTURE (EB SHOULDER)
5. REMOVE EB TO SB DIAGONAL RAMP

* UNDER THE PROPOSED PROJECT WITH NO SLIP RAMPS THE PHASING SEQUENCE WOULD REMAIN THE SAME HOWEVER THE SLIP RAMP FROM PACHECO BLVD. WOULD NOT BE INCLUDED IN THE PROJECT.

NOT TO SCALE

Project No. 26812933	PHASE 2	FIGURE
I-680/SR 4 INTERCHANGE PRELIMINARY PHASING	EASTBOUND TO SOUTHBOUND CONNECTION	A-ii

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CONSTRUCTION NOTES FOR PHASE 3:

1. WIDEN SR4 IN MEDIAN & ADD MEDIAN BARRIER OR DOUBLE THRIE BEAM AS REQUIRED
2. SHIFT LANES ON WB AND EB SR4 AT PACHECO
3. WIDEN SR4/PACHECO STRUCTURES (EB AND WB SHOULDER)
4. WIDEN SR4/I680 STRUCTURE (EB SHOULDER)

NOT TO SCALE

Project No. 26812933	PHASE 3	FIGURE
I-680/SR 4 INTERCHANGE PRELIMINARY PHASING	WIDENING	A-iii

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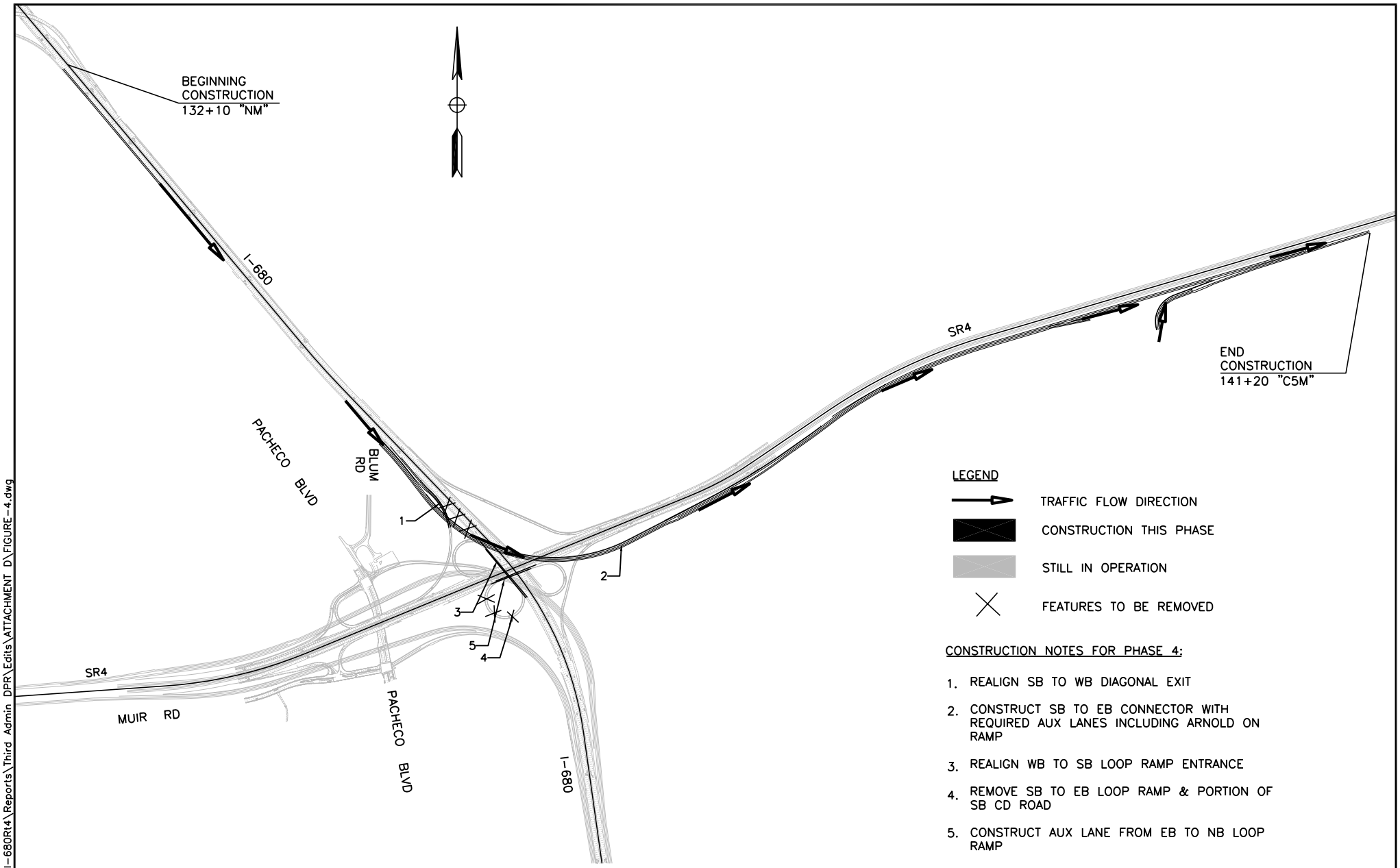

CONSTRUCTION NOTES FOR PHASE 4:

1. REALIGN SB TO WB DIAGONAL EXIT
2. CONSTRUCT SB TO EB CONNECTOR WITH REQUIRED AUX LANES INCLUDING ARNOLD ON RAMP
3. REALIGN WB TO SB LOOP RAMP ENTRANCE
4. REMOVE SB TO EB LOOP RAMP & PORTION OF SB CD ROAD
5. CONSTRUCT AUX LANE FROM EB TO NB LOOP RAMP

NOT TO SCALE

Project No. 26812933	PHASE 4	FIGURE
I-680/SR 4 INTERCHANGE PRELIMINARY PHASING	SOUTH BOUND TO EASTBUND CONNECTOR	A-iv

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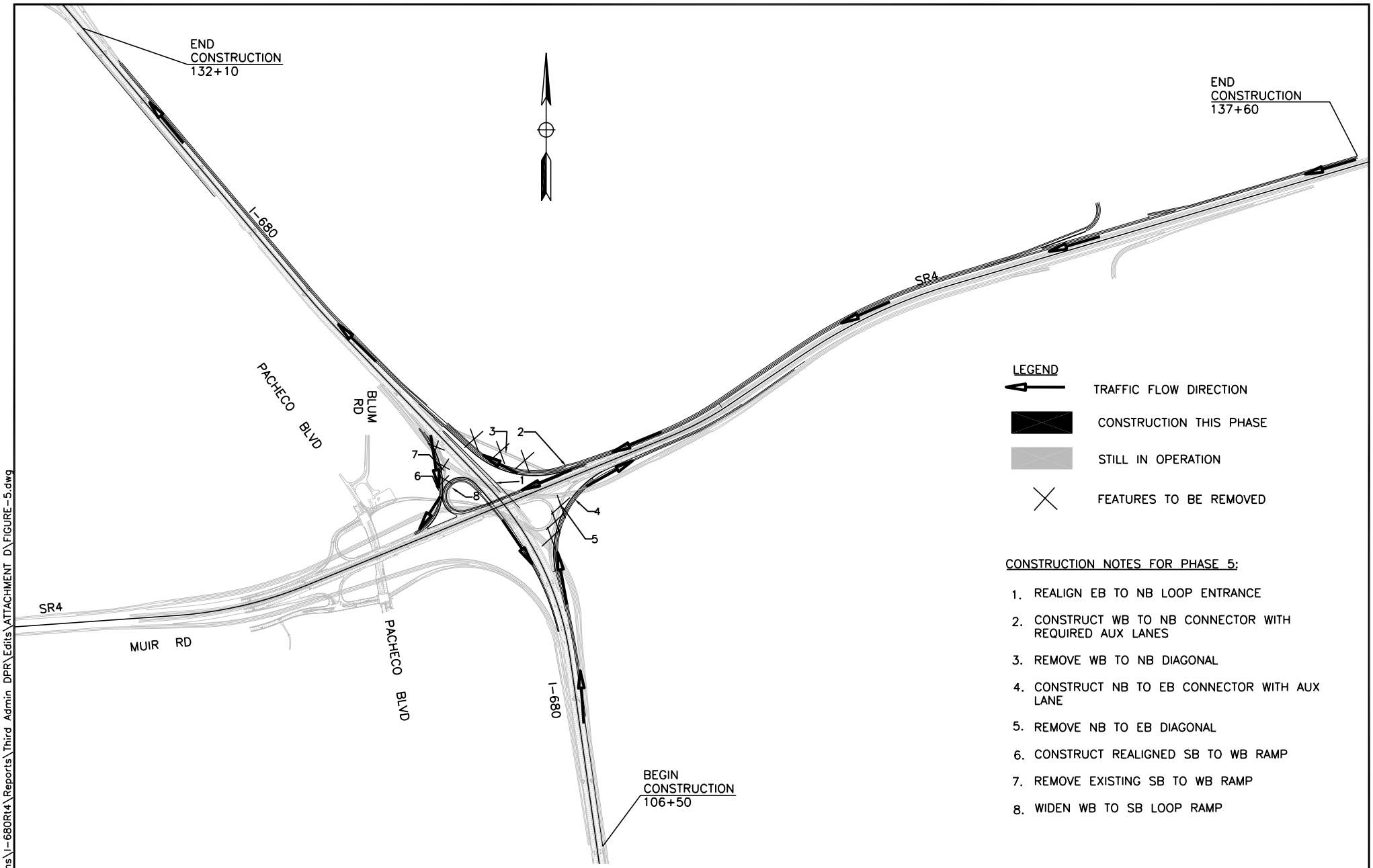


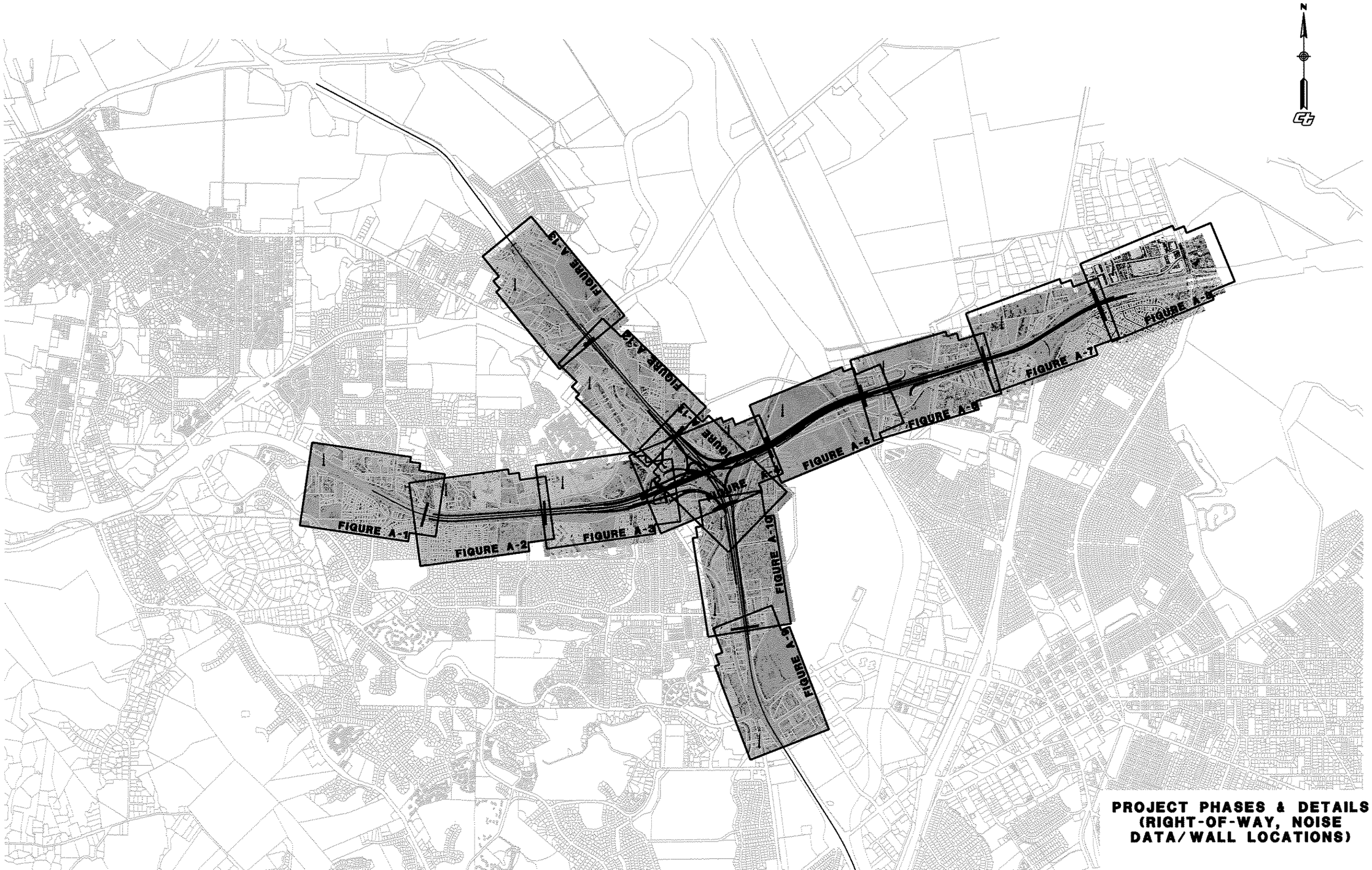
CONSTRUCTION NOTES FOR PHASE 5:

1. REALIGN EB TO NB LOOP ENTRANCE
2. CONSTRUCT WB TO NB CONNECTOR WITH REQUIRED AUX LANES
3. REMOVE WB TO NB DIAGONAL
4. CONSTRUCT NB TO EB CONNECTOR WITH AUX LANE
5. REMOVE NB TO EB DIAGONAL
6. CONSTRUCT REALIGNED SB TO WB RAMP
7. REMOVE EXISTING SB TO WB RAMP
8. WIDEN WB TO SB LOOP RAMP

NOT TO SCALE

Project No. 26812933	PHASE 5	FIGURE
I-680/SR 4 INTERCHANGE PRELIMINARY PHASING	WESTBOUND TO NORTHBOUND CONNECTOR	A-v

X:\x_tss\ZIP\x_trans\I-680Rt4\Reports\Third Admin DPR\Edits\ATTACHMENT D\FIGURE-5.dwg



PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

NOT TO SCALE

KEYMAP FIGURE A-K

x:\x_txx\zip\x_trans\i-680rt4\cad\studys\fig a-k.dgn

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SCALE 1:1500

FIGURE A-1

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-2

SCALE 1:1500

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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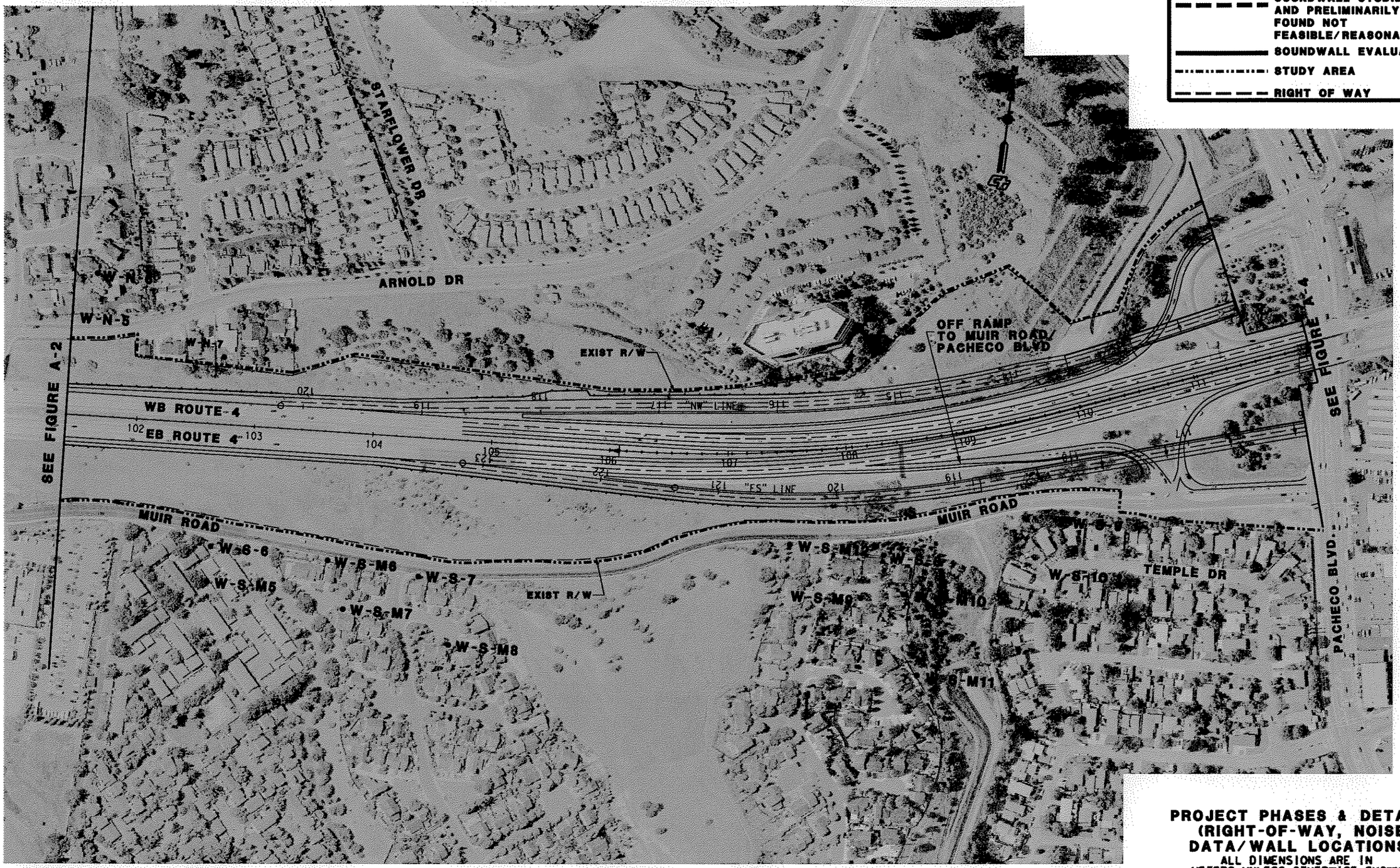

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-3

SCALE 1:1500

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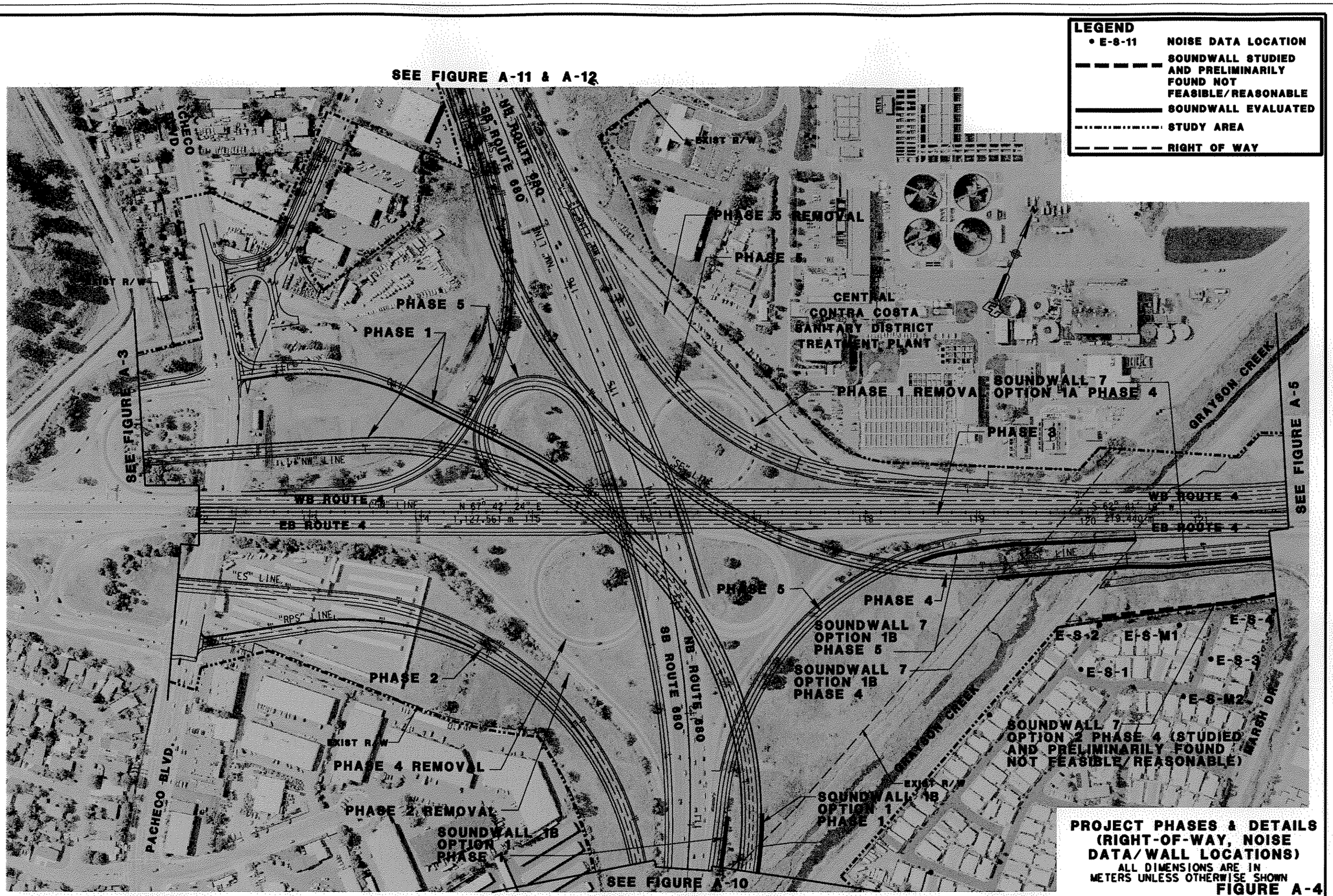

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-4

SCALE 1:1500

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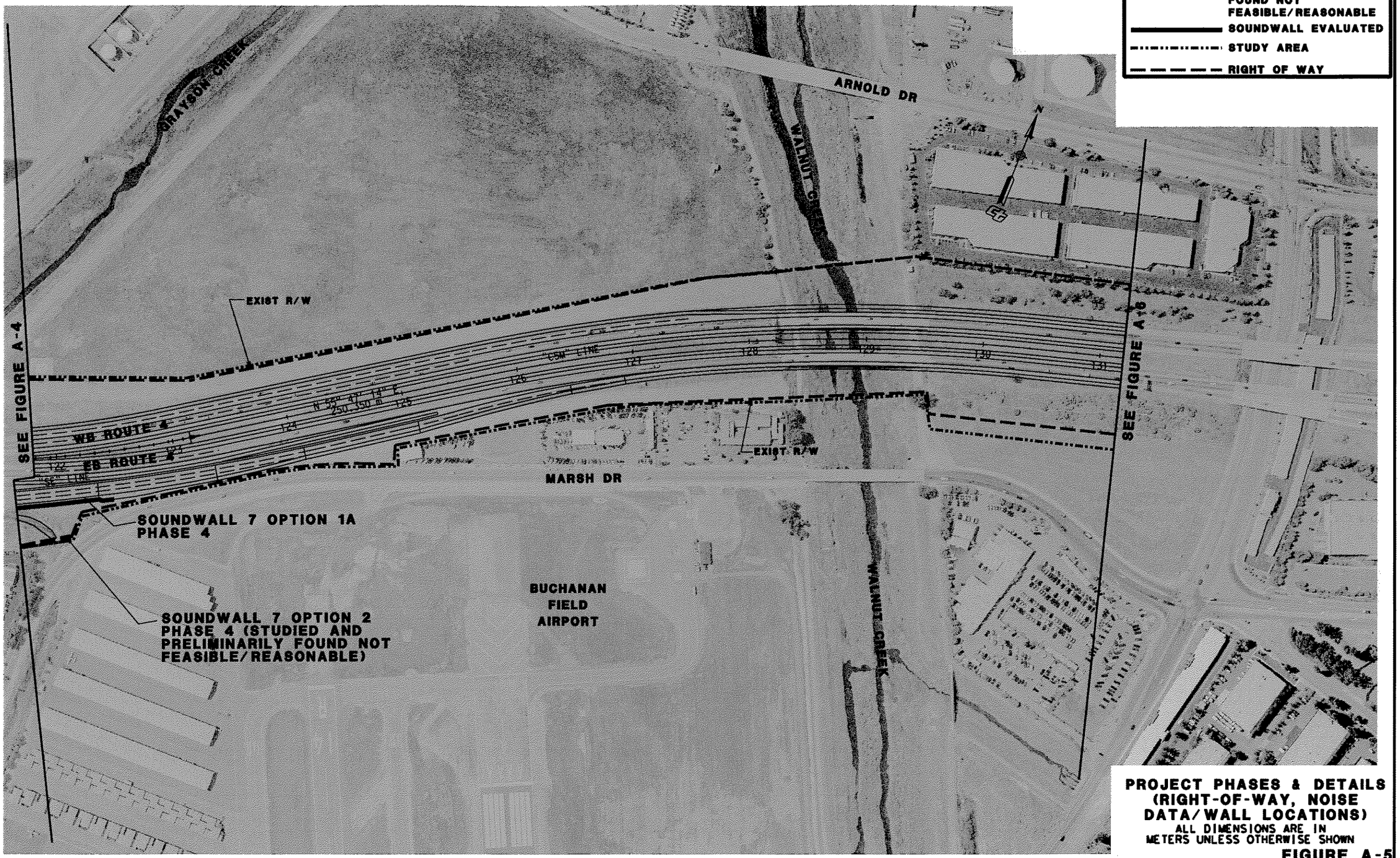

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SCALE 1:1500

FIGURE A-5

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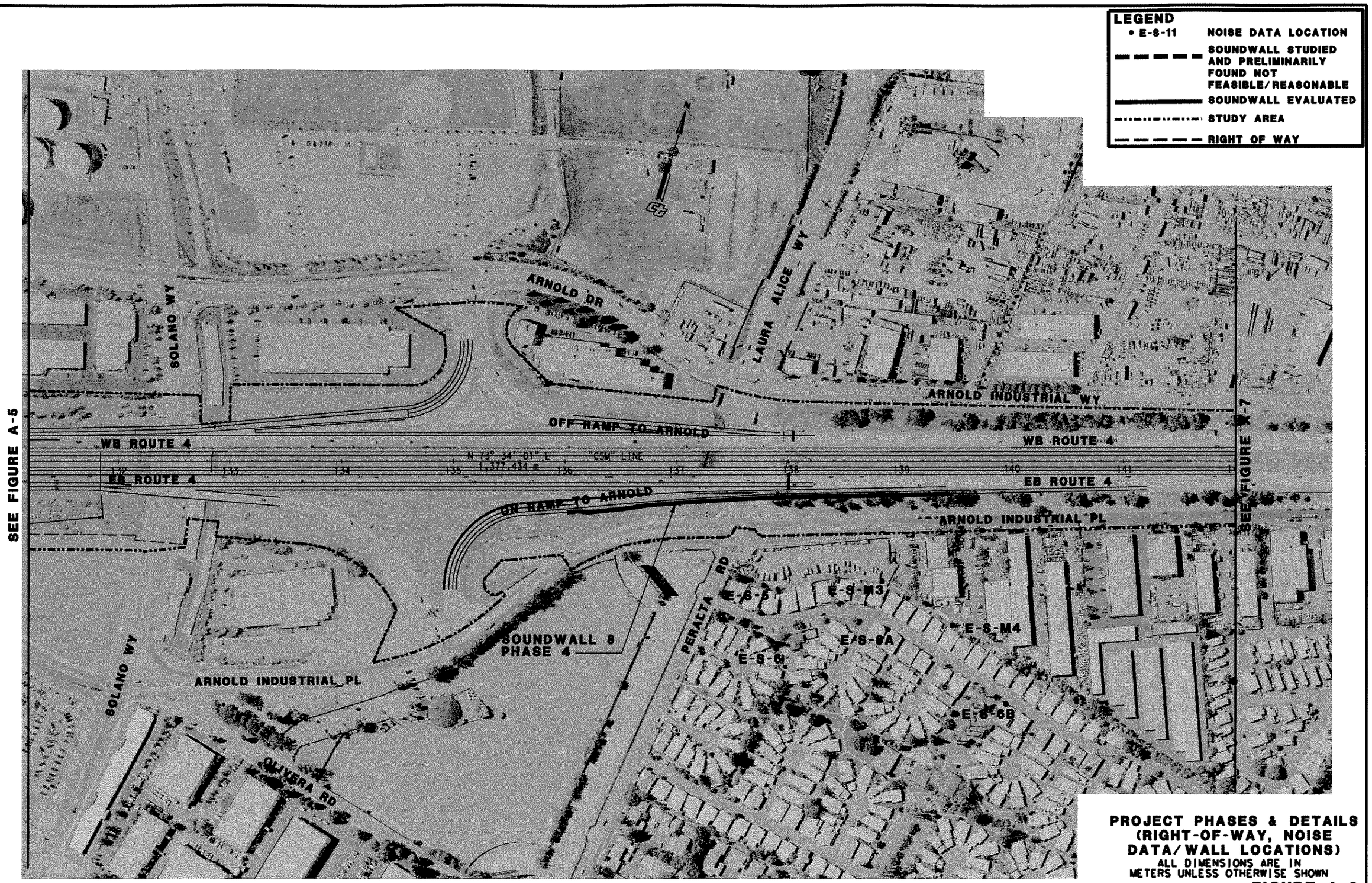

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SCALE 1:1500

FIGURE A-6

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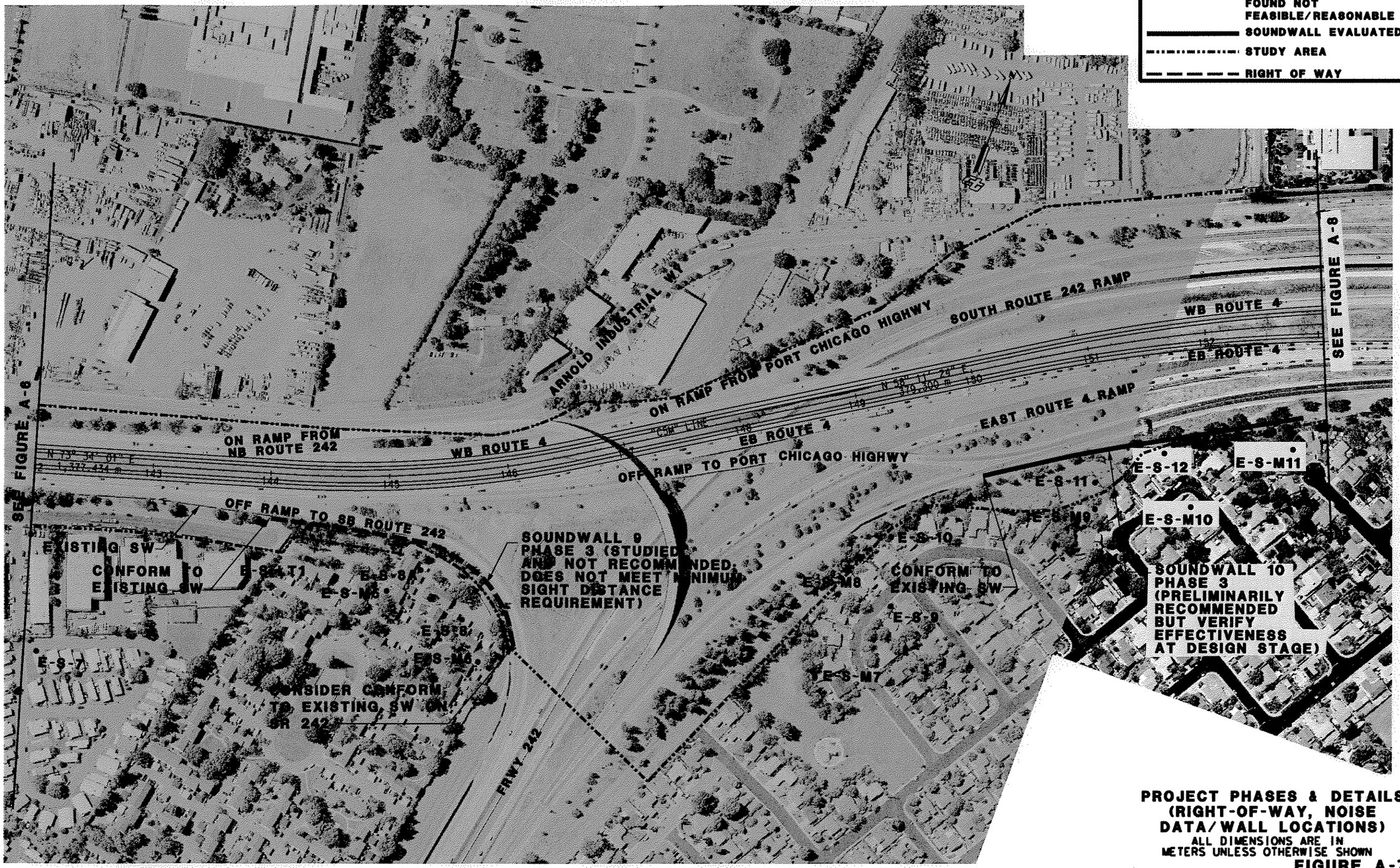

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-7

SCALE 1:1500

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SCALE 1:1500

FIGURE A-8

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PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-9

SCALE 1:1500

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PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-10

SCALE 1:1500

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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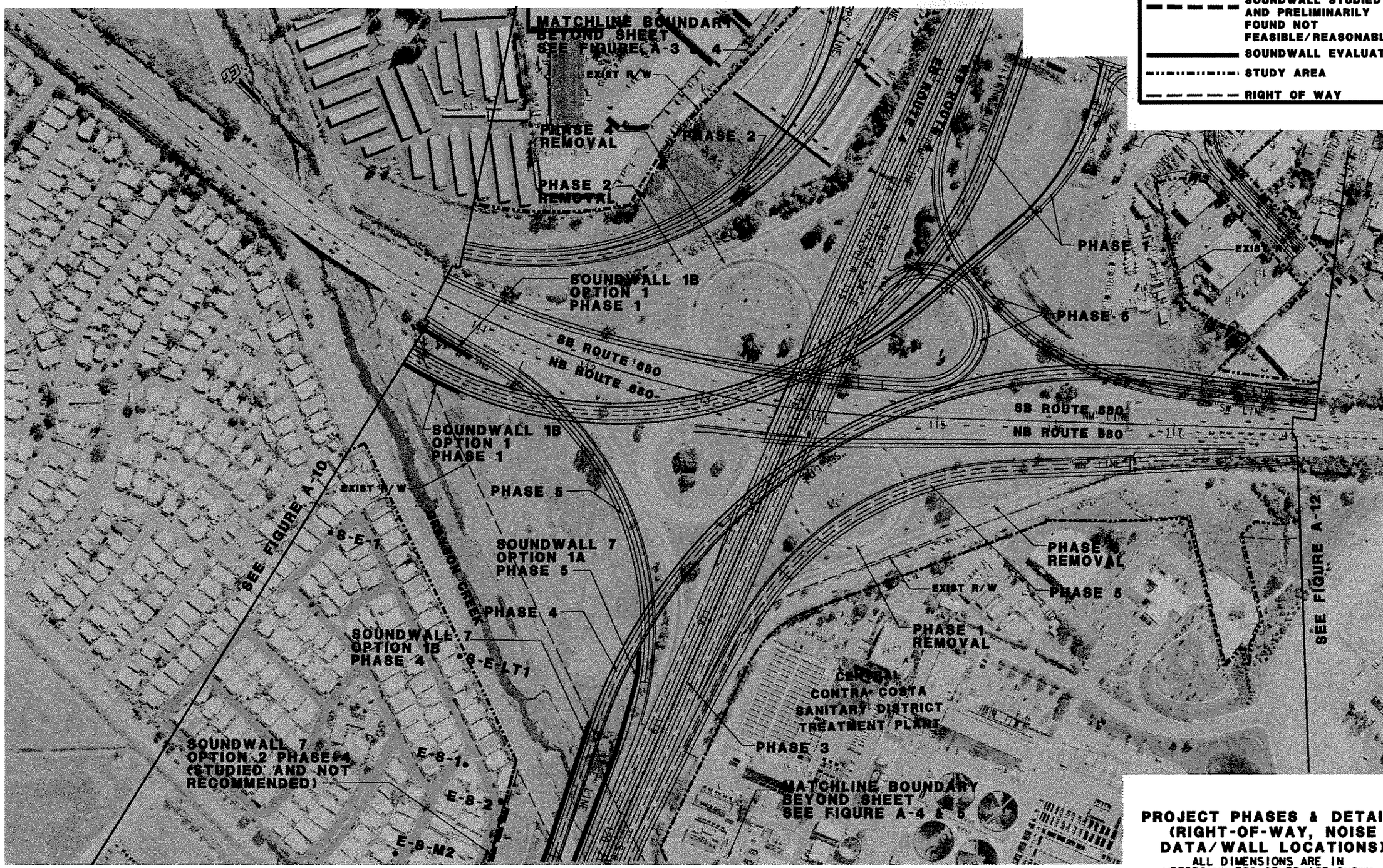
SEE FIGURE A-4



SEE FIGURE A-4

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SCALE 1:1500

FIGURE A-11

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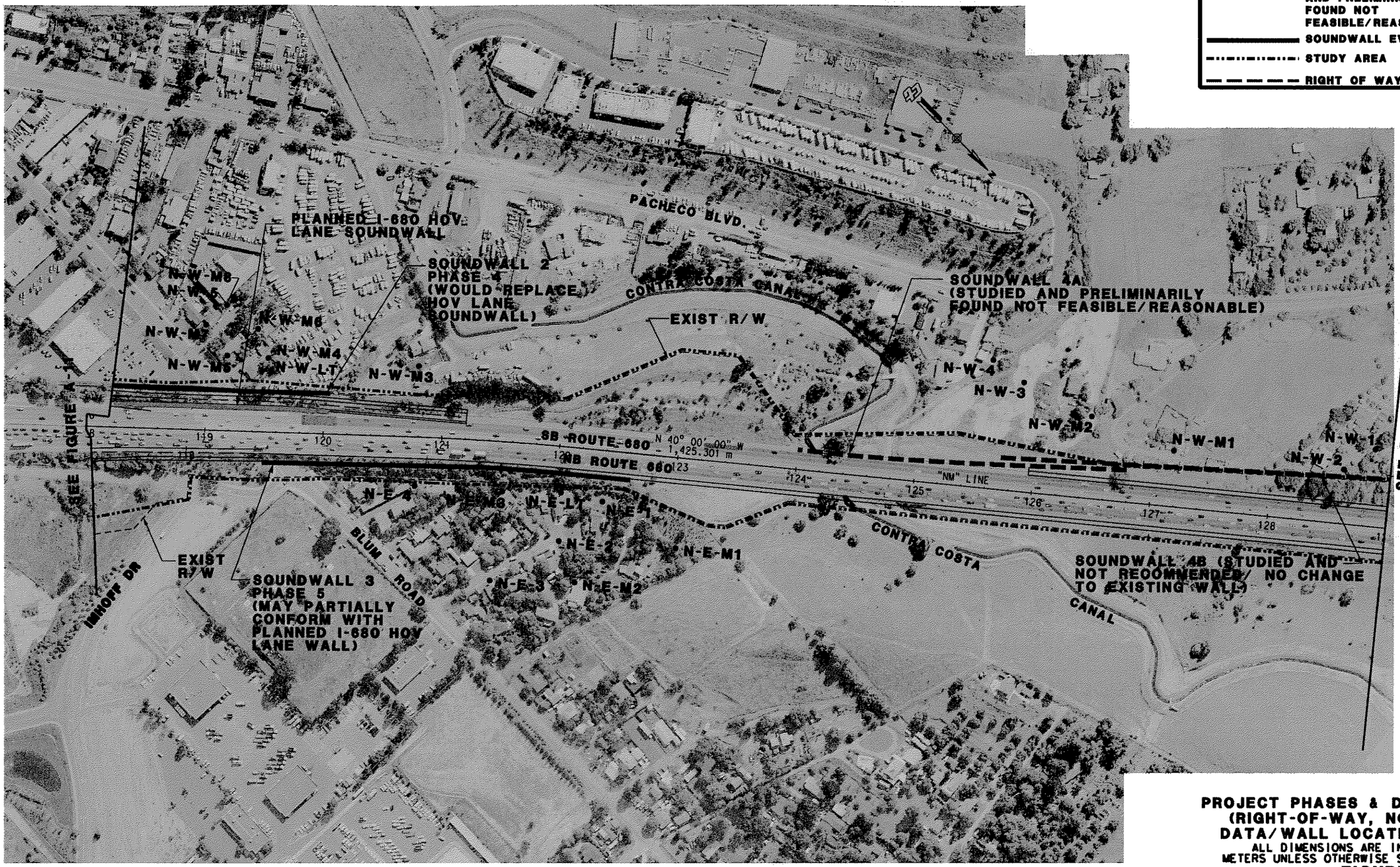

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FIGURE A-12

SCALE 1:1500

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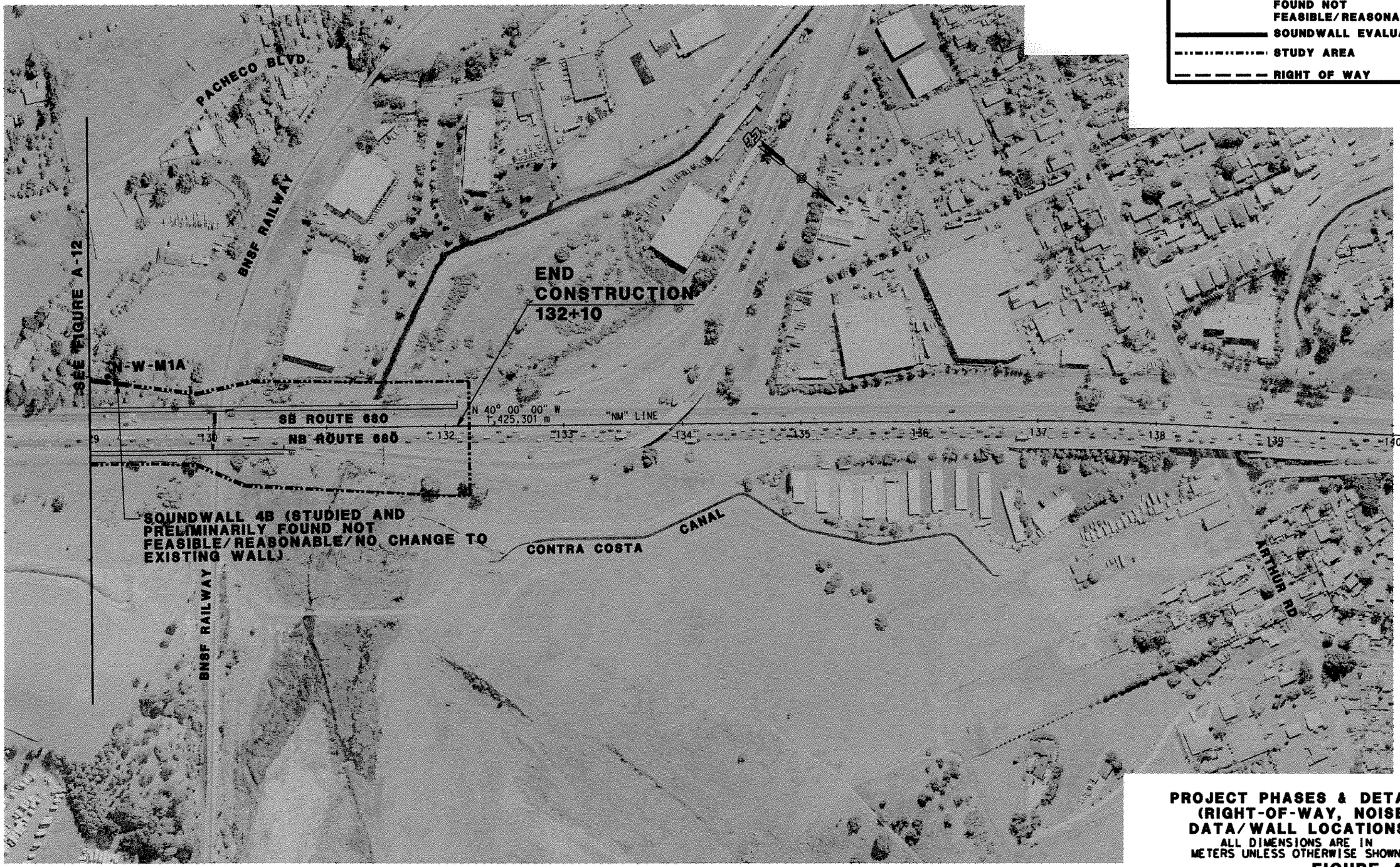

PROJECT PHASES & DETAILS (RIGHT-OF-WAY, NOISE DATA/WALL LOCATIONS)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SCALE 1:1500

FIGURE A-13

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Appendix B CEQA Checklist

Determining Significance Under CEQA

CEQA Guidelines Section 15064 (b) broadly defines a significant effect on the environment as a substantial or potentially substantial adverse change in the physical environment. For the purpose of this document, pertinent criteria from the CEQA Guidelines were used to establish significance criteria for the project. A significant impact would occur under the following circumstances:

- Implementation of the project would induce substantial population growth in the area;
- Implementation of the project would change the community cohesion or the economy of the area;
- Implementation of the project would effect the use of existing neighborhood or regional parks or other recreational facilities in a manner that would physically deteriorate the facility or reduce its ability to function as a recreational resource;
- Implementation of the alternatives would create the need for new or substantially altered public facilities, utilities or services;
- Implementation of the alternatives would create a disproportionate impact to an Environmental Justice Community.

CEQA Environmental Checklist

The following checklist identifies physical, biological, social, and economic factors that might be affected by the proposed project. The CEQA impact levels include potentially significant impact, less-than-significant impact with mitigation, less-than-significant impact, and no impact. Please refer to the following for detailed discussions regarding impacts:

- Guidance: Title 14, Chapter 3, California Code of Regulations, Sections 15000 et seq. (http://www.ceres.ca.gov/topic/env_law/ceqa/guidelines/)

- Statutes: Division 13, California Public Resource Code, Sections 21000-21178.1 (http://www.ceres.ca.gov/topic/env_law/ceqa/stat/)

CEQA requires that environmental documents determine significant or potentially significant impacts. In many cases, background studies performed in connection with the project indicate no impacts. A “no impact” reflects this determination. Any needed discussion is included in the section following the checklist.

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
AESTHETICS - Would the project:				
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	
AGRICULTURE RESOURCES - In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X
AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	
d) Expose sensitive receptors to substantial pollutant concentration?			X	
e) Create objectionable odors affecting a substantial number of people?				X
BIOLOGICAL RESOURCES - Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
CULTURAL RESOURCES - Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?				X
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X
d) Disturb any human remains, including those interred outside of formal cemeteries?				X
GEOLOGY AND SOILS - Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:		X		
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.		X		
ii) Strong seismic ground shaking?		X		
iii) Seismic-related ground failure, including liquefaction?		X		
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
c) Emit hazardous emissions or handle hazardous or acutely hazardous material, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?			X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
HYDROLOGY AND WATER QUALITY - Would be the project:				
a) Violate any water quality standards or waste discharge requirements?			X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			X	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
f) Otherwise substantially degrade water quality?			X	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?		X		
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?			X	
j) Inundation by seiche, tsunami, or mudflow?				X

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
LAND USE AND PLANNING - Would be the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
MINERAL RESOURCES - Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
NOISE - Would the project:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X	
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X
POPULATION AND HOUSING - Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			X	
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?			X	
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?			X	
PUBLIC SERVICES -				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?				X
Police protection?				X
Schools?				X
Parks?				X
Other public facilities?				X
RECREATION -				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X
TRANSPORTATION/TRAFFIC - Would be the project:				
a) Cause an increase in traffic which his substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			X	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patters, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incomplete uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?			X	
f) Result in inadequate parking capacity?			X	
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
UTILITY AND SERVICE SYSTEMS - Would be the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	

	Potentially significant impact	Less than significant impact with mitigation	Less than significant impact	No impact
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X

MANDATORY FINDINGS OF SIGNIFICANCE -

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, or cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

Discussion of CEQA Checklist Responses and Summary of Mitigation Measures

Impacts discussed below are referenced to the appropriate resource area and subsection identified in the checklist (i.e., Noise "a)," etc.). The mitigation measures identified are incomplete in the sense that they have not yet been agreed upon by all of the appropriate responsible agencies.

Impacts Mitigated to a Less Than Significant Level

The following summarizes the mitigation for impacts determined less than significant with mitigation, and references the sections of this IS/EA where the mitigation is described.

Aesthetics

c) There is a potential for impacts to occur to the visual character or quality of the project area (see Impacts, beginning Section 2.17.3, and Mitigation, Section 2.17.5).

Mitigation. *The following measures would reduce this impact to less than significant:*

- *Design and place landscaping along areas disturbed by construction to screen the roadway and associated vehicles.*
- *Use slope rounding techniques to integrate the structures into the landscape.*
- *Construct retaining walls to avoid or minimize impacts on adjacent properties. Match color and textures to existing walls within the project limits.*
- *Make new soundwalls similar in design and finish to existing walls in the vicinity. Install planting where adequate space is available and maintenance is feasible. Plant vines at even intervals along the soundwalls to reduce the walls' visual dominance and glare and to deter graffiti.*

Biological Resources

a,d) There is a potential to impact protected or candidate species or their habitat, sensitive natural communities, or movement of native residents or migratory wildlife (see Impacts, beginning Section 2.8.2, and Mitigation, Section 2.8.4).

Mitigation. *Twelve measures to avoid and minimize potential impacts to listed steelhead to reduce the potential impact to less than significant. These measures range from limiting construction activities to certain seasons in areas where habitat is identified to ensuring that materials placed in streams shall be nontoxic. These measures are detailed in Section 2.8.4.*

All proposed measures to mitigate impacts to biological resources would be subject to approval by the appropriate Federal and State natural resource agencies.

Geology and Soils

a i, ii,iii, c) There is a potential for impacts from fault rupture, ground shaking, liquefaction, and locating the project on a geologic unit or soil that is unstable (see Impacts, beginning Section 2.9.2, and Mitigation, Section 2.9.5).

Mitigation. *Incorporating recommendations from geologic and geotechnical investigations performed during the final design would reduce these impacts to less than significant. A regular maintenance program, including annual inspections, should also be carried out. Section 2.9.5 details the mitigation recommendations.*

Hydrology and Water Quality (Floodplains)

h) There is a potential for impacts because of the placement of the proposed project within a 100-year flood hazard area, which could result in impeding or redirecting flood flows (see Impacts, beginning Section 2.10.2, and Mitigation, Section 2.10.5).

Mitigation. *Designing the proposed new bridge structure to maintain current flow capacity would reduce this impact to less than significant.*

Noise

a, d) There is a potential for generation of noise levels in excess of established standards from existing and future traffic volumes, and during project construction (see Impacts, beginning Section 2.4.2, and Mitigation, Section 2.4.5).

Mitigation. *The construction of soundwalls would be incorporated into the project design.*

Population and Housing

c) Some residents living within the proposed right-of-way would be adversely affected by the proposed project. Impacts to people within the project right-of-way would include the relocation of people in five to seven homes. A business may also be relocated if a slip ramp is built at Pacheco Boulevard. This relocation impact is considered significant (see Impacts, beginning Section 2.14.3, and Mitigation, Section 2.14.8).

Mitigation. *The individuals and businesses displaced by the project would be offered relocation assistance services and payments for purposes of locating a suitable replacement property, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended. Eligible displaced households are also entitled to relocation payments to relieve the financial hardship of locating and acquiring replacement housing. Mitigation measures would be adopted by CCTA and Caltrans to reduce the relocation impacts to less than significant.*

Mitigation for Impacts That Are Less Than Significant

The following less than significant impacts include recommended mitigation that would ensure the avoidance of significant impacts.

Aesthetics

a) There is a potential for adverse effects to occur to a scenic vista (see Impacts, beginning Section 2.17.3, and Mitigation, Section 2.17.5).

Mitigation. *Impacts would be minimized and avoided by the following measure:*

- *Design and place landscaping along areas disturbed by construction to screen the roadway and associated vehicles.*

d) There is a potential for impacts to occur from new sources of light or glare (see Impacts, beginning Section 2.17.3, and Mitigation, Section 2.17.5).

Mitigation. *Impacts would be minimized and avoided by the following measure:*

- *Limit and design lighting to minimize light intrusion into adjacent areas. Include landscaping, where space allows, to help screen lighting from vehicles to residential areas adjacent to the freeways.*

Air Quality

a,b,c,d) There would be potential construction impacts to air quality (see Impacts, beginning Section 2.3.2, and Mitigation, Section 2.3.5).

Mitigation. *Temporary impacts would be avoided and minimized by the instituting dust control measures identified in the BAAQMD CEQA Guidelines (BAAQMD 1999). These measures are specified in Section 2.3.5.*

Biological Resources

b) There is a potential to impact a riparian habitat or other sensitive natural community (see Impacts, beginning Section 2.7.3, and Mitigation, Section 2.7.5).

Mitigation. *Impacts would be minimized and avoided by the following measures:*

- *Loss of nesting habitat trees of any special-status species discovered during preconstruction surveys shall be mitigated by preserving those trees or ones similar on the site that can produce substitute nesting habitat, or by installing replacement trees as part of the project landscaping.*
- *In October of each construction year and at project completion, slopes and graded areas would be reseeded for erosion control.*

c) There is a potential to impact federally protected wetlands (see Impacts, beginning Section 2.6.2, and Mitigation, Section 2.6.5).

Mitigation. *Temporary and construction impacts would be avoided and minimized by the following measures:*

- *Limit disturbance to actual project site and necessary access routes, avoiding existing grades and vegetation.*
- *Erosion control and sediment detention devices shall be incorporated into the project design and implemented during construction.*
- *Disturbed soils shall undergo erosion control treatment prior to October 31 and after construction is completed.*

- *Restrict work within creek channels to a "work window" (e.g., June 1 to mid-October).*

Permanent impacts to wetlands would be avoided or minimized by the following measures:

- *Permanent revegetation and tree replanting will be performed.*
- *On-site wetland mitigation opportunities appear limited. Off-site, compensatory mitigation may be available through a conservation bank or an in-lieu fee.*

Geology and Soils

a iv, b, d) Hazards due to landslides, substantial soil erosion or loss of topsoil, or expansive soils would result in a less than significant impact (see Impacts, beginning Section 2.9.2, and Mitigation, Section 2.9.5).

Mitigation. *Incorporating recommendations from geologic and geotechnical investigations performed during the final design would further reduce this hazard. Section 2.9.5 details the mitigation recommendations.*

Hazards and Hazardous Materials

d) The project's proximity to a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 would result in a less than significant impact (see Impacts, beginning Section 2.2.2, and Mitigation, Section 2.2.4).

Mitigation. *To further reduce this impact, buildings acquired for the project would be investigated for contamination, and soil and groundwater testing may be conducted for four sites and for soils identified for grading or excavation. Section 2.2.4 details the mitigation recommendations.*

Appendix C Summary of Mitigation and Avoidance Measures

The following is a comprehensive list of the recommended mitigation and avoidance measures for the proposed project. The list addresses all impacts, by resource area, regardless of their classification or magnitude.

Mitigation measures have been specified where applicable in the discussions for each environmental and community topic area evaluated in this Environmental Assessment/Initial Study (EA/IS). The following provides additional explanation of the mitigation measures.

Hazardous Waste and Material

Prior to construction, steps would be taken to verify whether site contamination in the study area may impact any of the proposed phases of the interchange. The proposed steps would include but are not limited to the following:

- **Investigations of all buildings acquired for the project.** The Initial Site Assessment did not address any potential contamination issues regarding existing structures. Because the project would involve the acquisition of commercial and residential properties, these structures should be investigated for potential hazardous materials or contamination issues prior to construction. The investigations should include checking for the presence of building materials painted with lead-based paint, storage buildings that might contain hazardous materials, asbestos (i.e., transit pipe, insulation, and siding), home heating fuel storage tanks, and other similar issues.
- **Soil and groundwater sampling.** Further investigation of the four identified potential hazardous waste sites is recommended prior to construction to evaluate the potential for hydrocarbon impacts. Soil sampling and analysis will be required if the excavated material is used on-site, disposed of off-site in a landfill, or reused off-site. This sampling and analysis should be conducted prior to construction. Although none of the reports and databases reviewed indicates that the project phases are likely to be contaminated, potential hazards or construction delays would be avoided by early investigation.

Where contamination is present, a remediation plan that complies with State and Federal standards would be developed and implemented in cooperation with the current landowner.

Air Quality

No substantial impacts to air quality would result from operation of Phases 1 and 2, or from cumulative implementation of Phases 1 through 5. To mitigate potential construction impacts, dust control practices would be employed to minimize or avoid potential exceedances (violations) of the air quality standard for particulate matter less than 10 micrometers in diameter (PM_{10}) during construction. Mitigation measures that would be employed include the following (BAAQMD 1999):

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials *or* require all trucks to maintain at least 0.6 meter (2 feet) of freeboard.
- Pave, apply water three times daily, or apply nontoxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 24 km per hour (15 miles per hour).
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

In addition, the following can mitigate pollutant emissions in construction equipment exhaust:

- Keeping engines properly tuned

- Limiting idling
- Avoiding unnecessary concurrent use of equipment

The proposed measures would be implemented for the construction of Phases 1 through 5. Implementation of the above mitigation measures would result in construction emissions occurring at a less-than-substantial level.

Noise

The installation of soundwalls would mitigate for long-term noise impacts, and the location of each preliminarily evaluated wall is included in this EA/IS. For each of the soundwalls, a "reasonableness allowance" has been calculated that considers the future noise level, the noise level increase caused by the project (e.g., most increases are within 1 to 3 A-weighted decibels [dBA]), and the age of the dwelling units protected. The calculated reasonableness allowance provides an indication of an amount that, under the Federal Highway Administration (FHWA) and Caltrans criteria, is a reasonable expenditure of funding to existing dwellings impacted by highway noise. The cost of constructing a barrier has been estimated and compared to the calculated allowance. Barriers have been preliminarily identified that are generally cost effective, that are reasonably close to being cost effective, or that provide benefits as noted in the discussion of noise mitigation. Section 2.4.5 provides additional details.

To minimize construction impacts, the following measures would be required for construction contractors:

- Equip all internal combustion engine–driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Strictly prohibit unnecessary idling of internal combustion engines within 100 feet of residences.
- Avoid staging construction equipment within 200 feet of residences and locate all stationary noise-generating construction equipment, such as air compressors and portable power generators, as far as practical from noise-sensitive residences.
- Construction equipment should be required to conform to the provisions in Section 7-1.01I, Sound Control Requirements, of the latest Standard Specifications. These requirements are meant to minimize the impact from

construction noise yet in no way relieve the contractor from complying with local noise ordinances.

Soundwalls will be aesthetically treated with colors, patterns, and textures that are similar to existing walls along the corridor. Vines could be planted on walls during the interchange construction project to deter graffiti and reduce glare.

Wetlands and Other Waters of the United States

An estimated less than 0.01 hectare (ha) (less than 0.03 acre) of wetlands would be permanently impacted by the proposed project. To avoid or minimize any potential impacts to wetlands and waters of the United States, the following measures are recommended:

- Disturbance to existing grades and vegetation will be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to wetland habitat. Existing ingress or egress points shall be used. Following completion of the work, the contours of the area shall be returned to preconstruction condition or better.
- Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing sediment impact to the wetlands and input to waters of the United States. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials would be kept on hand to respond to sediment emergencies and to cover small sites that may become bare.
- All disturbed soils at each site will undergo erosion control treatment prior to October 31 and after construction is terminated. Treatment includes hydroseeding and sterile straw mulch. Disturbed soils on a gradient of over 30 percent will have erosion control blankets installed. Permanent revegetation and tree replanting will take place in small openings in the erosion control blanket, with native species.
- Work within the Grayson and Walnut Creek channels will be seasonally restricted. It is expected that necessary regulatory permits will specify that no work within the channels should occur between mid-October and mid-April.

Temporary construction access to and within the channels would be necessary for installation of new piers. Installation of the piers should be completed within a single year's seasonal work window (e.g., from June 1 to mid-October). This work period limitation shall be specified in the construction contracts to ensure that the construction access is considered temporary.

- Permanent revegetation and tree replanting will be performed. Native plant species will be considered for revegetation. Section 2.17.5 outlines conceptual revegetation and planting concepts.
- For unavoidable impacts to wetlands, development of on-site mitigation is limited. Off-site mitigation is available within the local and regional area through approval of use of a conservation bank.

Vegetation and Wildlife

Some trees in the project area may need to be removed to allow for construction. Loss of nesting habitat trees of any special-status species discovered during preconstruction surveys shall be mitigated by preserving those trees or ones similar on the site that can produce substitute nesting habitat. Removal of potential nest trees will occur between September and January to avoid nesting season. If preserving the required habitat is infeasible, then replacement trees shall be installed as part of the project landscaping. Tree replacement should occur at a minimum 3:1 ratio or greater to compensate for tree mortality. Trees that replace lost nesting habitat should be the same species as those removed and installed in a minimum of 57-liter (15-gallon) containers.

Impacts to wildlife and vegetation are not considered substantial, and no specific mitigation is proposed. However, in October of each construction year and at completion of the project, slopes and graded areas will be reseeded for erosion control. Conceptual landscaping for the project is discussed in Section 2.17.

Threatened and Endangered Species

Central Valley ESU steelhead and chinook salmon have been known to pass through the Grayson Creek and Walnut Creek areas in or near the project site. To avoid impacts to these federally listed species, the following measures would be implemented:

- All work would be conducted during the dry season (June 1 through October 31) within the Walnut and Grayson Creek channels.
- Work will only occur in a dry channel. If it is necessary to conduct work in a live stream, the workspace shall be isolated to avoid construction activities in flowing water. The proposed project shall not dewater the entire stream and shall allow fish passage past the project area. Adequate water depth and channel width must be maintained at all times for fish passage. Prior to construction activities, the workspace will be isolated from flowing water to prevent sedimentation and turbidity and avoid effects to fish. The diversion shall remain in place during the project and be removed immediately after work is completed, in a manner that will allow flow to resume with the least disturbance to the substrate.
- If a project requires dewatering any area, either a pump shall remove water to an upland disposal site, or a filtering system shall be used to collect the water and return clear water to the creek. The pump intake shall be fitted with a fish exclusion device that meets NOAA Fisheries fish screening criteria (refer to http://www.nwr.noaa.gov/1salmon/salmesa/pubs/swrscrng.pdf or an equivalent source).
- All materials placed in stream, such as pilings and retaining walls, shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.
- All construction materials and fill will be stored and contained in a designated area that is located away from channel areas to prevent inadvertent transport of materials into the adjacent stream channel.
- Disturbance to existing grades and vegetation will be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to streambank or stream channel habitat as much as possible. When possible, existing ingress or egress points shall be used and/or work performed from the top of the creek banks. Following completion of the work, the contours of the creek bed and creek flows shall be returned to preconstruction condition or better with an emphasis on creating easy fish passage through the area. Obvious barriers to fish passage should be removed to facilitate upstream movement.

- Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, "Aqua Dam," or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water, and of detaining sediment laden water on-site. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials would be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.
- All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be disposed of at an approved disposal site. All petroleum products chemicals, silt, fine soils, and any substance or material deleterious to listed species shall not be allowed to pass into, or be placed where it can pass into the stream channel. There will be no sidecasting of material into any waterway.
- Any soils within the active channel that are disturbed, moved, or uncovered shall be tested for chemical contaminants. If such soils are found to be contaminated at levels that are deleterious to aquatic life, including salmonids, those soils shall be removed from the area and disposed of in an appropriate upland or off-site facility.
- Fueling, cleaning or maintenance of equipment would be prohibited except in designated areas located as far from the creek as possible. In addition, the contractor would maintain adequate materials onsite for containment and cleanup of any spills.
- After construction and prior to October 31, all disturbed soils at each site would undergo erosion control treatment consisting of temporary seeding, straw mulch, or other measures pursuant to a Storm Water Pollution Prevention Plan (SWPPP) approved by the Regional Water Quality Control Board. Any disturbed soils on a gradient of over 30 percent would also have an erosion control blanket installed. Permanent revegetation or tree replanting should then take place in small openings in the erosion control blanket, with suitable species that are compatible with native vegetation.
- During dewatering activities a fisheries biologist shall be present to salvage chinook and steelhead individuals, should they be present. Fish will be netted, placed in a bucket of water and immediately moved to a downstream portion of

the creek. Records of species, relative size, and number individuals shall be kept. Periodic checks of the work area shall occur to ensure that salmonids have not re-entered the work area.

Geology

The design and construction of the proposed project would incorporate features that would offset the potential geological impacts associated with the project, given its location and sensitivity to hazards. The following measures are listed according to type of hazard.

Fault Rupture and Subsidence

- Any proposed engineering design would have to be carried out in accordance with Caltrans Seismic Design Criteria and the regulations detailed in the Alquist-Priolo Earthquake Fault Zoning Act. This will involve detailed, site-specific subsurface geologic investigations to accurately locate the active trace(s) of the fault.
- Potential surface deformation resulting from aseismic creep can be mitigated by a regular maintenance program to repair the road surface, curbs, and other engineered facilities. Annual inspection should be carried out to assess ongoing creep damage.

Earthquake Shaking

- Roadways and bridges will have to be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for seismic zone 4.
- To satisfy the provisions of the 1998 California Building Code, the proposed phase facilities will have to be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedance in 50 years). Bridges will have to be designed in accordance with the latest Caltrans Seismic Design Criteria.

Liquefaction and Lateral Spreading

- Site-specific exploratory borings and accompanying laboratory testing during or prior to final design of the project will be required to delineate any potentially liquefiable materials. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction

potential or the engineering design will have to incorporate pile foundations that extend beyond potentially liquefiable deposits.

Expansive Soil

- Site-specific borings and testing should include investigation for subsurface materials that might contribute to heaving. To prevent heaving, pyritic shales should be overexcavated and replaced with fill that will isolate the remaining rock from either air or water.

Landsliding

- Site-specific geologic and geotechnical investigations and laboratory testing, as needed during the final design/plans, specifications, and estimates (PS&E) phase, will determine the stability of slopes and their parent material. Using these data, appropriate slope-strengthening and stabilizing designs can be developed and this impact avoided or minimized.

Erosion

- Soil and slope stability measures can prevent or reduce erosion. Erosion of soils during construction can be minimized using temporary hydroseeding to provide a vegetation cover or straw bales, visquine plastic slope cover, and temporary drainage measures to prevent excessive slope runoff. These measures are addressed in more detail in the *Water Quality Report, Interstate 680/State Route 4 Interchange Improvements, Contra Costa County, CA* (URS 2002).

Floodplains

To minimize the potential for effects from placement of the project within a 100-year flood hazard area, which could result in impeding or redirecting flood flows, the proposed new bridge structure would be designed to maintain the current flow capacity.

During a flood event, water elevations south of Grayson Creek could increase by a maximum of 2 cm (1 inch) at the point of greatest change, near Pacheco Boulevard, with the first four phases in place, and by up to 0.09 meter (3.5 inches) when Phase 5 is completed. The Contra Costa County Flood Control and Water Conservation District concurred that a minor amount of fill could be placed and compacted on the top of the existing maintenance road just upstream of the interchange as necessary to increase existing levee height to offset the changes. This action would be coordinated between CCTA and the Contra Costa Flood Control and Water Conservation District.

Hydrology

Construction. Construction best management practices (BMPs) are temporary BMPs that the project contractors would have to implement to meet Best Available Technology/Best Conventional Technology for construction projects. The selected construction site BMPs would be consistent with those practices to achieve compliance with requirements of the State of California National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activities.

Construction BMPs that have been identified in the project's Storm Water Data Report (May 2005) include the use of vegetated swales to minimize velocity and erosive conditions and revegetation of slopes to reduce erosion and sediment loads. Other construction BMPs that may be set forth in SWPPPs include using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter storm drain systems or surface water; developing and implementing a spill prevention and cleanup plan; installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and using barriers such as straw bales or plastic to minimize the amount of uncontrolled runoff that could enter drains or surface water. Because of piling operations, construction dewatering BMPs will also be included in the SWPPP and implemented during construction to prevent any non–storm water from entering into waterways or environmentally sensitive areas.

Erosion control measures would be developed as part of the SWPPP and applied to exposed areas during construction. Erosion control measures may include the trapping of sediments within the construction area by placing barriers such as straw bales, sandbags, or gravel barriers at the perimeter of downstream drainage points. Other methods of minimizing erosion impacts include limiting the amount and length of exposure of graded soil, hydromulching and hydroseeding (applying a mixture of mulch, seed, and fertilizer), and other soil protection measures such as straw mulch or compaction.

The overall mitigation structure for water quality impacts is a condition of the NPDES permit, other planning agreements, and the expected need for county storm water management programs. Implementation details for all BMPs would be developed and incorporated into the SWPPP, project design, and operations prior to the beginning of project construction. With proper implementation of these measures

and compliance with the new NPDES permit, short-term construction-related water quality impacts would be avoided or minimized.

Long Term. The project design will incorporate Design Pollution Prevention (DPP) BMPs. DPP BMPs are intended to stabilize soil and prevent contaminants and soil from entering storm water runoff. Another category of BMPs called Permanent Treatment BMPs are intended to treat storm water runoff and remove contaminants and sediments that have already entered the runoff. The project's NPDES permit will likely stipulate that Permanent Treatment BMPs to control pollutant discharges be considered and implemented for all new or reconstructed facilities. Permanent Treatment BMPs that are generally considered are infiltration basins, detention basins, and biofiltration swales/strips.

Although design plans for the interchange have not been finalized, the use of existing biofiltration swales will likely be the primary Permanent Treatment BMP. An existing biofiltration swale already exists in the southwestern corner of the interchange area, adjacent to Grayson Creek, and treats runoff from portions of the western half of the interchange area. This swale will remain in place with the interchange project modifications. Additional drainage areas that can be used as biofiltration swales have been identified in the Storm Water Data Report along most of both sides of SR-4 within the project limits and on short segments of I-680. The swales will be designed to also minimize velocity and erosive conditions. New and existing slopes that are disturbed will be vegetated, and an erosion control plan will be developed. Outlet protection/energy dissipation devices consisting of flared end sections and rock slope protection will be provided at all newly constructed outlets to reduce velocities and prevent scouring and sediment resuspension.

The use of large infiltration or detention basins is generally not considered feasible for modifying or controlling large storm events because of the lack of necessary right-of-way in the interchange area. The only area identified for a potential small detention basin (or swale area) is west of I-680 and south of Grayson Creek. This basin or swale can be considered during final design, but the use of the biofiltration measures discussed above is considered more feasible and practicable.

Existing storm sewer subcatchments within the project site drain directly into drainage inlets, which lead to deep trunk storm sewer systems. These systems drain directly to Grayson Creek. Storm water treatment of these systems was considered, but to construct a new treatment facility and to reconstruct large portions of the

existing storm sewer system to divert storm water to a treatment facility was determined to be cost-prohibitive.

Community Impacts

Relocation assistance payments and counseling will be provided to persons and businesses in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Policies Act, as amended, to ensure adequate relocation and a decent, safe, and sanitary home for displaced residents. All eligible displacees will be entitled to moving expenses. All benefits and services will be provided equitably to all residential and business relocatees without regard to race, color, religion, age, national origins and disability as specified under Title VI of the Civil Rights Act of 1964.

Mitigation measures for the loss of homes and an area business would be adopted and finalized by Contra Costa Transportation Authority and Caltrans. Appropriate mitigation may involve compensation for the cost of comparable units in the vicinity. Displacees would also be entitled to moving expenses. The Caltrans Relocation Assistance Program, as established by Federal and State law, would provide relocation assistance to the displacees. To the extent possible, the aim will be to relocate households and the commercial property as close to the existing locations as possible.

A limited loss of property may be required within the existing parking areas for up to two area businesses and the California Highway Patrol, but business operations would not be affected. Public parking would be maintained throughout the project vicinity. While areas of the Caltrans Park and Ride lot may be affected by project construction, steps would be taken during the project construction phases to ensure that a net loss of parking is avoided. Any portions of the property impacted by construction would be fenced off and include appropriate signage. Circulation and access in the area would also be maintained.

Utilities and Emergency Services

The contractor would notify emergency service providers of the proposed dates of the construction of the overall project work and utility relocation work.

Traffic and Transportation

Construction of Phases 1 and 2 is anticipated over a 2-year period. Caltrans will require the contractor to include measures to avoid and minimize regional and local

traffic disruption through notification of upcoming work and posting of detour or closure plans.

Visual/Aesthetics

The following measures would be developed in detail in landscaping plans for the project, during the project design phase.

- Design and place landscaping along areas disturbed by construction to screen the roadway and associated vehicles. Categories of landscaping have been initially identified at a conceptual level for the project right-of-way in the visual resources technical report. These categories identify general areas suitable for varying heights of ground cover and shrubs, trees, grasses and wildflowers (for erosion control), and vines (potentially for soundwalls). An actual planting design would be developed during the overall design stage of project planning. New and replacement planting will be carried out within State right-of-way in conformance with Caltrans standards for types of species, setback clearances, and maintenance criteria. Native plant species will be considered. In areas where direct replacement planting is not possible due to setback requirements, planting would be placed within interchange areas. The planting design will conform to FAA standards for height restrictions in and around Buchanan Field Airport.
- Slope rounding techniques would be utilized to integrate the structures into the landscape by sculpting the earth so that it follows the horizontal direction and the gradient of the slopes of the ramps, and by making the transitions from the flat areas to the slopes gradual in appearance.
- To avoid or minimize impacts on adjacent properties, retaining walls will be constructed. The wall's color and textures will match existing walls within the project limits.
- Limit and design lighting to minimize light intrusion into adjacent areas. Include landscaping, where space allows, to help screen lighting from vehicles to residential areas adjacent to the freeways.
- Soundwalls are proposed for noise abatement purposes. Walls will be similar in design and treated with aesthetic finishes to be consistent with existing walls within the project limits and along the I-680/SR-4 corridor. Soundwalls and retaining walls will be reviewed during project development for installation of planting where adequate space is available and maintenance is feasible. Vine plantings at even intervals along the soundwalls would be planted as a minimum

mitigation measure (where space allows) to reduce the walls' visual dominance and glare and to deter graffiti.

Archaeological Resources

No further archaeological work is necessary within the current project Area of Potential Effect (APE). If in the future the project expands to include unsurveyed lands, then additional archaeological work may be necessary. Likewise, if cultural materials are encountered during ground-disturbing activity associated with this project, all work in the vicinity of the discovery must halt until a qualified archaeologist makes an assessment of the find and follows the proper protocol for the specific type of cultural material. Special note should be made regarding this stop work requirement in the area outside of the APE, southeast of the I-680/SR-4 interchange toward Buchanan Field Airport, consistent with the concern expressed about a known site in that area.

Appendix D Summary of Relocation Benefits

10.07.00.00 MOBILE HOMES

10.07.01.00 Applicability [49 CFR 24.501]

This section describes the requirements for relocation payments to a person displaced from a mobile home and/or mobile home site who meets basic eligibility requirements. Except as modified by this section, such a displaced person is entitled to a moving expense payment of their personalty in accordance with 10.04.02.00. Replacement housing payments should be paid in accordance with the same requirements as persons displaced from conventional dwellings.

10.07.02.00 Moving and Related Expenses [49 CFR 24.502]

The owner of a mobile home that is not acquired by the Department is eligible for the actual, reasonable, and necessary expenses to relocate that mobile home to another site.

The owner of the mobile home who occupies the unit, is also eligible for RHPs described further in this section. However, if the mobile home is not acquired, but the homeowner-occupant obtains a RHP under one of the circumstances described in 10.07.03.00, the owner is not eligible for payment for moving the mobile home. The owner-occupant may also be eligible for a payment for moving personal property from the mobile home.

The following rules apply to payments for actual moving expenses under 49 CFR §24.301:

1. A displaced mobile homeowner, who moves the mobile home to a replacement site, is eligible for the reasonable cost of disassembling, moving, and reassembling any attached appurtenances, such as porches, decks, skirting, and awnings which were not acquired, anchoring of the unit, and utility "hook-up" charges.
2. If a mobile home requires repairs and/or modifications so it can be moved and/or made decent, safe, and sanitary, and the Department determines that it would be economically feasible to incur the additional expense, the reasonable cost of such repairs and/or modifications is reimbursable.
3. A non-returnable mobile home park entrance fee is reimbursable to the extent it does not exceed the fee at a comparable mobile home park, if the person is displaced from a mobile home park or the Department determines that payment of the fee is necessary to effect relocation.

Exhibit 10-EX-21 shows moving cost methods that displacees may select. The two basic cases are shown in the following table.

Criteria	Method
Mobile home is purchased and is not relocated.	Displacees may be paid to move their contents based on actual cost or Moving Expense Schedule A or B (10.04.02.03).
Mobile home is not purchased by the State but is relocated.	Payment for the move may be based on actual cost or self move. If the mobile home and household goods are moved to separate locations, actual cost method must be used for both the mobile home and household goods. Occupants of mobile homes may be paid for moving their personal property in the mobile home by any of the three methods described in 10.04.02.02. A payment for moving the mobile home itself is made on an actual cost basis.

10.07.02.01 Actual Cost of Mobile Home Moves

Displacee shall obtain two bids and submit them to the District for approval prior to the move. If necessary, the District may assist displacee in obtaining the required bids. Upon approval of the bids, the District will inform displacee to proceed with the lowest bidder. Prior to approval the District must carefully review the bids with special attention to:

- Disconnecting and reconnecting utilities and appliances.
- Providing an additional axle and/or brakes if necessary to comply with State requirements.
- Alternative of shipping the unit on a lowboy trailer.
- Need to rent wheels and/or tires.

- Temporarily protecting separated doublewide units.
- Resealing the roof, especially for older units.
- Dealing with floor material when units are split.
- Replacing items such as awnings, skirting, and steps to bring them up to code.
- Setting up on replacement pad, which includes leveling and fitting skirting to the new contour.

10.07.02.02 Moving Expenses for Personalty

The occupant of a mobile home unit is entitled to moving expenses for their personal property contained in and around the mobile home unit. Moving expenses can be paid for either an actual move, an MSA, or a Fixed Moving Schedule payment.

If the mobile home unit is moved to a replacement site, some of the personal property may be moved as part of the unit. The RAP Agent should ensure that items moved with the mobile home unit are not included in the calculation of a Fixed Moving Schedule.

The non-occupant owner of a mobile home unit may also be entitled to moving expenses for personal property. These items might include the appliances in the mobile home or yard fixtures that were not acquired. The basis for the payment can be an actual move, a self-move, or a Fixed Moving Schedule. Again, the RAP Agent should ensure that items moved with the mobile home unit (e.g., appliances) are not included in the calculation of a Fixed Moving Schedule.

10.07.02.03 Additional Actual Costs

Allowances for food and lodging required during move and set-up time for mobile home relocation are paid in accordance with the appropriate procedures in 10.04.02.01. The RAP Agent shall predetermine the number of rooms and meals and incidental allowances based on size and composition of the displaced family.

When a mobile home is moved to an individual site, the RAP Agent must predetermine that the mobile home meets code requirements for placement on the site.

Payment for acceptable miscellaneous mobile home moving costs (such as painting or waxing, skirting, awnings, landscaping, and minor work to hide protuberances) is made only to achieve the move where alternatives are:

- To buy the unit and pay a PD that exceeds the total move cost.
- To indefinitely postpone the move.

These items must be required in available comparable parks. A statement of landscaping requirements should be obtained in advance of the move.

The standard 50-mile limit applies to mobile home moves.

10.07.03.00 Replacement Housing Payment for 180-Day Mobile Home Owner-Occupants [49 CFR 24.503]

A displaced owner-occupant of a mobile home is entitled to a RHP if the person both owned and occupied the mobile home on the displacement site for at least 180 days prior to the FWO, and all the other basic eligibility requirements are met.

To be eligible for benefits, the Department must either:

(a) Acquire the mobile home and the mobile home site, or
(b) Determine that the mobile home that is not to be acquired, cannot be moved because:

- It is not and cannot economically be made decent, safe, and sanitary; or
- The unit would incur substantial damage or unreasonable cost; or
- There is no available comparable replacement site (and is not capable of being moved); or
- It does not meet mobile home park entrance requirements.

A 180-day owner-occupant who is displaced from a mobile home on a rented site may be eligible for a PD based on a comparable mobile home available for purchase, plus a RD based on a comparable mobile home site available for rent. The 180-day owner-occupant who rents the mobile home site may be eligible for a DP in lieu of the RD if a replacement site is purchased. All basic eligibility requirements must be met.

10.07.03.01 Price Differential (PD)

A PD is paid when the Department purchases the mobile home.

The District must make a market value appraisal of the mobile home as soon as it qualifies for purchase. The PD is the difference between the amount paid for the unit and the probable cost of the most comparable replacement dwelling, which could be another mobile home set-up or a conventional residential property.

Payment may be released when transfer of title is complete. As with other replacement housing entitlements, spend-to-get applies. The cost of awnings, carports, skirting, landscaping, and installation may be added, but incidental expenses should not be included in the PD calculation.

Site purchase differentials apply when the Department acquires a mobile home site from the owner-occupant and displacee purchases and occupies a replacement property.

10.07.03.02 Purchase of Replacement

If a replacement unit is purchased from a dealer, displacee must open an escrow account with an authorized escrow agent. Escrow instructions must prohibit the release of funds prior to satisfactory installation of the mobile home and passage of title. Between private parties the transaction may be handled by escrow or the funds held in the District until completion of the transaction. For assignments and verification of occupancy, Exhibits 10-EX-22, 10-EX-23, and 10-EX-24 may be used. Either way the transaction is handled, other RAP payments due the claimants may be deposited into escrow to reduce the need for purchase financing.

10.07.03.03 Suitable Replacement Sites

The requirements for comparable replacement dwellings apply to the selection of replacement sites. Displacee should be given as many choices of suitable replacement sites as are available at the time of relocation.

Where many units must be relocated and only a small number of sites can be found, it is not required that all vacancies are filled before authorizing purchase. Generally, the vacancy rate should be less than ten percent of need before authority to purchase and pay a RHP is granted.

The reason for purchasing mobile homes even though there are some vacancies available is so displacees will not have to draw straws to decide who must move into the few available vacant spaces and who can wait for the RHPs offered to those who cannot find a space.

10.07.03.04 Incidental Expenses

There are some variations in the eligible items discussed in 10.04.13.00. The major ones are:

- Sales tax or use tax payments - reimbursement is based on the calculated replacement cost or the actual taxes paid, whichever is less. The sales taxes paid on necessary added improvements are also eligible.
- DMV title transfer fees.
- Permit fees - such as charges for building and transportation permits, if not part of the moving expenses.

10.07.03.05 Mortgage Differential Payment

Mobile home loans typically have shorter terms and higher interest rates. Interest rates may be obtained from local institutions that provide mobile home financing. The displacee must have a loan on the displacement property (conventional dwelling, mobile home unit, mobile home site), to qualify for a MD payment.

The following instructions cover the two basic relocation situations:

- Conventional Dwelling to Mobile Home - The maximum rate to be applied is the current prevailing loan rate in effect for conventional dwellings when displacee obtains the financing commitment.
- Mobile Home to Mobile Home or Conventional Dwelling - The maximum rate to be applied is the current prevailing interest rate applicable to the type of replacement dwelling displacee purchases and occupies.

10.07.04.00 Replacement Housing Payment for 90-Day Mobile Home Occupants [49 CFR 24.504]

A displaced 90-day occupant of a mobile home is eligible for a RHP if the person:

(a) Owned and occupied the mobile home on the displaced mobile home site for at least 90 days prior to the FWO, but less than 180 days, or
(b) Rented and occupied the Mobil home on the displaced mobile home site for at least 90 days prior to the FWO.

And:

(c) Meets all the other basic eligibility requirements.

10.07.04.01 Rent Differential (RD)

Rent Differential payments for the mobile home tenant may be combined with other benefits to which displacees are entitled (10-EX-21). The Department only has to acquire the site from the tenant in order for the tenant to be eligible for a RD payment.

There may be circumstances when the displacee owns the mobile home and rents the site (and vice versa). The displacee's tenure as a tenant or an owner is determined by their status in the mobile home unit, not the mobile home site.

Example: Owns the mobile home, rents the site. Treat them as an owner (all other eligibility requirements must be met).

Example: Rents the mobile home, owns the site. Treat them as a tenant (all other eligibility requirements must be met).

10.07.04.02 Down Payment (DP)

An eligible 90-day tenant may convert the RD to a DP of at least $5,250. The full amount of the DP must be applied to the purchase price of the replacement dwelling (e.g., mobile home, mobile home site, conventional dwelling) and related incidental expenses.

Down Payments are done in the same manner as conventional dwellings (See Section 10.04.25.00 for details) except:

- Escrow requirements are the same as mobile home PD.
- The RD can be based on just the mobile home, the mobile home site, or both.
- The Department needs to acquire only the site to qualify displacee for payment.
- 180-day mobile home owner-occupants who formerly rented their site can qualify for a DP on a replacement site up to the amount of the RD.

10.07.05.00 Replacement Housing Payment Based on Dwelling and Site [49 CFR 24.505(a)]

Both the mobile home and mobile home site must be considered when computing a RHP. For example, a displaced mobile home occupant may have owned the displacement mobile home and rented the site or may have rented the displacement mobile home and owned the site. Also, a person may elect to purchase a replacement mobile home and rent a replacement site, or rent a replacement mobile home and purchase a replacement site. In such cases, the RHP shall consist of a payment for a dwelling and a payment for a site. However, the total RHP shall not exceed the maximum payment (either $22,500 or $5,250) permitted under the section that governs the computation of the dwelling before last resort housing payment provisions must be applied.

10.07.05.01 Cost of Comparable Replacement Dwelling [49 CFR 24.505(b)]

If a comparable replacement mobile home and/or mobile home site is not available, the RHP shall be computed on the basis of the reasonable cost of a conventional comparable replacement dwelling.

A mobile home site in a rural area should never be compared to a mobile home site in a mobile home park. If the mobile home unit will be moved, then the RHP for the mobile home site should be based on a comparable replacement site as to size and amenities. If necessary, the cost of site preparations necessary to accommodate a mobile home (e.g., pad, utilities, ground preparation) should be included in the calculation of the RHP.

If the Department determines that it would be practical to relocate the mobile home, but the owner-occupant elects not to do so, the Department may determine that, for purposes of computing the PD the cost of a comparable replacement dwelling is the sum of:

- The value of the mobile home; and
- The cost of any necessary repairs or modifications; and
- The estimated cost of moving the mobile home to a replacement site.

10.07.06.00 Initiation of Negotiations [49 CFR 24.505(c)]

If the mobile home is not actually acquired, but the occupant is considered displaced under this part, "initiation of negotiations" is the date the offer is made to acquire the land, or, if the land is not acquired, the written notification that he or she is a "displaced person".

10.07.07.00 Person Moves Mobile Home [49 CFR 24.505(d)]

If the owner is reimbursed for the cost of moving the mobile home under this part, he or she is not eligible to receive a replacement housing payment to assist in purchasing or renting a replacement mobile home. The person may, however, be eligible for assistance in purchasing or renting a replacement site.

10.07.08.00 Partial Acquisition of Mobile Home Park [49 CFR 24.505(e)]

The acquisition of a portion of a mobile home park property may leave a remaining part of the property that is not adequate to continue the operation of the park. If the Department determines that a mobile home located in the remaining part of the property must be moved as a direct result of the project, the owner and any tenant shall be considered a displaced person who is entitled to relocation payments and other assistance.

10.07.09.00 Part Ownership of a Mobile Home [49 CFR 24.503]

The occupant of a mobile home who owns a partial interest in the unit, should be treated as an owner of the mobile home unit. The Department is not required to provide persons owning only a fractional interest in the displacement dwelling with a greater level of assistance to purchase a replacement dwelling than would normally be required if the person was the sole owner of the property.

The partial interest owner may be entitled to receive a RHP based on the difference between the asking price of a comparable mobile home site and the total acquisition price of the displacement site - not their fractional interest or share. If no mobile home sites are available for purchase within the displacee's financial means, then the fractional interest owner may be entitled to a RD.

10.07.10.00 Mobile Home DS&S Inspections

Decent, safe, and sanitary requirements are generally the same as those for conventional dwellings, except a mobile home must have an HCD approval decal. The mobile home must be placed in a fixed location on real property in accordance with local laws and ordinances.

A RAP Agent should inspect a mobile home prior to purchase since it may lack qualifying DS&S features.

10.07.11.00 Rental of Vacant Spaces

Situations have arisen in the acquisition of mobile home parks where displacees, by reason of occupancy at the time of the offer, relocated before the Department acquired the park. The owner of the mobile home park re-rented the vacant spaces to Non-Tenured occupants. When the Department attempted to vacate the mobile home park, ineligible displacees were unable to relocate their mobile homes since:

- The mobile homes were not acceptable in other mobile home parks in the area because they were of substandard size or condition, or
- No replacement housing of any type was available in the replacement area.

The lack of sufficient spaces to relocate eligible tenants has also caused problems. This has resulted in project delays and the implementation of LRH payments, at a substantial cost to the State, to relocate these persons.

Two potential solutions to these problems are available:

- Rental of spaces in the park to be acquired to prevent Non-Tenured occupants from moving into the right of way.
- Rental of spaces in probable replacement mobile home parks to secure future spaces for eligible displacees who could not otherwise relocate.

The Acquisition function may rent vacant mobile home spaces in replacement parks, as noted above, using an appropriate agreement with the owner. This

procedure is implemented only if absolutely necessary since its effect on the replacement housing market could be significant and politically sensitive. It should be the last possible use of normal relocation benefits short of proceeding with LRH.

Rental of spaces in other mobile home parks must be discussed and justified in the RID. All other means of providing solutions to relocation problems must be explored before rental of spaces can be recommended. The RID must discuss type and location of replacement parks and their ability to accommodate displacees.

10.07.12.00 Mobile Home as Replacement for Conventional Dwelling

A mobile home may be used as a replacement for a conventional dwelling provided it satisfies DS&S requirements. Eligibility and benefits under the various occupancy and replacement combinations are covered in 10-EX-21.

Most owner-occupants, whether long-term or short-term, who move from conventional housing to mobile homes will not qualify for RHPs (PD or RD).

Because mobile homes are generally less expensive than conventional dwellings, they will not meet the spend-to-get requirement. This is particularly true where an owner-occupant moves from conventional dwelling and purchases a mobile home and rents the site, or vice versa. The result is that displacee simply purchases a replacement dwelling for less than the price paid for the acquired property or rents a displacement dwelling for less than the economic rent of the acquired dwelling.

Where the RAP Agent knows that owner-occupants of conventional dwellings are considering mobile homes as replacement housing, the RAP Unit must notify the owner-occupants in writing that they may not qualify for any replacement housing payment. The RAP Agent should carefully consider each case on its own merits because the value of the acquired property may be low enough, or the cost of the mobile home high enough, that the owner-occupant could qualify for payment. Claims not meeting spend-to-get requirements shall be denied.

However, 90-day occupant-owners may be eligible for a DP of $5,250.

Appendix E Glossary of Technical Terms

This appendix briefly explains the technical terms and names used in this EA/IS. A list of acronyms appears directly before Chapter 1.

Best Management Practice (BMP)	Any program, technology, process, operating method, measure or device that controls, prevents, removes or reduces pollution.
Basin Plan	A specific plan for control of water quality within one of the nine hydrologic basins of the State under the regulation of a Water Quality Control Board.
Cooperating Agency	An agency, other than the lead agency, that has jurisdiction by law or other expertise, that is formally involved in a proposed project.
Corridor	A strip of land between two termini within which traffic, topography, environment, and other characteristics are evaluated for transportation purposes.
Cumulative effects	Project effects that are related to other actions with individually insignificant but cumulatively significant impacts.
Decibel	A numerical expression of the relative loudness of a sound.
Encroachment (floodplain)	An action within the limits of the 100-year floodplain.
Endangered	Plant or animal species that are in danger of extinction throughout all or a significant portion of its range.
Erosion	The wearing away of the land surface by running water, wind, ice, or other geological agents.
Federal Register	A Federal publication that provides official notice of Federal administrative hearings and issuance of proposed and final Federal administrative rules and regulations.
Floodplain (100-year)	The area subject to flooding by a flood or tide that has a 1 percent chance of being exceeded in any given year.
FONSI	Finding of No Significant Effect, issued by FHWA upon approval of the NEPA review process

Freeway	A divided arterial highway with full control of access and with grade separations at intersections.
Habitat	The place or type of site where a plant or animal naturally or normally lives and grows.
Hectare	A unit of surface measure in the metric system, equal to 10,000 square meters.
Initial Study (IS)	Environmental review document prepared to comply with CEQA
Initial Site Assessment (ISA)	A Caltrans term for an initial study to determine hazardous waste issues on a project.
L_{eq}	A unit used for evaluation of sound impacts, L_{eq} is the measurement of the fluctuating sound level received by a receptor averaged over a time interval (usually 1 hour).
Level of Service (LOS)	A measurement of capacity of a roadway.
Median	The area of a divided highway that separates the traveled way for traffic in opposite directions.
Mitigation	Compensation for an impact by replacement or provision of substitute resources or environments. Mitigation can include avoiding an impact by not taking a certain action, minimizing impacts by limiting the degree of an action, or rectifying an impact by repairing or restoring the affected environment.
Negative Declaration (ND)	Issued upon approval of the environmental review process under CEQA
NPDES	National Pollutant Discharge Elimination System. A permit regulated by the Regional Water Quality Control Board that is required if more than 0.4 ha (1 acre) of original ground is graded. One condition of this permit is that the contractor must submit a Storm Water Pollution Prevention Plan (SWPPP), which is similar to the Water Pollution Control Plan required by Caltrans' Standard Specification 7-1.01G.
Practicable	An action that is capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes.

Receptors	Term used in air quality and noise studies that refers to houses or businesses that could be affected by a project.
Regulatory agency	An agency that has jurisdiction by law.
Responsible agency	A public agency other than the Lead Agency that has responsibility for carrying out or approving a project under CEQA.
Right-of-way	A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
Riparian	Pertaining to the banks and other adjacent terrestrial (as opposed to aquatic) environs of freshwater bodies, watercourses, estuaries, and surface-emergent aquifers, whose transported freshwater provides soil moisture sufficient in excess of that available through local precipitation to potentially support the growth of vegetation.
RTP	Regional Transportation Plan, prepared by the regional agency responsible for transportation planning and funding. In Contra Costa County, the RTP is prepared by the Metropolitan Transportation Commission to identify transportation improvement priorities.
Special-status species	Plant or animal species that are either (1) federally listed, proposed for or a candidate for listing as threatened or endangered; (2) bird species protected under the Federal Migratory Bird Treaty Act; (3) protected under state endangered species laws and regulations, plant protection laws and regulations, Fish and Game codes, or species of special concern listings and policies; (4) recognized by national, state, or local environmental organizations (e.g., California Native Plant Society).
STIP	The State Transportation Improvement Program, updated every 2 years, is the California Transportation Commission's priorities for improvements on and off the state highway system.
SWPPP	A Storm Water Pollution Prevention Plan is prepared to evaluate sources of discharges and activities that may affect storm water runoff, and implement measures or practices to reduce or prevent such discharges.

Threatened	A species that is likely to become endangered in the foreseeable future in the absence of special protection.
Underground Storage Tanks (USTs)	Tanks that typically store fuel or liquid chemicals underground.
Waters of the United States	As defined by the USACE in 33 Code of Federal Regulations 328.3(a): 1. All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; 2. All interstate waters including interstate wetlands; 3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce, including any such waters: (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) Which are used or could be used for industrial purposes by industries in interstate commerce; 4. All impoundment of waters otherwise defined as waters of the United States under this definition; 5. Tributaries of waters identified in paragraphs 1-4; 6. The territorial seas; 7. Wetlands adjacent to waters (waters that are not wetlands themselves) identified in paragraphs 1-6.

Wetlands	When used in a formal context, such as in this IS/EA, wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances will support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas [33 CFR 328.3(b)].

Appendix F Noise Measurements, Modeling Results, and Barrier Analysis

The noise analysis methods and criteria applied are discussed in Sections 2.4.1.1 and 2.4.1.2. Noise measurements and modeling were conducted at noise-sensitive land use locations that could be affected by the project (Appendix A, Figures A-1 through A-13). Table F-1 lists the noise modeling results for Phases 1 and 2. Table F-2 lists the results for Phases 3 through 5. These tables identify the locations that exceed the noise abatement threshold criteria that require evaluation of noise barriers (see criteria described in Section 2.4.1.2).

The future predicted noise levels at each of the evaluation locations are shown in Table F-3 for Phases 1 and 2, and in Table F-4 for Phases 3 through 5. The results of the evaluation of potential barriers considered, based on noise-reduction effectiveness, number of homes effectively protected, and a brief summary of whether the barrier identified and evaluated is reasonable from a present cost and effectiveness consideration are listed in Table 2.4-2 in the main text of this report for Phases 1 and 2, and in Table 2.4-3 for Phases 3 through 5.

Phases 3, 4, and/or 5 are not currently identified for funding. When they are advanced for further consideration, as funding is available, the results presented for this study should be reviewed against potential changes in the environmental setting and evaluation criteria.

TABLE F-1

Noise Modeling Results - Phases 1 and 2

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
West Leg	EB Route 4 w/o I-680	(Receivers South of EB State Route 4; Station 89+00 to 112+00) (Figures A-1 to A-3)					
W-S-1	Rear yard of 1295 Paradise Cir.	Yes	64	64	65	1	NONE
W-S-2	Front yard of 1320 Paradise Cir.	Yes	62	62	64	1	NONE
W-S-3	Rear yard of 1391 Paradise Cir.	Yes	**68**	**69**	**70**	2	**A/E**
W-S-4	Front of 1404 Myrtlewood Ct.	Yes	60	60	61	1	NONE
W-S-5	Front of 2161 Elderwood Dr. ~ 16 m. from the centerline of Muir Rd. and 39 m. from the edge of Route 4 fill section.	Yes	**67**	**68**	**68**	1	**A/E**
W-S-LT	Rear yard of 1541 Deerwood Dr. ~ 24 m. from the edge of Route 4 fill section. (Offset Measurement)	Yes	**69**	**69**	**71**	2	**A/E**
W-S-6	~ 13 m. from the center of the near lane of Muir Rd. at Fountainhead Dr.	Yes	64	65	65	1	NONE
W-S-7	Rear yard of 2205 Highcliff Ct.	No	61	61	62	1	NONE
W-S-8	Rear yard of 2127 North Peak Place.	No	**66**	**66**	**67**	2	**A/E**
W-S-9	Rear yard of 1134 Temple Dr.	Yes	60	61	60	-1	NONE
W-S-10	Front of 1121 Temple Dr.	Yes	63	63	60	-3	NONE
W-S-M1	Rear yard of single- family residence on Paradise Cir. east of W-S-1.	Yes	**68**	**68**	**69**	1	**A/E**
W-S-M2	Rear yard of single-family residence on Deerwood Dr. east of W-S-LT.	Yes	**69**	**70**	**71**	1	**A/E**
W-S-M3	Rear yard of single-family residence on Deerwood Dr. east of W-S-LT and south of W-S-M2.	Yes	**66**	**66**	**67**	1	**A/E**
W-S-M4	Second row receiver on Deerwood Dr. south of W-S-LT.	Yes	60	60	62	1	NONE
W-S-M5	Second row receiver, multi-family residence south of W-S-6.	Yes	58	58	59	1	NONE
W-S-M6	Rear yard of single-family residence, west of Sweetwater Dr. and adjacent to Muir Rd.	No	62	62	63	1	NONE
W-S-M7	Second row receiver, single-family residence west of Sweetwater Dr.	No	57	57	58	1	NONE
W-S-M8	Second row receiver, single-family residence east of Sweetwater Dr.	No	54	54	55	1	NONE
W-S-M9	Second row receiver, single-family residence on North Peak Pl.	No	61	61	62	1	NONE
W-S-M10	Second row receiver, rear yard of single family residence at the end of North Peak Pl.	No	63	63	64	1	NONE
W-S-M11	Third row receiver, rear yard of single family residence at the end of East View Pl.	No	59	59	60	1	NONE
W-S-M12	Rear yard of single-family residence, west of W-S-8 and adjacent to Muir Rd.	No	65	65	**66**	2	**A/E**

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-1

Noise Modeling Results - Phases 1 and 2

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
West Leg	WB Route 4 w/o I-680	(Receivers North of WB State Route 4; Station 89+00 to 112+00) (Figures A-1 to A-3)					
W-N-LT	Rear yard of 104 Morning Glory Ln.	No	**68**	**68**	**69**	1	**A/E**
W-N-1	Front of 106 Williamson Ct.	No	62	62	63	1	NONE
W-N-2	1785 Arnold Dr. ~15 m. from the centerline of the near lane of Arnold Dr.	Yes	**69**	**70**	**70**	1	**A/E**
W-N-3	Holiday Hills north of Arnold Drive ~ 63 m. from edge of Arnold Dr.	No	64	65	**66**	1	**A/E**
W-N-4	Holiday Hills north of Arnold Drive ~ 38 m. from edge of Arnold Dr.	No	**68**	**68**	**69**	1	**A/E**
W-N-5	Rear yard of residence at Arnold-Glacier intersection.	Yes	64	64	65	1	NONE
W-N-6	Rear yard of 2006 Fries Ct.	No	61	62	63	2	NONE
W-N-7	Rear yard of 2040 Arnold Dr.	No	61	61	62	2	NONE
W-N-M1	Multi-family residence (Eastgate Apartments) on Arnold Drive west of W-N-LT.	No	61	61	**62**	1	NONE
W-N-M2	Second row receiver, single family residence in Williamson Ct.	No	62	62	63	1	NONE
W-N-M3	Single family residence on Holiday Hills Dr.	No	63	63	64	1	NONE
W-N-M4	Multi-family residence in Shadowbrook development west of W-N-1.	No	59	59	60	1	NONE
W-N-M5	Single family residence on Fig Tree Lane.	Yes	65	**66**	**66**	1	**A/E**
W-N-M6	Multi-family residence in Shadowbrook development near common outdoor use area.	No	64	64	65	1	NONE
W-N-M7	Rear yard of single family residence in Williamson Ct.	No	**68**	**68**	**69**	1	NONE
W-N-M8	Eastgate Apartments unshielded area near patios.	No	64	64	65	1	NONE
N-W-M6	Mult-family residences, between Hanson Ct. and Blum Rd.	Yes	**67**	**68**	**69**	2	**A/E**
N-W-M7	Single family residence, on Blum Rd.	Yes	**68**	**69**	**70**	2	**A/E**

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-1

Noise Modeling Results - Phases 1 and 2

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
South Leg	NB I-680	(I-680 between Concord Avenue and Interchange; Station 101+00 to 113+00) (Figures A-10 and A-11)					
S-E-LT1	West of 360 Avenida Flores in Rancho Diablo Mobile Home Park. ~ 188 m. from Rt. 4 and ~ 216 m. from I-680.	Yes	60	63	65	6	NONE
S-E-1	351 Flores in Rancho Diablo Mobile Home Park.	Yes	60	62	61	2	NONE
S-E-2	Near 265 Minoru Dr. in Concord Cascade Mobile Home Park.	Yes	**70**	**71**	**73**	4	**A/E**
S-E-3	~ 34 m. from the edge of NB I-680 at mobile home property line.	Yes	**72**	**73**	**74**	2	**A/E**
S-E-LT2	~ 16 m. from a 4.9 m. barrier near mobile homes.	Yes	**67**	**68**	**78**	12	**A/E, S [2]**
S-E-4	159 Algiers Lane in Concord Cascade Mobile Home Park.	Yes	62	63	**77**	15	**A/E, S [2]**
S-E-5	155 Algiers Lane in Concord Cascade Mobile Home Park.	Yes	64	65	**74**	11	**A/E**
S-E-M1	Back yard of single family home on Minoru Dr. (west side of street) north of S-E-2.	Yes	**68**	**69**	**71**	3	**A/E**
S-E-M2	Back yard of single family home on Minoru Dr. (west side of street) south of S-E-3.	Yes	**68**	**69**	**79**	10	**A/E**
S-E-M3	Second Row Receiver, single family home on the corner of Minoru Dr. and Amate Way.	Yes	65	**66**	**74**	10	**A/E**
S-E-M4	Single family home on Calle Molino north of S-E-4.	Yes	62	63	**77**	15	**A/E, S [2]**
S-E-M5	Single family residence on Medina Dr. (middle section of road) south of S-E-4.	Yes	63	64	**77**	14	**A/E, S [2]**
S-E-M6	Single family residence on Medina Dr. (southernmost corner of road) south of S-E-4.	Yes	63	64	**72**	9	**A/E**
S-E-M7	Second row receiver, front yard of single family residence on Medina Dr. south east of S-E-4.	Yes	**66**	**67**	**76**	10	**A/E**
S-E-M8	Single family home on Minoru Dr. east of S-E-M1.	Yes	59	60	**67**	8	**A/E**
S-E-M9	Single family home on Minoru Dr. south of S-E-M1.	Yes	59	60	**68**	9	**A/E**

2 A noise impact would result as noise levels would approach or exceed the NAC and would substantially increase (12 dBA or more) at land uses represented by these receivers.

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
East Leg	EB Route 4 e/o I-680	(State Route 4 Station 118+00 to 122+00) (Figure 2-4)					
E-S-1	Corner of Avenida Flores and Via Peralta in Ranch Diablo Mobile Home Park.	Yes	64	65	**67**	3	**A/E**
E-S-2	Front of 317 Avenida Flores ~ 87 m. from the centerline of the near lane of Route 4 in Rancho Diablo Mobile Home Park.	Yes	**67**	**68**	**69**	2	**A/E**
E-S-3	319 La Vina in Rancho Diablo Mobile Home Park.	Yes	65	65	**68**	3	**A/E**
E-S-4	Northeast corner of the Rancho Diablo Mobile Home Park at the intersection of Avenida Flores and Via Peralta.	Yes	**69**	**70**	**72**	3	**A/E**
E-S-M1	Mobile home on Avenida Flores west of E-S-2.	Yes	**67**	**67**	**70**	3	**A/E**
E-S-M2	Second Row Receiver, Mobile home on Via Peratta south of E-S-3.	Yes	63	64	**66**	3	**A/E**
East Leg	EB Route 4 e/o I-680	(State Route 4 Station 136+00 to 146+00) (Figures 2-6 and 2-7)					
E-S-5	2364 Dalis Drive ~ 8 m. from a 1.5 m. barrier.	No	64	64	**66**	2	**A/E**
E-S-6	South of 2364 Dalis Drive.	No	**67**	**67**	**69**	2	**A/E**
E-S-6A	2323 Dalis Drive.	No	62	62	64	2	NONE
E-S-6B	2289 Dalis Drive.	No	59	59	61	2	NONE
E-S-M3	Back yard of Mobile home on Dalis Dr. east of E-S-5.	No	64	65	**66**	2	**A/E**
E-S-M4	Rear yard of Mobile home on Dalis Dr. southeast of E-S-5.	No	61	62	63	2	NONE
E-S-7	99 A Street south of commercial area.	Yes	62	63	65	3	NONE
E-S-LT1	~38 m. from the edge of the EB Rt. 4 to SB Rt. 242 connector ramp at setback of adjacent condominiums. (Offset measurement)	Yes	**68**	**69**	**71**	2	**A/E**
E-S-8	Northeast portion of condominium development near EB Rt. 4 to SB Rt. 242 connector ramp.	Yes	**67**	**68**	**69**	2	**A/E**
E-S-8A	~22 m. from the edge of the EB Rt. 4 to SB Rt. 242 connector ramp at setback of adjacent condominiums (#3815).	Yes	**69**	**70**	**72**	2	**A/E**
E-S-M5	Single family residence at the north end of Northwood Dr.	Yes	**68**	**68**	**70**	2	**A/E**
E-S-M6	Single family residence west of Northwood Dr, next to off ramp of eastbound 4 to southbound 242.	Yes	**69**	**70**	**70**	2	**A/E**

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
East Leg	EB Route 4 e/o Route 242	(State Route 4 Station 148+00 to 156+00) (Figure 2-8)					
E-S-9	Front of 3638 Montreal Circle.	Yes	62	63	64	2	NONE
E-S-10	Rear yard of 3669 Montreal Circle.	Yes	59	60	61	2	NONE
E-S-11	Rear yard of 3726 Salsbury ~ 5 m. south of the ROW chain-link fence.	Yes	**67**	--	--	--	**A/E**
E-S-12	Rear yard of 3744 Salsbury.	Yes	**68**	--	--	--	**A/E**
E-S-M7	Rear yard of single family residence on western side of Montreal Cir. Southwest of E-S-9.	Yes	64	65	65	2	NONE
E-S-M8	Rear yard of single family residence on western side of Montreal Cir. west of E-S-9.	Yes	64	64	65	1	NONE
E-S-M9	Rear yard of 3726 Salsbury.	Yes	63	--	--	--	NONE
E-S-M10	Second Row Receiver on Salsbury Dr.	Yes	62	--	--	--	NONE
E-S-M11	Rear yard of single family residence on St. George Ct.	Yes	**66**	--	--	--	**A/E**
E-S-13	Front of 3799 Bayview Dr.	Yes	63	--	--	--	NONE
E-S-14	Rear yard of 3802 Bayview Dr. ~ 70 m. from the centerline of the near travel lane.	Yes	**72**	--	--	--	**A/E**
E-S-15	Rear yard of 3820 Bayview Circle ~ 60 m. south of centerline of near EB Rt. 4 travel lane.	Yes	**75**	--	--	--	**A/E** [1]
E-S-LT2	Rear yard of 3820 Bayview Circle ~ 60 m. south of centerline of near EB Rt. 4 travel lane.	Yes	**77**	--	--	--	**A/E** [1]
E-S-16	Rear yard of 3874 Bayview Circle ~ 53 m. south of centerline of near EB Rt. 4 travel lane.	Yes	**75**	--	--	--	**A/E** [1]
E-S-17	Front of 3891 Bayview Dr.	Yes	62	--	--	--	NONE
E-S-18	Front of 3951 Bayview Dr.	Yes	61	--	--	--	NONE
E-S-19	Front of 3933 Bayview Dr.	Yes	61	--	--	--	NONE
E-S-20	Park on Bayview Street overlooking Rt. 4 ~ 1.5 m. from chain-link fence.	Yes	**68**	--	--	--	**A/E**

1 The noise impact would be considered severe at noise-sensitive land uses represented by these receivers.

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
North Leg	NB I-680	(Receivers East of NB I-680; Station 119+00 to 124+00) (Figure 2-12)					
N-E-1	Side yard of 55 Rutherford ~ 17 m. from the right-of-way fence.	Yes	**70**	**71**	**71**	1	**A/E**
N-E-LT	Rear yard of 48 Rutherford Ln. ~ 20 m. from the edge of the near NB I-680 travel lane.	Yes	**68**	**69**	**69**	1	**A/E**
N-E-2	Front of 45 Rutherford ~ 83 m. from the centerline of the near NB travel lane.	Yes	**67**	**68**	**69**	2	**A/E**
N-E-3	Front of 5A Rutherford.	Yes	**66**	**67**	**68**	2	**A/E**
N-E-4	~ 31 m. from the centerline of the near NB I-680 travel lane in apartment complex.	No	**68**	**69**	**71**	3	**A/E**
N-E-M1	Back yard of single family home (private driveway) off of Rutherford Dr. north of N-E-1.	Yes	65	**66**	**66**	1	**A/E**
N-E-M2	Second row receiver, side yard of single family residence, east of N-E-1.	Yes	**66**	**67**	**67**	1	**A/E**
N-E-M3	Front yard of single family residence, at north end of Meyers Dr., north of N-E-4.	Yes	**70**	**71**	**72**	3	**A/E**

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
North Leg	SB I-680	(Receivers West of SB I-680; Station 118+00 to 129+00) (Figures 2-12 and 2-13)					
N-W-1	Setback of 4685 Pacheco Blvd. ~ 72 m. from the centerline of the near SB I-680 travel lane.	Yes	63	64	63	1	NONE
N-W-2	Setback of 4685 Pacheco Blvd. ~ 35 m. from the centerline of the near SB I-680 travel lane.	Yes	**69**	**69**	**69**	1	**A/E**
N-W-3	~ 77 m. from the centerline of the near I-680 SB travel lane.	Yes	65	**66**	**66**	1	**A/E**
N-W-4	Rear yard of 4795 Pacheco Blvd. ~ 102 m. from the centerline of the near I-680 SB travel lane.	No	64	65	65	1	NONE
N-W-M1	Single family residence between 680 and Pacheco Blvd. south of N-W-2.	Yes	**71**	**72**	**71**	1	**A/E**
N-W-M1A	Single family residence between 680 and Pacheco Blvd. north of N-W-1.	Yes	**70**	**71**	**70**	0	**A/E**
N-W-M2	Second row receiver, single family residence between 680 and Pacheco Blvd. north of N-W-3.	No	**67**	**68**	**68**	1	**A/E**
N-W-M3	Single family residence between 680 and Pacheco Blvd.	Yes	**67**	**68**	**67**	1	**A/E**
N-W-M4	Single family residence, between Hanson Ct. and Blum Rd.	Yes	**68**	**69**	**70**	2	**A/E**
N-W-M5	Single family residence, on Blum Rd.	Yes	**68**	**69**	**70**	2	**A/E**
N-W-M6	Mult-family residences, between Hanson Ct. and Blum Rd.	Yes	**67**	**68**	**69**	2	**A/E**
N-W-M7	Single family residence, on Blum Rd.	Yes	**68**	**69**	**70**	2	**A/E**
N-W-M8	Second row receiver, Multi family residences on Hanson Ct. (Lower level)	Yes	**67**	**68**	**69**	2	**A/E**
N-W-M9	Second row receiver, Multi family residences on Hanson Ct. (Upper level.)	Yes	**68**	**69**	**69**	1	**A/E**
N-W-LT	Rear yard of 4710 Blum. ~ 38 m. from the edge of I-680 SB.	Yes	**69**	**70**	**71**	2	**A/E**
N-W-5	Front of # 160 Hanson Ct. ~ 100 m. from the edge of I-680 SB.	Yes	**67**	**68**	**69**	2	**A/E**

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-3

Phase 1 and 2 Predicted Noise Levels and Reduction with Barriers in Place

Location	Future Worst Hour Noise Leq (hr)	Noise Barrier ID or Location	Future Noise Levels (dBA) with Barrier in Place						Noise Level Reduction (dBA) Achieved by Barrier					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
South Leg	NB I-680 s/o SR 4													
SW1A - NB680 EOS SW + NB680-WB4 CONNECTOR EOS SW														
S-E-LT1	65	**SW1 A**	65	64	64	63	62	--	0	1	1	2	3	--
S-E-1	61	**SW1 A**	60	60	60	59	58	--	1	1	1	2	3	--
S-E-2	**73**	**SW1 A**	**73**	**72**	**72**	**72**	**72**	--	0	1	1	1	1	--
S-E-3	**74**	**SW1 A**	**72**	**71**	**71**	**70**	**70**	--	2	2	3	3	4	--
S-E-LT2	**78**	**SW1 A**	**74**	**72**	**71**	**69**	**68**	--	4	**6**	**8**	**9**	**11**	--
S-E-4	**77**	**SW1 A**	**74**	**72**	**71**	**69**	**68**	--	3	**5**	**6**	**8**	**9**	--
S-E-5	**74**	**SW1 A**	**72**	**71**	**70**	**68**	**67**	--	2	3	4	**6**	**7**	--
S-E-M1	**71**	**SW1 A**	**71**	**70**	**70**	**70**	**70**	--	0	0	0	1	1	--
S-E-M2	**79**	**SW1 A**	**74**	**71**	**70**	**68**	**67**	--	**5**	**7**	**9**	**11**	**12**	--
S-E-M3	**74**	**SW1 A**	**73**	**72**	**71**	**69**	**68**	--	2	3	4	**5**	**7**	--
S-E-M4	**77**	**SW1 A**	**73**	**72**	**70**	**69**	**68**	--	4	**5**	**7**	**8**	**10**	--
S-E-M5	**77**	**SW1 A**	**74**	**72**	**71**	**69**	**68**	--	3	**5**	**6**	**8**	**9**	--
S-E-M6	**72**	**SW1 A**	**70**	**70**	**68**	**67**	**66**	--	2	3	4	**5**	**6**	--
S-E-M7	**76**	**SW1 A**	**72**	**71**	**69**	**68**	**67**	--	4	**5**	**7**	**8**	**9**	--
S-E-M8	**67**	**SW1 A**	**67**	**67**	**67**	**67**	**67**	--	0	0	1	1	1	--
S-E-M9	**68**	**SW1 A**	**68**	**68**	**67**	**67**	**67**	--	0	1	1	1	2	--
SW1B - Option 1 - NB680 EOS SW (4.2m) + NB680-WB4 CONNECTOR EOS SW (4.2m) + MAINLINE EOS SW (Varies)														
S-E-2	**74**	**SW1 B O1**	**72**	**71**	**69**	**68**	**67**	--	2	3	**5**	**6**	**6**	--
S-E-3	**74**	**SW1 B O1**	**73**	**71**	**70**	**69**	**68**	--	1	2	4	**5**	**6**	--
S-E-M1	**71**	**SW1 B O1**	**69**	**68**	**66**	65	65	--	2	3	4	**5**	**6**	--
S-E-M8	**67**	**SW1 B O1**	**67**	**67**	**67**	**66**	65	--	0	0	1	1	2	--
S-E-M9	**68**	**SW1 B O1**	**68**	**68**	**68**	**67**	**67**	--	0	0	1	1	2	--
SW1B - Option 2 - NB680 EOS SW (4.2m) + NB680-WB4 CONNECTOR EOS SW (4.2m) + ROW SW (Varies)														
S-E-2	**74**	**SW1 B O2**	**70**	**68**	**66**	65	64	64	3	**5**	**7**	**8**	**9**	**10**
S-E-3	**74**	**SW1 B O2**	**68**	**66**	65	65	64	64	**5**	**7**	**9**	**9**	**9**	**10**
S-E-M1	**71**	**SW1 B O2**	**68**	**67**	65	64	63	62	2	4	**6**	**7**	**8**	**8**
S-E-M8	**67**	**SW1 B O2**	**67**	**66**	**66**	65	64	64	1	1	1	2	3	4
S-E-M9	**68**	**SW1 B O2**	**67**	**66**	**66**	**66**	65	64	2	2	2	3	3	4

Notes: **Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.**

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TABLE F-3

Phase 1 and 2 Predicted Noise Levels and Reduction with Barriers in Place

Location	Future Worst Hour Noise Leq (hr)	Noise Barrier ID or Location	Future Noise Levels (dBA) with Barrier in Place						Noise Level Reduction (dBA) Achieved by Barrier					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
West Leg	EB Route 4													
W-S-1	65	**SW5**	64	64	63	63	62	--	1	1	2	2	3	--
W-S-2	64	**SW5**	63	62	61	60	59	--	1	2	3	4	4	--
W-S-3	**70**	**SW5**	**69**	**68**	**67**	**66**	65	--	1	2	3	4	**5**	--
W-S-4	61	**SW5**	61	60	59	58	57	--	1	1	2	3	4	--
W-S-5	**68**	**SW5**	**68**	**68**	**67**	**67**	**67**	**66**	1	1	1	2	2	2
W-S-LT	**71**	**SW5**	**69**	**68**	**66**	65	64	64	2	3	4	**5**	**6**	**7**
W-S-6	65	**EB 4 EOS**	65	65	65	65	65	--	0	0	0	0	0	--
W-S-7	62	**EB 4 EOS**	62	62	62	62	62	--	0	0	0	0	0	--
W-S-8	**67**	**EB 4 EOS**	**67**	**66**	65	64	64	--	0	1	2	3	4	--
W-S-9	60	**EB 4 EOS**	58	58	57	57	57	--	2	2	2	3	3	--
W-S-10	60	**EB 4 EOS**	59	59	59	59	59	--	1	1	1	2	2	--
W-S-M1	**69**	**SW5**	**67**	**66**	65	64	63	--	2	3	4	**5**	**6**	--
W-S-M2	**71**	**SW5**	**71**	**70**	**69**	**68**	**66**	**66**	0	0	2	3	4	**5**
W-S-M3	**67**	**SW5**	**67**	**67**	**66**	65	64	63	0	0	1	2	3	4
W-S-M4	62	**SW5**	61	60	59	58	57	57	1	1	2	3	4	**5**
W-S-M5	59	**EB 4 EOS**	59	59	59	59	59	--	0	0	0	0	0	--
W-S-M6	63	**EB 4 EOS**	63	63	63	63	63	--	0	0	0	0	0	--
W-S-M7	58	**EB 4 EOS**	58	58	58	58	58	--	0	0	0	0	0	--
W-S-M8	55	**EB 4 EOS**	55	55	55	55	55	--	0	0	0	0	0	--
W-S-M9	62	**EB 4 EOS**	61	60	60	59	58	--	1	2	2	3	4	--
W-S-M10	64	**EB 4 EOS**	63	63	62	61	61	--	1	2	2	3	3	--
W-S-M11	60	**EB 4 EOS**	60	59	59	59	59	--	0	1	1	1	2	--
W-S-M12	**66**	**EB 4 EOS**	**66**	**66**	**66**	65	64	--	0	0	1	1	2	--
West Leg	WB Route 4													
W-N-LT	**69**	**SW6**	**67**	**66**	65	65	64	--	2	3	3	4	**5**	--
W-N-1	63	**SW6**	62	62	60	59	59	--	1	1	2	3	4	--
W-N-2	**70**	**SW6**	**70**	**69**	**69**	**68**	**67**	--	0	1	2	2	3	--
W-N-3	**66**	**WB 4 EOS**	65	65	64	63	62	--	0	1	1	2	3	--
W-N-4	**69**	**WB 4 EOS**	**68**	**67**	**67**	**66**	65	--	1	2	2	3	4	--
W-N-5	65	--	65	65	65	65	65	--	0	0	0	0	0	--
W-N-6	63	--	63	63	63	63	63	--	0	0	0	0	0	--
W-N-7	62	--	62	62	62	62	62	--	0	0	0	0	0	--
W-N-M1	62	**SW6**					61	--	--	--	--	--	1	--
W-N-M2	63	**SW6**	63	62	61	60	59	--	0	1	2	3	4	--
W-N-M3	64	**WB 4 EOS**	64	64	63	62	61	--	0	1	1	2	3	--
W-N-M4	60	**SW6**	--	--	--	--	60	--	--	--	--	--	0	--
W-N-M5	**66**	**SW6**	--	--	--	--	63	--	--	--	--	--	3	--
W-N-M6	65	**SW6**	--	--	--	--	61	--	--	--	--	--	4	--
W-N-M7	**69**	**SW6**	--	--	--	--	64	--	--	--	--	--	**5**	--
W-N-M8	65	**SW6**	--	--	--	--	62	--	--	--	--	--	3	--

Notes: **Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.**

TABLE F-4

Noise Modeling Results with Barriers in Place (Phases 3, 4, and 5)

Location	Project Worst Hour Leq (hr)	Noise Barrier ID or Location	Predicted Noise Levels (dBA) 1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	Noise Increase in dBA 1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
North Leg	SB I-680 n/o SR 4													
N-W-M3	**67**	**SW2**	**67**	**67**	**67**	**67**	**67**	--	0	0	0	0	0	--
N-W-M5	**70**	**SW2**	**66**	64	63	62	61	--	4	**6**	**7**	**8**	**9**	--
N-W-M6	**69**	**SW2**	**66**	64	63	62	61	--	3	**5**	**6**	**7**	**8**	--
N-W-M7	**70**	**SW2**	**66**	65	64	63	61	--	3	**5**	**6**	**7**	**8**	--
N-W-LT	**71**	**SW2**	**67**	**66**	65	64	62	--	4	**6**	**7**	**8**	**9**	--
N-W-5	**69**	**SW2**	**66**	65	64	63	61	--	3	4	**5**	**6**	**8**	--
North Leg	NB I-680 n/o SR 4													
N-E-1	**71**	**SW3**	**69**	**68**	**66**	65	64	--	2	3	4	**6**	**7**	--
N-E-LT	**69**	**SW3**	**68**	**66**	64	63	62	--	1	3	**5**	**6**	**7**	--
N-E-2	**69**	**SW3**	**67**	**66**	65	63	62	--	2	3	4	**6**	**7**	--
N-E-3	**68**	**SW3**	**66**	65	63	62	61	--	2	3	**5**	**6**	**7**	--
N-E-4	**71**	**SW3**	**66**	65	64	63	62	--	**5**	**6**	**7**	**8**	**9**	--
N-E-M1	**66**	**SW3**	**66**	65	65	65	64	--	0	0	1	1	2	--
N-E-M2	**67**	**SW3**	**66**	**66**	65	64	63	--	1	1	2	3	4	--
N-E-M3	**72**	**SW3**	**68**	**66**	65	64	63	--	**5**	**7**	**8**	**9**	**10**	--
North Leg	SB I-680 n/o SR 4													
N-W-3	**66**	**SW4 A**	64	63	61	60	59	--	2	3	4	**6**	**7**	--
N-W-4	65	**SW4 A**	63	62	61	59	58	--	1	3	4	**5**	**6**	--
N-W-M1	**71**	**SW4 A**	**70**	**69**	**68**	**67**	**66**	--	1	2	3	4	**5**	--
N-W-M2	**68**	**SW4 A**	**67**	**66**	65	63	62	--	1	2	3	**5**	**6**	--
N-W-M1A	**70**	**SW4 B**	**68**	**66**	65	64	63	--	3	4	**6**	**7**	**8**	--
N-W-1	63	**SW4 B**	63	63	62	62	61	--	0	1	1	2	2	--
N-W-2	**69**	**SW4 B**	**67**	**66**	65	64	63	--	2	3	4	**6**	**6**	--

Notes: **Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.**

TABLE F-4

Noise Modeling Results with Barriers in Place (Phases 3, 4, and 5)

Location	Project Worst Hour Leq (hr)	Noise Barrier ID or Location	Predicted Noise Levels (dBA) 1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	Noise Increase in dBA 1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
East Leg	EB Route 4 e/o I-680													
		SW7 - Option 1 - SB680-EB4 CONNECTOR EOS SW												
E-S-1	**67**	**SW7 O1**	**66**	65	65	65	64	--	1	1	2	2	3	--
E-S-2	**69**	**SW7 O1**	**67**	**67**	**66**	**66**	**66**	--	1	2	3	3	3	--
E-S-3	**68**	**SW7 O1**	**67**	**66**	65	64	63	--	1	2	3	4	4	--
E-S-4	**72**	**SW7 O1**	**69**	**68**	**67**	**66**	64	--	3	4	**5**	**6**	**7**	--
E-S-M1	**70**	**SW7 O1**	**67**	**67**	**66**	65	64	--	2	3	4	**5**	**6**	--
E-S-M2	**66**	**SW7 O1**	65	65	64	63	63	--	1	2	2	3	4	--
		SW7 - Option 2 - EB4 MAINLINE EOS SW + SB680-EB4 CONNECTOR EOS SW												
E-S-1	**67**	**SW7 O2**	--	--	--	--	63	--	--	--	--	--	4	--
E-S-2	**69**	**SW7 O2**	--	--	--	--	64	--	--	--	--	--	**5**	--
E-S-3	**68**	**SW7 O2**	--	--	--	63	63	--	--	--	--	**5**	**5**	--
E-S-4	**72**	**SW7 O2**	--	--	**66**	65	64	--	--	--	**6**	**7**	**8**	--
E-S-M1	**70**	**SW7 O2**	--	--	--	65	64	--	--	--	--	**5**	**6**	--
E-S-M2	**66**	**SW7 O2**	--	--	--	--	62	--	--	--	--	--	4	--
		SW7 - Option 3 - ROW SW												
E-S-1	**67**	**SW7 O3**	**67**	**67**	**66**	65	64	--	0	0	0	1	2	3
E-S-2	**69**	**SW7 O3**	**68**	**67**	65	63	62	--	0	1	2	4	**6**	**7**
E-S-3	**68**	**SW7 O3**	**68**	**68**	**67**	**67**	**66**	--	0	0	0	1	1	2
E-S-4	**72**	**SW7 O3**	**70**	**69**	**69**	**68**	**67**	--	2	2	3	4	**5**	**5**
E-S-M1	**70**	**SW7 O3**	**69**	**68**	**67**	65	64	--	0	0	1	3	4	**6**
E-S-M2	**66**	**SW7 O3**	**66**	**66**	**66**	**66**	65	--	0	0	0	0	1	1
East Leg	EB Route 4 e/o I-680													
E-S-5	**66**	**SW8**	65	64	62	61	60	--	1	2	3	**5**	**6**	--
E-S-6	**69**	**SW8**	**66**	**66**	65	64	63	--	2	3	4	**5**	**5**	--
E-S-6A	64	**SW8**	63	62	61	60	59	--	1	1	3	4	**5**	--
E-S-6B	61	**SW8**	60	60	59	58	58	--	0	1	1	2	3	--
E-S-M3	**66**	**SW8**	65	64	63	61	60	--	1	2	3	**5**	**6**	--
E-S-M4	63	**SW8**	63	62	61	60	59	--	1	1	2	3	4	--
E-S-7	65	--	65	65	65	65	65	--	0	0	0	0	0	--
East Leg	EB Route 4 e/o I-680													
E-S-LT1	**71**	**SW9**	**69**	**68**	**67**	**66**	65	--	1	2	3	**5**	**6**	--
E-S-8	**69**	**SW9**	**69**	**68**	**68**	**66**	65	--	0	1	2	3	4	--
E-S-8A	**72**	**SW9**	**71**	**70**	**69**	**67**	**66**	--	1	2	3	4	**6**	--
E-S-M5	**70**	**SW9**	**69**	**69**	**68**	**68**	**67**	--	1	1	2	2	3	--
E-S-M6	**70**	**SW9**	**70**	**69**	**68**	**67**	**66**	--	1	1	3	4	**5**	--

Notes: **Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.**

TABLE F-4

Noise Modeling Results with Barriers in Place (Phases 3, 4, and 5)

Location	Project Worst Hour Leq (hr)	Noise Barrier ID or Location	Predicted Noise Levels (dBA) 1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	Noise Increase in dBA 1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
East Leg	EB Route 4 e/o Route 242													
E-S-9	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-10	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-11	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-12	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M7	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M8	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M9	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M10	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M11	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-13	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-14	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-15	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S2-LT	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-16	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-17	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-18	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-19	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--
E-S-20	--	**SW10 ?**	--	--	--	--	--	--	--	--	--	--	--	--

Notes: **Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.**

Appendix G Title VI Policy Statement

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
1120 N STREET
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-5266
FAX (916) 654-6608
TTY (916) 653-4086

Flex your power!
Be energy efficient!

January 14, 2005

TITLE VI
POLICY STATEMENT

The California Department of Transportation under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, national origin, sex, disability, and age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

WILL KEMPTON
Director

Appendix H Consultation and Coordination

This appendix contains relevant letters and records of consultation with Federal, State and local agencies relevant to the project development and environmental review process. The following briefly summarizes the correspondence.

U.S. Fish and Wildlife Service (USFWS)

- February 11, 2002 – USFWS provided a requested list of endangered and threatened species recorded in the area of the USGS quadrangle maps that include the project location.
- April 1, 2003 – USFWS responded to a request for technical review of the evaluation of all five phases of the interchange improvements for the presence of the federally threatened red-legged frog *(Rana aurora draytonii).* The USFWS determined that the proposed project is not likely to result in "take" of this species.

National Oceanic and Atmospheric Administration (NOAA) Fisheries

- October 25, 2004 – A request was sent to NOAA Fisheries for concurrence on measures that were being included in the project to avoid and minimize impacts to potential fisheries habitat in Grayson and Walnut Creeks. Specifically, the letter summarized mitigation and avoidance measures for Central Valley steelhead (*Oncorhynchus mykiss*) and Central Valley chinook (*O. tshawytscha*) and requested concurrence from NOAA Fisheries on the measures.
- November 24, 2004 – NOAA Fisheries replied and found that the proposed mitigation measures are sufficient to avoid or minimize adverse impacts to listed salmonids, with some additional recommendations. The requests include expansion of the proposed "work window" for activities in the creeks from June 1 to October 31, testing of soils within the active channel that are disturbed and management or removal of any such contaminated soils, and emphasis on the need or effort to complete any channel work in a fashion that facilitates fish passage or removes obvious existing barriers such as rubble and debris.

U.S. Army Corps of Engineers (USACE)

- USACE concurrence on wetland delineation is pending.

State Office of Historic Preservation

- January 27, 2005 – Consultation was initiated with the State Historic Preservation Officer (SHPO), as summarized in the letter dated January 27, 2005, transmitting the findings of cultural resources investigations that were performed for all five phases of the project. The SHPO concurred with the findings that the Contra Costa Canal (crossed by the project in two locations) is eligible for the National Register of Historic Places, and that all other properties identified in the project's Area of Potential Effects are not eligible. Although the canal is a historic property, the studies for this project also determined that the proposed changes would have no effect on the canal's significance.

California Highway Patrol (CHP) and Contra Costa County Office of the Sheriff

- The CHP and the Contra Costa County Sheriff's office submitted letters regarding the interchange design with respect to access to Pacheco Boulevard.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-02-SP-0871

February 11, 2002

Michele Lee
URS
500 12th Street, Suite 200
Oakland, California 94607

Subject: Species List for I-680/State Route 4 Interchange, Martinez, California

Dear Michele:

We are sending the enclosed list in response to your February 11, 2002, request for information about endangered and threatened species (Enclosure A). The list covers the following U.S. Geological Survey 7 1/2 minute quads:

465A WALNUT CREEK
482D VINE HILL

Please read Important Information About Your Species List (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Contact Dan Buford, Branch Chief, at (916) 414-6625, if you have any questions about the attached list or your responsibilities under the Endangered Species Act.

For the fastest response to species list requests, address them to the attention of Harry Mossman at this address. You may fax requests to him at 414-6710 or email them to harry_mossman@fws.gov.

Sincerely,

Harry Mossman

for Jan C. Knight, Chief
Endangered Species Division

Enclosures

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-02-SP-0871
February 11, 2002

QUAD: 465A WALNUT CREEK

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Critical habitat, Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Plants

Contra Costa goldfields, *Lasthenia conjugens* (E) *

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

- Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)
- greater western mastiff-bat, *Eumops perotis californicus* (SC)
- small-footed myotis bat, *Myotis ciliolabrum* (SC)
- long-eared myotis bat, *Myotis evotis* (SC)
- fringed myotis bat, *Myotis thysanodes* (SC)
- long-legged myotis bat, *Myotis volans* (SC)
- Yuma myotis bat, *Myotis yumanensis* (SC)
- San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)
- San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

- tricolored blackbird, *Agelaius tricolor* (SC)
- grasshopper sparrow, *Ammodramus savannarum* (SC)
- Bell's sage sparrow, *Amphispiza belli belli* (SC)
- short-eared owl, *Asio flammeus* (SC)
- western burrowing owl, *Athene cunicularia hypugaea* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- Costa's hummingbird, *Calypte costae* (SC)
- Lawrence's goldfinch, *Carduelis lawrencei* (SC)
- Vaux's swift, *Chaetura vauxi* (SC)
- black tern, *Chlidonias niger* (SC)
- black swift, *Cypseloides niger* (SC)
- white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (CA)
- American peregrine falcon, *Falco peregrinus anatum* (D)
- saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
- loggerhead shrike, *Lanius ludovicianus* (SC)
- black rail, *Laterallus jamaicensis coturniculus* (CA)
- Lewis' woodpecker, *Melanerpes lewis* (SC)
- Suisun song sparrow, *Melospiza melodia maxillaris* (SC)
- long-billed curlew, *Numenius americanus* (SC)
- bank swallow, *Riparia riparia* (CA)
- rufous hummingbird, *Selasphorus rufus* (SC)
- Allen's hummingbird, *Selasphorus sasin* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Spea hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

Big plant, *Blepharizonia plumosa ssp. plumosa* (SC) *?

Diablo helianthella (=rock-rose), *Helianthella castanea* (SC)

Congdon's tarplant, *Hemizonia parryi ssp. congdonii* (SC) *

delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC) *

QUAD: 482D VINE HILL

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

California clapper rail, *Rallus longirostris obsoletus* (E)

California least tern, *Sterna antillarum (=albifrons) browni* (E)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS
Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

delta green ground beetle, *Elaphrus viridis* (T)

callippe silverspot butterfly, *Speyeria callippe callippe* (E)

California freshwater shrimp, *Syncaris pacifica* (E)

Plants

soft bird's-beak, *Cordylanthus mollis ssp. mollis* (E)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Suisun ornate shrew, *Sorex ornatus sinuosus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

grasshopper sparrow, *Ammodramus savannarum* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
Aleutian Canada goose, *Branta canadensis leucopareia* (D)
ferruginous hawk, *Buteo regalis* (SC)
Costa's hummingbird, *Calypte costae* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
black tern, *Chlidonias niger* (SC)
black swift, *Cypseloides niger* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
American peregrine falcon, *Falco peregrinus anatum* (D)
saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
greater sandhill crane, *Grus canadensis tabida* (CA)
loggerhead shrike, *Lanius ludovicianus* (SC)
black rail, *Laterallus jamaicensis coturniculus* (CA)
Lewis' woodpecker, *Melanerpes lewis* (SC)
Suisun song sparrow, *Melospiza melodia maxillaris* (SC)
long-billed curlew, *Numenius americanus* (SC)
bank swallow, *Riparia riparia* (CA)
rufous hummingbird, *Selasphorus rufus* (SC)
Allen's hummingbird, *Selasphorus sasin* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Spea hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
river lamprey, *Lampetra ayresi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

- Suisun Marsh aster, *Aster lentus* (SC)
- delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
- Mason's lilaeopsis, *Lilaeopsis masonii* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(MB)	*Migratory Bird*	Migratory bird
NMFS	NMFS species	Under the jurisdiction of the National Marine Fisheries Service. Contact them directly.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California Counties
Reference File No. 1-1-02-SP-0871
February 11, 2002

CONTRA COSTA COUNTY

Listed Species

Mammals

San Joaquin kit fox, *Vulpes macrotis mutica* (E)
riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *
riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *
salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

California brown pelican, *Pelecanus occidentalis californicus* (E)
California clapper rail, *Rallus longirostris obsoletus* (E)
California least tern, *Sterna antillarum (=albifrons) browni* (E)
bald eagle, *Haliaeetus leucocephalus* (T)
western snowy plover, *Charadrius alexandrinus nivosus* (T)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)
Critical habitat, Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)
giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Central California Coastal steelhead, *Oncorhynchus mykiss* (T) NMFS
Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS
Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS
Critical habitat, Central California coastal steelhead, *Oncorhynchus mykiss* (T) NMFS
Critical habitat, Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS
Critical habitat, delta smelt, *Hypomesus transpacificus* (T)
Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS
Sacramento splittail, *Pogonichthys macrolepidotus* (T)
coho salmon - central CA coast, *Oncorhynchus kisutch* (T) NMFS
delta smelt, *Hypomesus transpacificus* (T)
tidewater goby, *Eucyclogobius newberryi* (E)
winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

Lange's metalmark butterfly, *Apodemia mormo langei* (E)

callippe silverspot butterfly, *Speyeria callippe callippe* (E)

longhorn fairy shrimp, *Branchinecta longiantenna* (E)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Plants

Antioch Dunes evening-primrose, *Oenothera deltoides ssp. howellii* (E)

Contra Costa goldfields, *Lasthenia conjugens* (E)

Contra Costa wallflower, *Erysimum capitatum ssp. angustatum* (E)

Critical Habitat, Contra Costa wallflower, *Erysimum capitatum ssp. angustatum* (E)

Critical habitat, Antioch Dunes evening-primrose, *Oenothera deltoides ssp. howellii* (E)

Critical habitat, Santa Cruz tarplant, *Holocarpha macradenia* (T)

Santa Cruz tarplant, *Holocarpha macradenia* (T) *

large-flowered fiddleneck, *Amsinckia grandiflora* (E)

pallid manzanita (=Alameda or Oakland Hills manzanita), *Arctostaphylos pallida* (T)

soft bird's-beak, *Cordylanthus mollis ssp. mollis* (E)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Berkeley kangaroo rat, *Dipodomys heermanni berkeleyensis* (SC) *

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Suisun ornate shrew, *Sorex ornatus sinuosus* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)
long-legged myotis bat, *Myotis volans* (SC)
salt marsh vagrant shrew, *Sorex vagrans halicoetes* (SC)
small-footed myotis bat, *Myotis ciliolabrum* (SC)

Birds

Alameda (South Bay) song sparrow, *Melospiza melodia pusillula* (SC)
Aleutian Canada goose, *Branta canadensis leucopareia* (D)
Allen's hummingbird, *Selasphorus sasin* (SC)
American bittern, *Botaurus lentiginosus* (SC)
American peregrine falcon, *Falco peregrinus anatum* (D)
Bell's sage sparrow, *Amphispiza belli belli* (SC)
California thrasher, *Toxostoma redivivum* (SC)
Costa's hummingbird, *Calypte costae* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
San Pablo song sparrow, *Melospiza melodia samuelis* (SC)
Snowy Egret, *Egretta thula* (MB)
Suisun song sparrow, *Melospiza melodia maxillaris* (SC)
Swainson's hawk, *Buteo Swainsoni* (CA)
Vaux's swift, *Chaetura vauxi* (SC)
bank swallow, *Riparia riparia* (CA)
black rail, *Laterallus jamaicensis coturniculus* (CA)
common loon, *Gavia immer* (SC)
ferruginous hawk, *Buteo regalis* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
loggerhead shrike, *Lanius ludovicianus* (SC)
long-billed curlew, *Numenius americanus* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)
short-eared owl, *Asio flammeus* (SC)
tricolored blackbird, *Agelaius tricolor* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
white-faced ibis, *Plegadis chihi* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

Reptiles

California horned lizard, *Phrynosoma coronatum frontale* (SC)

San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

silvery legless lizard, *Anniella pulchra pulchra* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Spea hammondii* (SC)

Fish

Pacific lamprey, *Lampetra tridentata* (SC)

green sturgeon, *Acipenser medirostris* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

river lamprey, *Lampetra ayresi* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Antioch andrenid bee, *Perdita scitula antiochensis* (SC)

Antioch cophuran robberfly, *Cophura hurdi* (SC)

Antioch efferian robberfly, *Efferia antiochi* (SC)

Antioch mutillid wasp, *Myrmosula pacifica* (SC)

Antioch sphecid wasp, *Philanthus nasilis* (SC)

Bridges' Coast Range shoulderband snail, *Helminthoglypta nickliniana bridgesi* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Ciervo aegialian scarab beetle, *Aegialia concinna* (SC)

Hurd's metapogon robberfly, *Metapogon hurdi* (SC)

Marin elfin butterfly, *Incisalia mossii* (SC)

Middlekauf's shieldback katydid, *Idiostatus middlekaufi* (SC)

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

San Francisco lacewing, *Nothochrysa californica* (SC)

San Joaquin dune beetle, *Coelus gracilis* (SC)

curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)

molestan blister beetle, *Lytta molesta* (SC)

yellow-banded andrenid bee, *Perdita hirticeps luteocincta* (SC)

Plants

Ben Lomond buckwheat (= naked buckwheat), *Eriogonum nudum var. decurrens* (SC)

Big plant, *Blepharizonia plumosa ssp. plumosa* (SC)
Brewer's dwarf-flax (=western flax), *Hesperolinon breweri* (SC)
California croton, *Croton californicus* (SLC)
Carquinez goldenbush, *Isocoma arguta* (SC)
Congdon's tarplant, *Hemizonia parryi ssp. congdonii* (SC)
Diablo helianthella (=rock-rose), *Helianthella castanea* (SC)
Franciscan thistle, *Cirsium andrewsii* (SC)
Gairdner's yampah, *Perideridia gairdneri ssp. gairdneri* (SC)
Livermore tarplant, *Deinandra bacigalupii* (SC)
Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
Mt. Diablo bird's-beak, *Cordylanthus nidularius* (SC)
Mt. Diablo jewelflower, *Streptanthus hispidus* (SC)
Mt. Diablo phacelia, *Phacelia phacelioides* (SC)
Northern California black walnut, *Juglans californica var. hindsii* (SC)
Pacific cordgrass (=California cordgrass), *Sparina foliosa* (SLC)
San Joaquin spearscale (=saltbush), *Atriplex joaquiniana* (SC)
Suisun Marsh aster, *Aster lentus* (SC)
Tiburon buckwheat, *Eriogonum caninum* (SLC)
alkali milk-vetch, *Astragalus tener var. tener* (SC) *
brittlescale, *Atriplex depressa* (SC)
caper-fruited tropidocarpum, *Tropidocarpum capparideum* (SC) **
coast rock-cress, *Arabis blepharophylla* (SLC)
delta coyote-thistle (=button-celery), *Eryngium racemosum* (CA)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
diamond-petaled California poppy, *Eschscholzia rhombipetala* (SC) *
fragrant fritillary, *Fritillaria liliacea* (SC)
heartscale, *Atriplex cordulata* (SC)
interior California (Hospital Canyon) larkspur, *Delphinium californicum ssp. interius* (SC)
little mousetail, *Myosurus minimus ssp. apus* (SC)
most beautiful (uncommon) jewelflower, *Streptanthus albidus ssp. peramoenus* (SC)
recurved larkspur, *Delphinium recurvatum* (SC)
rock sanicle, *Sanicula saxatilis* (SC)
salt marsh owl's clover (=johnny-nip), *Castilleja ambigua ssp. ambigua* (SLC)
serpentine bedstraw, *Galium andrewsii ssp. gatense* (SLC)
stinkbells, *Fritillaria agrestis* (SLC)

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them. Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents. Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regard-less of whether they appear on a quad list.
Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. For plant surveys, we recommend using the enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat

modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

> If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a *formal consultation* with the Service. During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a *biological opinion* by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
>
> If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an *incidental take permit*. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project. Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compen-sates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Candidate Species

We recommend that you address impacts to *candidate* species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and

private conservation agencies and organizations. Some of these species may become candidate species in the future.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county or surrounding-quad lists that we have enclosed.

To update your list, get an informal list from our web page: http://sacramento.fws.gov/es.

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known

   h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

   a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

   b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

   c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

   d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than three years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-03-TA-1228

April 1, 2003

Ms. Rosemary E. Laird
URS Corporation
500 12th Street, Suite 200
Oakland, California 94607-4014

Subject: Request for Technical Assistance for the Proposed Interstate 680 and State Route 4 Interchange Improvement Project, Contra Costa County, California

Dear Ms. Laird:

This is in response to your February 12, 2003, letter requesting that the U.S. Fish and Wildlife Service (Service) review the proposed Interstate 680 and State Route 4 Interchange Improvement Project, Contra Costa County, California for its potential to effect the federally threatened California red-legged frog (*Rana aurora draytonii*) red-legged frog. The red-legged frog is protected under the Federal Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). Your letter was received in our office on February 13, 2003.

The proposed project is to construct a five phase interchange improvement for the interchange of Interstate 680 and State Route 4. Within the project site both Interstate 680 and State Route 4 cross Grayson Creek, and State Route 4 crosses Walnut Creek.

We have reviewed the supporting documents supplied by you to assist us in making a determination whether the proposed project may result in "take" of the federally threatened red-legged frog under the Act. Section 9 and the implementing regulations in section 4(d) of the Act prohibit the "take" of any federally listed species by any person subject to the jurisdiction of the United States. As defined in the Act, "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct." "Harm" has been further defined to include habitat destruction when it kills or injures a listed species by interfering with essential behavioral patterns such as breeding, foraging, or resting.

The project site is located in an urbanized area with residential and commercial development surrounding the existing interchanges and highways. Both streams have been substantially

modified from their natural condition. Within the project area the streams are in artificially excavated, earth lined channels that are devoid of riparian trees or shrubs. There are no documented occurrences of red-legged frogs within one mile of the project site. The habitat modifications, lack of adequate riparian cover, and the lack of suitable habitat within one mile of the project site make it unlikely that red-legged frogs would use these streams as movement corridors to and from foraging and breeding areas. For these reasons, the Service has determined that the proposed project is not likely to result in "take" of the federally threatened red-legged frog.

No further action pursuant to the Act is necessary, unless (1) a listed species is discovered within the project area; (2) new information reveals effects of the proposed project that may affect federally listed species in a manner or to an extent not considered; or (3) a new species or critical habitat is designated that may be affected by the proposed project.

If you have any questions regarding this response to the proposed Interstate 680 and State Route 4 Interchange Improvement Project, please contact Mike Nepstad or Dan Buford at (916) 414-6625.

Sincerely,

Daniel Buford

for Michael Fris
Division Chief, Endangered Species Program

URS

October 25, 2004

Mr. Rodney R. McInnis
Regional Administrator
NOAA Fisheries
650 Capitol Mall, Suite 8-300
Sacramento, California 958142-4708

Attn: Mike Acetuno

Subject: Proposed Construction Mitigation Measures Interstate 680/State Route 4 Interchange Project Contra Costa County, California

Dear Mr. McInnis:

The Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) in cooperation with the Contra Costa Transportation Authority (CCTA), propose to construct a phased sequence of improvements to the Interstate 680 (I-680) and State Route 4 (SR4) Interchange in Contra Costa County to alleviate operational deficiencies and meet anticipated future usage. The proposed project improvements include work at the bridges on the I-680 and SR-4 crossings over Grayson Creek and Walnut Creek. Central Valley steelhead (*Oncorhynchus mykiss*) and Chinook salmon *(Oncorhynchus tshawytscha)* individuals have been sighted in both creeks. As a result, Caltrans is already committed on the I-680 HOV lane project (which overlaps the proposed interchange project area) to construction monitoring at the creeks, as well as measures to 1) avoid work during the periods of potential species presence, 2) prevention or minimization of potential construction-related erosion and sedimentation, and 3) provisions for potential fish passage. These same or similar measures, as detailed in this letter, will be applied to the proposed interchange project. This letter summarizes the mitigation requirements that are included in the I-680/SR4 Interchange project environmental document. We are seeking your informal review and a letter of concurrence on these measures as we proceed with the planning of this project.

Project Description

The I-680/SR4 interchange project extends from Morello Road on SR4, in the west, to 0.71 kilometer (0.44 mile) of Hwy 242, in the east, and Concord Avenue on I-680, in the south, to the Pacheco Road onramp in the north (Figure 1). Construction is proposed in five phases, as described below.

Phase 1 involves building a two-lane flyover, direct connector from the northbound I-680 to westbound SR4 with the inclusion of a Pacheco Boulevard exit ramp and auxiliary lanes. The northbound I-680 to westbound SR4 loop will be removed in this phase. The Phase 2 plans are to construct a two-lane connector from SR4 eastbound to I-680 southbound with a Pacheco

URS Corporation
1333 Broadway, Suite 800
Oakland, CA 94612-1924
Tel: 510.893.3600
Fax: 510.874.3268

Boulevard entrance ramp and required auxiliary lanes. The current eastbound to southbound diagonal will be removed. Phase 3 calls for widening of SR4 from Morello Road to east of the State Route 242 interchange by widening the lanes within the median. Phase 4 includes building a two-lane flyover directly connecting I-680 southbound to eastbound SR4, with required auxiliary lanes. The southbound I-680 to eastbound SR4 loop ramp will be removed. In Phase 5, a new connection will be constructed from SR4 westbound to I-680 northbound. The current westbound to northbound diagonal will be removed.

Phases 1 and 2 are included in the 2001 Regional Transportation Plan (RTP). A specific construction date is not scheduled. Phases 3, 4, and 5 are planned, but not funded at this time; they are evaluated in this report to address cumulative impacts of the project as a whole.

A description of the proposed project, a map, and photos of the proposed project area have been included to assist you with your review.

1.0 ENVIRONMENTAL SETTING

The project study area is an urbanized area with residential and commercial development surrounding existing interchanges and highways. Climate in the area is Mediterranean and the annual rainfall is approximately 40 cm (16 in.) per year, falling mainly between November and April (Western Regional Climate Center, 2002). Soils are Altamont clay, Tierra loam, Omni clay loam, Omni sandy loam, Positas loam, Millsholm loam, Dibble silty clay loam, Gaviota sandy loam and Lodo clay loam (Soil Conservation Service, 1977). The Omni series soils are hydric, poorly drained soils that formed in alluvium from sedimentary rocks. Figure 3 shows the extent of each soil map unit in the project vicinity.

The project study area crosses two channelized streams, Grayson Creek and Walnut Creek. Both I-680 and SR4 cross Grayson Creek; SR4 also crosses Walnut Creek. I-680 crosses the Contra Costa Canal in the northern portion of the project study area, and a small brackish marsh is located at the upper end of Pacheco Creek, north of the Burlington-Northern-Santa Fe Railroad (BNSF) and east of I-680. Both streams have been substantially modified from their natural condition. Within the project study area the streams are in artificially excavated, earth-lined channels that are devoid of riparian trees or shrubs. Flowing water is present in the channel all year.

The project area varies between 2 and 24 meters (6.5 and 79 feet) above sea level. At the lowest elevations, freshwater marsh borders the low-flow channels of Grayson and Walnut creeks. Upland habitat is predominately ruderal, non-native grassland, but also includes ornamental plantings of non-native shrubs along the margins of the existing highway corridor and at freeway interchanges.

Freshwater marsh habitat in the project area is composed primarily of cattail (*Typha latifolia*), hardstem bulrush (*Scirpus acutus*), flatsedge (*Cyperus rotundus*), Rabbitsfoot grass (*Polypogon monspeliensis*), saltgrass (*Distichlis spicata*), common horsetail (*Equisetum arvense*) and prickly lettuce (*Lactuca serriola*). The upland habitat is predominately non-native annual grasses and herbs such as wild oats (*Avena fatua*), slender wild oats (*Avena barbata*), yellow star thistle (*Centaurea solstitialis*), and broadleaf filaree (*Erodium botrys*).

Special Status Species / Critical Habitat

Information concerning threatened, endangered, or other special status species that may occur in Contra Costa County was obtained from the Sacramento Office of the U. S. Fish and Wildlife Service (USFWS). In addition, the California Department of Fish and Game's (CDFG's) Natural Diversity Database was searched for known occurrences of special status species within the U.S. Geological Survey 7.5-minute quadrangles of Benicia, Briones Valley, Clayton, Cordelia, Denverton, Diablo, Fairfield South, Honker Bay, Las Trampas Ridge, Oakland East, Vine Hill and Walnut Creek. A field reconnaissance survey of the project area was conducted on April 18, 2002, to identify habitats in the study area and vicinity. In addition, a literature review was conducted to identify habitat requirements/distribution for listed species.

As a result of the field and background review, it was determined that the proposed project area and vicinity provides suitable habitat characteristics for the following federally listed species under the jurisdiction of NOAA Fisheries:

- Central Valley steelhead (*Oncorhynchus mykiss*).
- Chinook salmon *(Oncorhynchus tshawytscha)*

1.1 POTENTIAL IMPACTS AND AVOIDANCE AND MINIMIZATION MEASURES

To minimize potential impacts to this special-status species in the vicinity or downstream of the project from increased sediment load when flows return to the stream, the following minimization measures will be implemented:

- All work would be conducted during the dry season (June 15 through October 15).
- Work will only occur in a dry channel. If it is necessary to conduct work in a live stream, the work space shall be isolated to avoid construction activities in flowing water. The proposed project shall not dewater the entire stream and shall allow fish passage past the project area. Adequate water depth and channel width must be maintained at all times for fish passage. Prior to construction activities the workspace will be isolated from flowing water to prevent sedimentation and turbidity and avoid effects to fish. The diversion shall remain in place during the project, then be removed immediately after work is complete, in a manner that will allow flow to resume with the least disturbance to the substrate.
- If a project requires dewatering any area, either a pump shall remove water to an upland disposal site, or a filtering system shall be used to collect the water and return clear water to the creek. The pump intake shall be fitted with a fish exclusion device that meets NMFS fish screening criteria (refer to: http://www.nwr.noaa.gov/1salmon/salmesa/pubs/swrscrng.pdf or equivalent source).
- All materials placed in stream, such as pilings and retaining walls, shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings or other materials used

for in-channel structures shall not contain coatings or treatments or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

- All construction materials and fill will be stored and contained in a designated area that is located away from channel areas to prevent inadvertent transport of materials into the adjacent stream channel.
- Disturbance to existing grades and vegetation will be limited to the actual site of the project and necessary access routes. Placement of all roads, staging areas, and other facilities shall avoid and limit disturbance to streambank or stream channel habitat as much as possible. When possible, existing ingress or egress points shall be used and/or work performed from the top of the creek banks. Following completion of the work, the contours of the creek bed and creek flows shall be returned to pre-construction condition or better.
- Erosion control and sediment detention devices (e.g. well anchored sandbag cofferdams, straw bales, "Aqua Dam"[1], or silt fences) shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water, and of detaining sediment laden water on-site. These devices will be placed at all locations where the likelihood of sediment input exists. A supply of erosion control materials would be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.
- All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be disposed of at an approved disposal site. All petroleum products chemicals, silt, fine soils, and any substance or material deleterious to listed species shall not be allowed to pass into, or be placed where it can pass into the stream channel. There will be no sidecasting of material into any waterway.
- Fueling, cleaning or maintenance of equipment would be prohibited except in designated areas located as far from the creek as possible. In addition, the contractor would maintain adequate materials onsite for containment and cleanup of any spills.
- After construction and prior to October 15, all disturbed soils at each site would undergo erosion control treatment consisting of temporary seeding, straw mulch, or other measures pursuant to a Storm Water Pollution Prevention Plan (SWPPP) approved by the Regional Water Quality Control Board. Any disturbed soils on a gradient of over 30 percent would also have an erosion control blanket installed. Permanent revegetation or tree replanting should then take place in small openings in the erosion control blanket, with suitable species that are compatible with native vegetation.
- During dewatering activities a fisheries biologist shall be present to salvage Chinook and steelhead individuals, should they be present. Fish will be netted, placed in a bucket of

[1] Information available at www.aquadam.com

water and immediately moved to a downstream portion of the creek. Records of species, relative size, and number individuals shall be kept. Periodic checks of the work area shall occur to ensure the salmonids have not re-entered the work area.

Conclusions

With the required implementation of the preceding measures, we believe that construction activities will avoid potential adverse effects to the two species. These measures will be included in the project's environmental document as required mitigation.

We would like to reach concurrence with NOAA Fisheries regarding the above species and the adequacy of the proposed measures. Please feel free to contact me at (510) 874-3005 to discuss or for further information, or Rosemary Laird at (510) 874-3239. Thank you in advance for your assistance.

Sincerely,

URS CORPORATION

Jeffrey D. Zimmerman
Environmental Project Manager

Enclosure

cc: R. Laird, URS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, California 95814-4706

November 24, 2004

In Reply Refer To:
151422SWR2004SA20079:JSS

Jeffrey D. Zimmerman
Environmental Project Manager
URS Corporation
1333 Broadway, Suite 800
Oakland, California 94612-1294

Dear Mr. Zimmerman:

Thank you for submitting your request for agency comments on the Proposed Construction Mitigation Measures for the Interstate 680/State Route 4 Interchange Project, located in Contra Costa County, California, to the National Marine Fisheries Service (NOAA Fisheries). NOAA Fisheries welcomes the opportunity to comment on these measures.

The Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) in cooperation with the Contra Costa Transportation Authority (CCTA) propose to construct a phased sequence of improvements to the Interstate 680 (I-680) and State Route 4 (SR-4) interchange in northern Contra Costa County. Portions of the project include construction on bridges spanning either Grayson Creek or Walnut Creek within the action area. As stated in your letter's introduction, these creeks have had reported sightings of both Central Valley steelhead (*Oncorhynchus mykiss*) and Central Valley Chinook (*O. tshawytscha*). Although the specific run of Chinook salmon observed was not specified, the most likely run of Chinook salmon to occur in these watersheds are the fall/late fall-run Chinook salmon. The URS Corporation has requested that NOAA Fisheries review the preliminary mitigation measures for the proposed project that are designed to minimize or avoid adverse impacts to theses salmonid species within the project area.

We have reviewed your mitigation measures and have found them to be sufficient in most regards to avoid or minimize adverse impacts to listed salmonids. The proposed work window will adequately avoid direct impacts to listed salmonids in this area. The work window may even be expanded to encompass the period between June 1 and October 31, adding an additional four weeks to your planned work window. As the watersheds that supply runoff to both Grayson Creek and Walnut Creek are at low elevation and are precipitation driven, water of suitable temperatures in the project area will usually occur only in the colder wet season (November through April). The month of May is transitional between the cooler wet season flows and the increased temperatures typical of the summer and fall months in these lower portions of the watershed. NOAA Fisheries does not anticipate that listed salmonids will be present in the lower portions of these two watersheds outside of the wet season.

In addition to the numerous preventative measures outlined in your letter, NOAA Fisheries makes the request that any soils within the active channel that are disturbed, moved, or uncovered, be tested for chemical contaminants. If such soils are found to be contaminated at levels that are deleterious to aquatic life, including salmonids, that these soils be removed from the area and disposed of in an appropriate fashion in an upland area. Newly exposed contaminated soils could potentially result in leaching of these compounds into the waterways following construction, thus posing a threat to downstream aquatic life.

The measure that focuses on contouring the bottom of the creek channels following construction to pre-project conditions or better should also emphasize the need for easy fish passage through the area as one of the post-construction goals. Even if the creek bottoms were undisturbed by the construction, efforts should be made to facilitate fish passage by removing obvious barriers to upstream movement (*i.e.* rubble or debris, illegal dumping of garbage, etc.).

NOAA Fisheries wishes to thank the URS Corporation for the opportunity to offer comments and suggestions on the Proposed Construction Mitigation Measures for the Interstate 680/State Route 4 Interchange Project. If you have any questions regarding these comments, please contact Jeffrey Stuart in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Mr. Stuart can be reached by telephone at (916) 930-3607, or by FAX at (916) 930-3629.

Sincerely,

Michael E. Aceituno
Supervisor, Sacramento Area Office

cc: NMFS-PRD, Long Beach, CA
Gary Stern, NOAA Fisheries, PRD, Santa Rosa, California

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5612
FAX (510) 286-6374
TTY (800) 735-2929

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January 27, 2005

Mr. Milford Wayne Donaldson, FAIA
State Historic Preservation Officer
Office of Historic Preservation
1416 Ninth Street, Room 1442-7
Sacramento, CA 95814

RE: Determinations of Eligibility and Finding of No Historic Properties Affected for the Interstate 680/Route 4 Interchange Improvement Project, in Contra Costa County, California; 04-CC-680, KP 32.5/35.8 (PM 20.2/22.2), 04-CC-004, KP R16.9/R24.3 (PM R10.5/R15.1) EA 04-275-229100

Dear Mr. Donaldson:

The California Department of Transportation, (Caltrans), under the authority of the Federal Highway Administration (FHWA), is initiating consultation with the State Historic Preservation Officer (SHPO) regarding the Interstate 680/Route 4 Interchange Improvement Project. This consultation is undertaken in accordance with the January 1, 2004 *Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation* (PA).

Enclosed you will find a Historic Property Survey Report (HPSR) for the proposed undertaking. The HPSR is intended to fulfill three of Caltrans' responsibilities under Section 106 of the National Historic Preservation Act: determination of the Area of Potential Effects (APE); identification of potential historic properties located within the undertaking's APE; and evaluation of potential historic properties for eligibility to the National Register of Historic Places (NRHP). Under the PA, Caltrans is responsible for ensuring the appropriateness of the APE (Stipulation VII.A) and the adequacy of historic property identification efforts (Stipulation VIII.B). We are consulting with you at the present time under Stipulation VIII.B.5 of the PA, which requires that we seek your concurrence on Caltrans' determinations of eligibility for potential historic properties.

On behalf of FHWA, Caltrans proposes to modify the existing cloverleaf interchange of Interstate 680 and Route 4, removing two loop ramps and constructing "fly over" direct connectors, as well as provide improvements to Pacheco Boulevard. The I-680/SR-4 Interchange Project is sponsored by the Contra Costa Transportation Authority and has funding administered by FHWA and Caltrans. FHWA and Caltrans are the agencies responsible for the project's compliance with the National Environmental Policy Act (NEPA) and the National Historic

Preservation Act (NHPA). A full project description and depiction of the APE can be found on pages 2-1 and 3-1–3-4 and in Attachment 6 of the HPSR.

Consultation and identification efforts for the I-680/SR-4 Interchange Project (summarized in Sections 4-5 of the HPSR) resulted in the identification of twenty-three (23) resources within the APE that required formal evaluation, in addition to four properties which were previously determined ineligible for listing in the NRHP. The evaluated resources include:

- 21 historic-period residential and commercial buildings
- 2 water conveyance systems, the Contra Costa Canal and the Walnut Creek and Grayson Creek Levees.

None of the above-listed resources have been previously evaluated for the NRHP eligibility. Pursuant to Stipulation VIII.C.2 of the PA, all twenty-three resources were formally evaluated for NRHP eligibility for the I-680/SR-4 Interchange Project; these evaluations are documented in the Historic Resources Evaluation Report (HRER). All other resources identified with the APE were exempted from formal evaluation pursuant to Stipulation VIII.C.1 and Attachment 4 of the PA ("Properties Exempt from Evaluation").

Pursuant to Stipulation VIII.C.5 of the PA, Caltrans is requesting your concurrence with the following NRHP determinations. We look forward to receiving your response within 30 days of your receipt of this submittal, in accordance with Stipulation VIII.C.5 of the PA.

1. Contra Costa Canal, Contra Costa County, CA (Map Ref. #26) is eligible for the NRHP at the state level under Criterion A for its association with the construction and operation of the Central Valley Project, and at the local level under Criterion A for its association with the economic development of eastern Contra Costa County. The period of significance for the 46-mile long canal is 1937-1951, which covers canal's construction period.

2. Walnut Creek & Grayson Creek Levees, Walnut Creek, CA (Map Ref. #27) are not eligible for the NRHP because the levees have been altered and have lost integrity.

The following twenty-one resources are not eligible for the NRHP because they lack an association with important persons or events and have lost architectural integrity:

3. 1785 Arnold Drive, Martinez, CA (Map Ref. #1)
4. 2034 Arnold Drive, Martinez, CA (Map Ref. #2)
5. 1138 Temple Drive, Walnut Creek, CA (Map Ref. #3)
6. 1136 Temple Drive, Walnut Creek, CA (Map Ref. #4)
7. 1134 Temple Drive, Walnut Creek, CA (Map Ref. #5)
8. 1132 Temple Drive, Walnut Creek, CA (Map Ref. #6)
9. 1130 Temple Drive, Walnut Creek, CA (Map Ref. #7)

10. 1128 Temple Drive, Walnut Creek, CA (Map Ref. #8)
11. 1126 Temple Drive, Walnut Creek, CA (Map Ref. #9)
12. 1124 Temple Drive, Walnut Creek, CA (Map Ref. #10)
13. 1122 Temple Drive, Walnut Creek, CA (Map Ref. #11)
14. 1120 Temple Drive, Walnut Creek, CA (Map Ref. #12)
15. 1118 Temple Drive, Walnut Creek, CA (Map Ref. #13)
16. 1116 Temple Drive, Walnut Creek, CA (Map Ref. #14)
17. 1114 Temple Drive, Walnut Creek, CA (Map Ref. #15)
18. 1112 Temple Drive, Walnut Creek, CA (Map Ref. #16)
19. 5775 Pacheco Boulevard, Walnut Creek, CA (Map Ref. #18)
20. 102 Berry Drive, Walnut Creek, CA (Map Ref. #20)
21. 104 Berry Drive, Walnut Creek, CA (Map Ref. #21)
22. 106 Berry Drive, Walnut Creek, CA (Map Ref. #22)
23. 110 Berry Drive, Walnut Creek, CA (Map Ref. #23)

Pending your concurrence regarding Caltrans' eligibility determinations, Caltrans' finding for the undertaking (pursuant to Stipulation IX.A.2) is "No Historic Properties Affected." While there is a historic property within the APE, the Contra Costa Canal, the two sections of the canal that pass beneath the I-680 and SR4 have been repeatedly altered from their original condition by modernization of the two roadways over the last forty years. This undertaking proposes to add additional sections to an existing siphon and reinforced box culvert (RBC) that were previously altered and modernized as a part of the construction of the I-680 and SR4. These two elements, the RBC and siphon, are not contributing features to the Contra Costa Canal, and their alteration does not affect the significance of the canal. The proposed undertaking will therefore have no effect on historic properties.

This letter and the attached documentation are concurrently being retained in Caltrans' files (pursuant to Stipulation XVI) and distributed to FHWA (pursuant to Stipulation VIII.C.5) and to the Contra Costa Transportation Authority, the Contra Costa Water District, and the Bureau of Reclamation, Mid-Pacific Regional Office (pursuant to Stipulation IX.A.2). If you concur with our eligibility determinations, these actions satisfy Caltrans' responsibilities under Stipulation IX.A.2 of the PA, and no further review will be required. In the event that you do not concur with Caltrans' determinations, further consultation will be carried out in accordance with Stipulation VIII.C.5.b.

If you need any additional information, please do not hesitate to contact Elizabeth McKee, District Branch Chief, Archaeology, at (510) 622-5458 and lissa_mckee@dot.ca.gov, or Elizabeth Krase, District Branch Chief, Architectural History, at (510) 286-5612 and elizabeth_krase@dot.ca.gov.

Thank you for your assistance with this undertaking.

Sincerely,

Original is signed

Brian Ramos, Ph.D.
Chief, Office of Cultural Resource Studies
California Department of Transportation
District 4

Attachment: HPSR, Finding of No Historic Properties Affected, for the Interstate 680/Route 4 Interchange Improvement Project, included a separately bound Archaeological Survey Report (ASR) and Historic Resources Evaluation Report (HRER)

CC: Gene Fong, FHWA Division Administrator
Susan Miller, Contra Costa Transportation Authority*
Mark Seedall, Contra Costa Water District**
Anastasia Leigh, Mid-Pacific Regional Office, US Bureau of Reclamation**

* Copy transmittal letter only.

** These recipients will only receive the HPSR and the HRER. Caltrans is prohibited from distributing the ASR as archaeological records contain sensitive site location information which must remain confidential, pursuant to Section 6254.10 of the Government Code exempting archaeological records from public disclosure requirements.

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

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CULTURAL RESOURCE STUDIES

March 9, 2005

Reply To: FHWA050131A

Brian Ramos, Chief
Office of Cultural Resource Studies
Caltrans District 4
111 Grand Avenue
Oakland, CA 94623-0660

Re: Determinations/Findings of Eligibility and Effect for the Proposed Interstate 680/Route 4 Interchange Improvement Project, Contra Costa County, CA

Dear Mr. Ramos:

Thank you for consulting with me about the subject undertaking in accordance with the *Programmatic Agreement Among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California* (PA).

The California Department of Transportation (Department) is requesting my concurrence, pursuant to Stipulation VIII.C.5 of the PA, in its determination that the Contra Costa Canal is eligible for the National Register of Historic Places (NRHP) at the state level of significance under criterion A for its association with the construction and operation of the Central Valley Project, and at the local level under criterion A for its association with the economic development of eastern Contra Costa county. The period of significance for the 46-mile long canal is 1937-1951, which covers the canal's construction period.

Pursuant to Stipulation VIII.C.5 of the PA, the Department has also determined that the following properties are not eligible for the NRHP:

- 1785 Arnold Drive, Martinez, CA
- 2034 Arnold Drive, Martinez, CA
- 1138 Temple Drive, Walnut Creek, CA
- 1136 Temple Drive, Walnut Creek, CA
- 1134 Temple Drive, Walnut Creek, CA
- 1132 Temple Drive, Walnut Creek, CA
- 1130 Temple Drive, Walnut Creek, CA
- 1128 Temple Drive, Walnut Creek, CA
- 1126 Temple Drive, Walnut Creek, CA
- 1124 Temple Drive, Walnut Creek, CA
- 1122 Temple Drive, Walnut Creek, CA
- 1120 Temple Drive, Walnut Creek, CA
- 1118 Temple Drive, Walnut Creek, CA
- 1116 Temple Drive, Walnut Creek, CA
- 1114 Temple Drive, Walnut Creek, CA

- 1112 Temple Drive, Walnut Creek, CA
- 5775 Pacheco Boulevard, Walnut Creek, CA
- 102 Berry Drive, Walnut Creek, CA
- 104 Berry Drive, Walnut Creek, CA
- 106 Berry Drive, Walnut Creek, CA
- 110 Berry Drive, Walnut Creek, CA

Based on review of the submitted documentation, I concur with the foregoing determinations.

Thank you for taking historic properties into account as part of your project planning. If you have any questions, please contact Natalie Lindquist of my staff at (916) 654-0631 or e-mail at nlind@ohp.parks.ca.gov.

Sincerely,

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

State of California—Business, Transportation and Housing Agency GRAY DAVIS, Governor

DEPARTMENT OF CALIFORNIA HIGHWAY PATROL
5001 Blum Road
Martinez, CA 94553
(925) 646-4980
(800) 735-2929 (TT/TDD)
(800) 735-2922 (Voice)

September 24, 2003

File No.: 320.10357.10170

John Y. Chang, Senior Transportation Engineer
Caltrans, Office of Project Management
Mail Station 8
P.O. Box 23660 111 Grand Avenue
Oakland, California 94623-0660

Subject: I-680/SR 4 Interchange Improvements

Dear Mr. Chang:

The California Highway Patrol (CHP) is very much in favor of the proposed improvements to the Interstate 680 and State Route 4 interchange project. The CHP's primary mission is the safe and efficient use of the highway transportation system. Therefore, highway safety and congestion relief concerns affecting Contra Costa County are very important to the Contra Costa County CHP Office. We have been involved with your project team on the proposed design and improvements to the interchange from the very beginning. The improvements, when completed as per the site plan draft dated April 16, 2003, titled Conceptual Alternative D2a, are very acceptable. This plan was created jointly by Caltrans and the Contra Costa County Transportation Authority (CCCTA). It will not only relieve traffic congestion and reduce bottlenecks within the interchange, but it will also provide the necessary inlets and outlets for area businesses and emergency vehicles including the CHP.

It has come to our attention that the Federal Highway Administration will be determining if the Conceptual Alternative D2a interchange improvements are acceptable, given that one feature of the preliminary design calls for local access ramps (slip ramps) to and from Pacheco Blvd. that will connect to two interchange ramps. The importance of these ramps are immeasurable to public safety. If these ramps are not included in the construction of the improvements to the interchange, emergency vehicle response will be significantly affected. The CHP, depending on which route taken, will have to travel either 1.5 or 1.6 miles in order to enter I-680 southbound from the Area office; compared to the .4 mile distance that must be traversed now and the slightly shorter distance when the new ramp is constructed. Although this distance may not seem significant, Pacheco Blvd. is a very busy roadway, especially during commute hours. Oftentimes, CHP response to critical incidents from the Area office requires the utilization of emergency lights and siren. Patrol officers and the public are exposed to an increased danger when officers are forced to impose their presence on the motoring public by forcing

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them to move out of the officer's way during emergency conditions. If these ramps are not constructed, officers will be forced on many occasions to traverse under emergency conditions the very congested intersection of Contra Costa Blvd. and the I-680 southbound off-ramp in order to enter I-680 southbound. Additionally, these ramps will assist allied police agencies and the fire department when responding to assist the CHP with critical incidents and or medical emergencies.

Maintaining access to Pacheco Blvd. and to I-680 from Pacheco Blvd. is of the utmost importance to the CHP. The CHP constructs its offices with ease of accessibility to freeway on and off ramps in mind. Based upon the conceptual engineering studies to date, Conceptual Alternative D2a is the only concept that has been identified that adequately meets the CHP's needs. We strongly encourage the FHA to approve the aforementioned Conceptual Alternative D2a.

Sincerely,

MICHAEL J. MAAS, Captain
Commander
Contra Costa Area

County of Contra Costa
Office of the Sheriff
Warren E. Rupf
Sheriff

November 10, 2003

Mr. Leo Scott
Caltrans, Office of Project Management
Mail Station 8
P.O. Box 23660
111 Grand Avenue
Oakland, California 94623-0660

Dear Mr. Scott:

Through a joint effort, Caltrans and the Contra Costa County Transit Authority have developed an improvement plan to address traffic concerns at the interchange of Interstate 680 and Highway 4. This plan, titled Conceptual Alternative D2a, will not only relieve traffic congestion, it will also provide inlets and outlets necessary for emergency responders to ensure public safety, specifically slip ramps connecting Pacheco Boulevard to the interchange. It has come to our attention, however, that the Federal Highway Administration (FHA) has not yet accepted this plan because of questions about these ramps. The Office of the Sheriff believes strongly that the value of these ramps to public safety is immeasurable.

Currently, access to both Interstate 680 and Highway 4 is gained via ramps immediately accessible from Pacheco Boulevard. Were this access to be eliminated, the nearest alternate access ramp to southbound Interstate 680 would be approximately 2 miles south of the current ramp. Within these 2 miles are several large, traffic-controlled intersections that become extremely congested throughout the day. It is estimated that this route could extend emergency responses by 3-5 minutes. The only way to mitigate this delay would be to activate emergency equipment, red lights and siren. Whenever this is done, however, there is an inherent risk to the public. Despite rules of the road telling motorists how to behave in these situations, many of them become startled at seeing the lights and hearing the siren. The ensuing momentary panic often results in poor decision-making, accidents and injuries, requiring the responding peace officer to deviate from the original emergency to render assistance at the 'new' emergency. In essence, the additional travel necessitated by eliminating freeway access doubles the public's potential for harm by both extending response times and requiring risky adjustments to compensate for them. While in a vacuum this delay may seem merely inconvenient, where public safety is concerned it could cost a life.

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In addition to these very real emergency response concerns, there is also the broader public safety concern of access to services. Because of ease of access to both Interstate 680 and Highway 4, the Office of the Sheriff has chosen to locate many of its facilities and emergency services in the area. Additionally, within the next two years, the Office of the Sheriff will construct a new facility in the area to house additional services. Between existing functions and those that will move to the area within the next two years, the Office of the Sheriff will provide the following services from the immediate vicinity of Interstate 680 and Highway 4: Patrol, S.W.A.T., Mutual Aid Mobile Field Force, Investigations, Coroner, Communications, Training, Office of Emergency Services, Civil, Records, and Administration. To eliminate access to the aforementioned freeways would severely impact our ability to provide critical services to the communities we serve.

Maintaining multi-directional access to Pacheco Boulevard, Interstate 680 and Highway 4 is of great importance to the Office of the Sheriff. Conceptual Alternative D2a is the only plan that ensures a high level of pubic safety through quick and safe freeway access for emergency responders and public access to law enforcement services. Therefore, we strongly encourage the FHA to approve the Conceptual Alternative D2a interchange improvement plan.

Sincerely,

WARREN E. RUPF, Sheriff

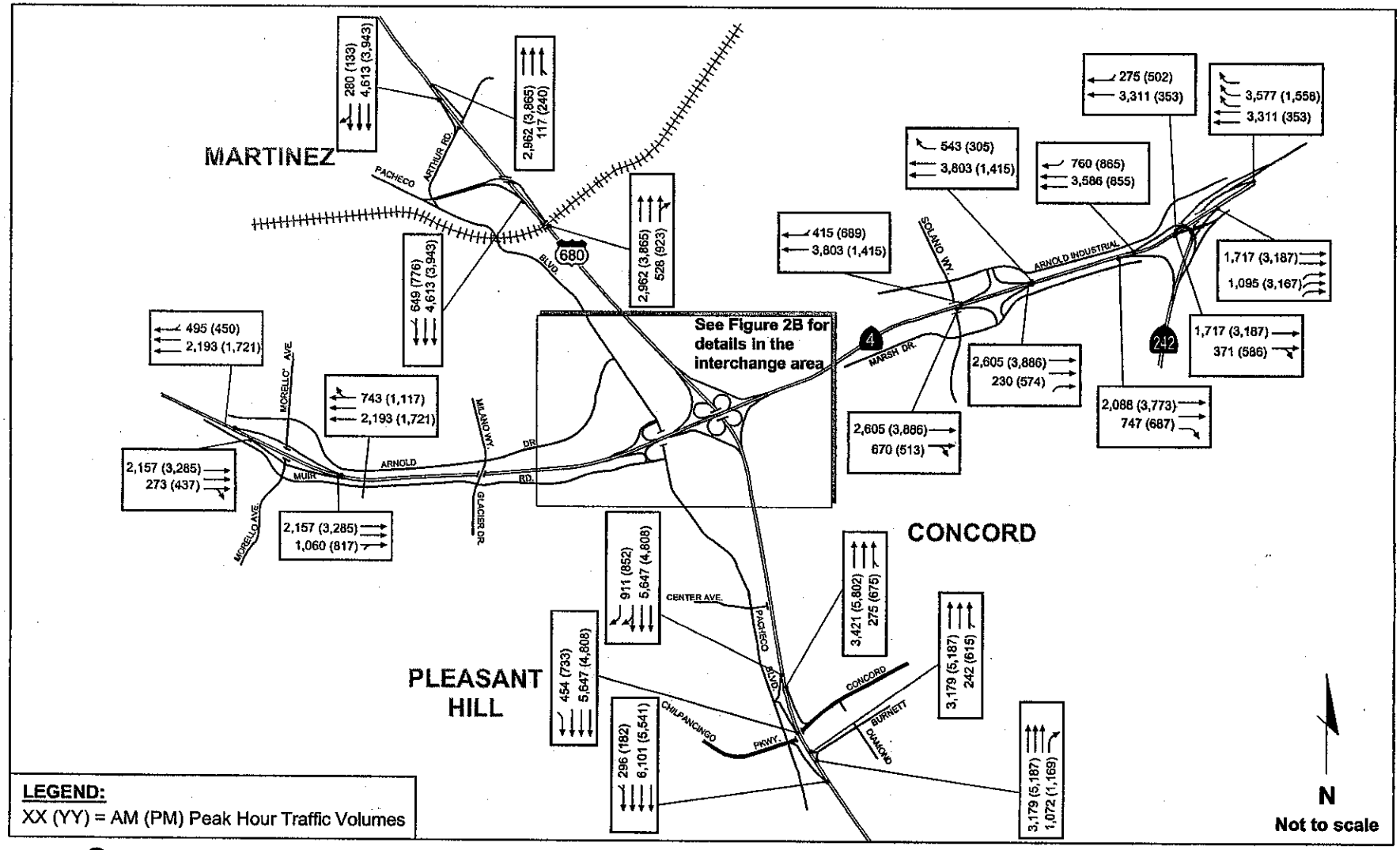
WER:aj

cc: Ms. Julia Bueren, Deputy Public Works Director
✓ Mr. Hank Haugse, Planning Manager, Nolte Associates, Inc.

Appendix I Peak Traffic Volume Diagrams

This appendix reproduces the Freeway Peak Hour Volume and Lane Configuration diagrams from the *Traffic Analysis Report for the Interstate 680/State Route 4 Interchange Improvement Project* (Fehr and Peers 2004), showing the morning and evening peak hour volumes by directional movement. Existing and future conditions are shown. The following diagrams are included:

- Existing Conditions (Figures 2A and B)
- 2030 No Project Conditions (Figures 5A and B)
- 2030 Full Project Conditions (all five phases) (Figures 7A and B)
- 2030 Phases 1 and 2 Conditions (Figures 9A and B)
- 2030 No Slip Ramps (Figures 13A and B)

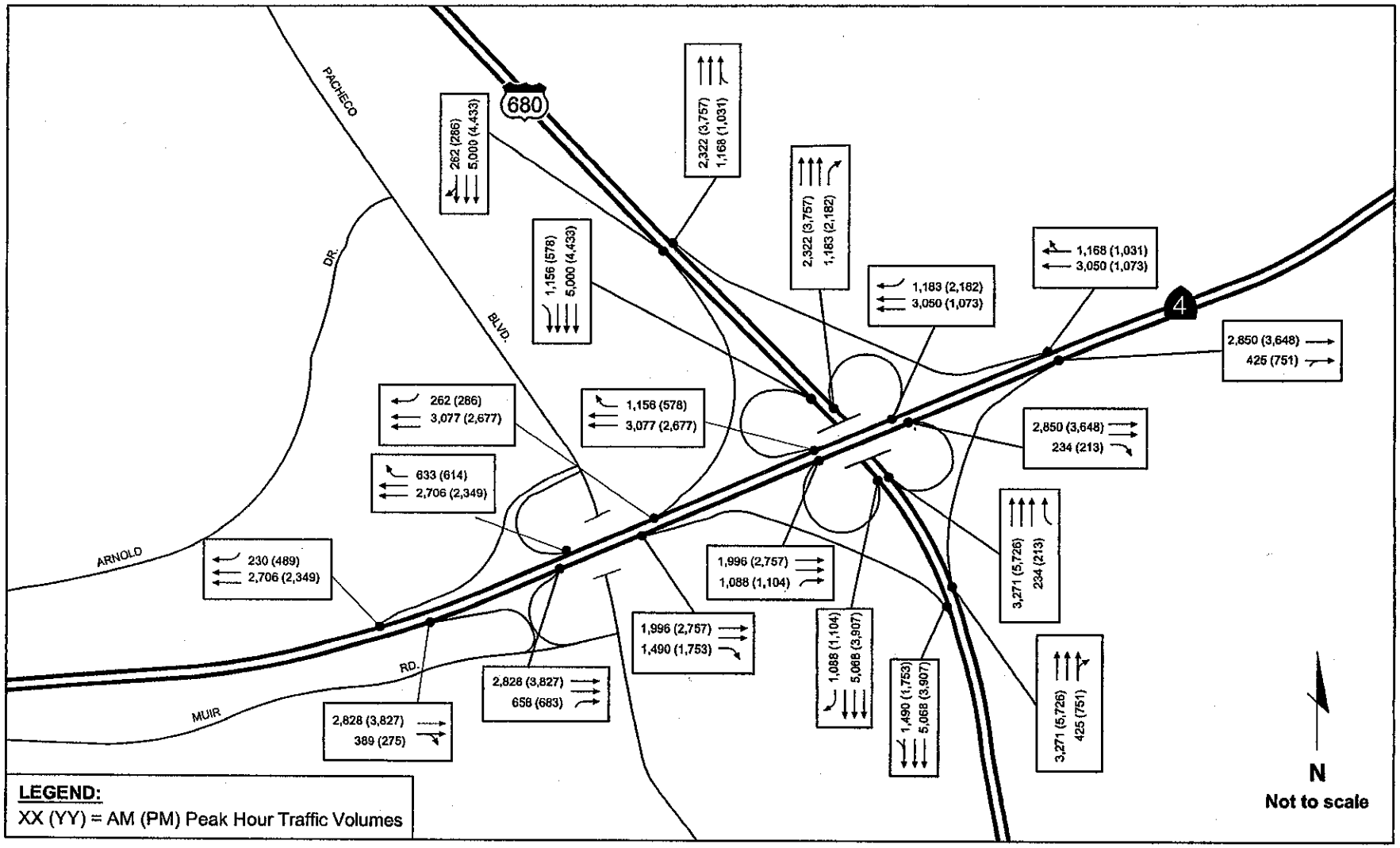


FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-01a 1-04

I-680/SR4 Interchange

EXISTING CONDITIONS
FREEWAY PEAK HOUR VOLUMES AND LANE CONFIGURATIONS
FIGURE 2A

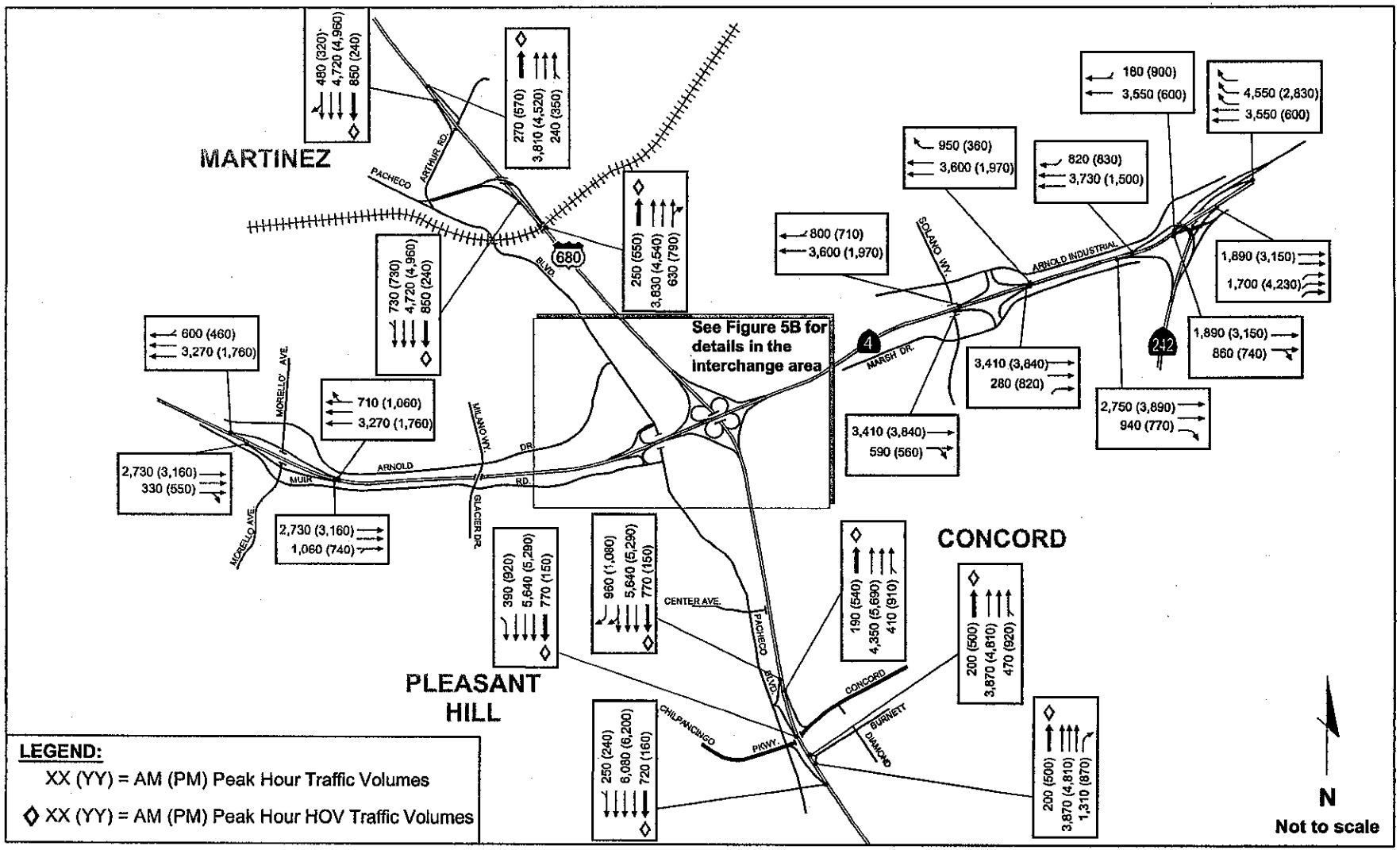


FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-01a 1-04

I-680/SR4 Interchange

EXISTING CONDITIONS
FREEWAY PEAK HOUR VOLUMES AND LANE CONFIGURATIONS
FIGURE 2B

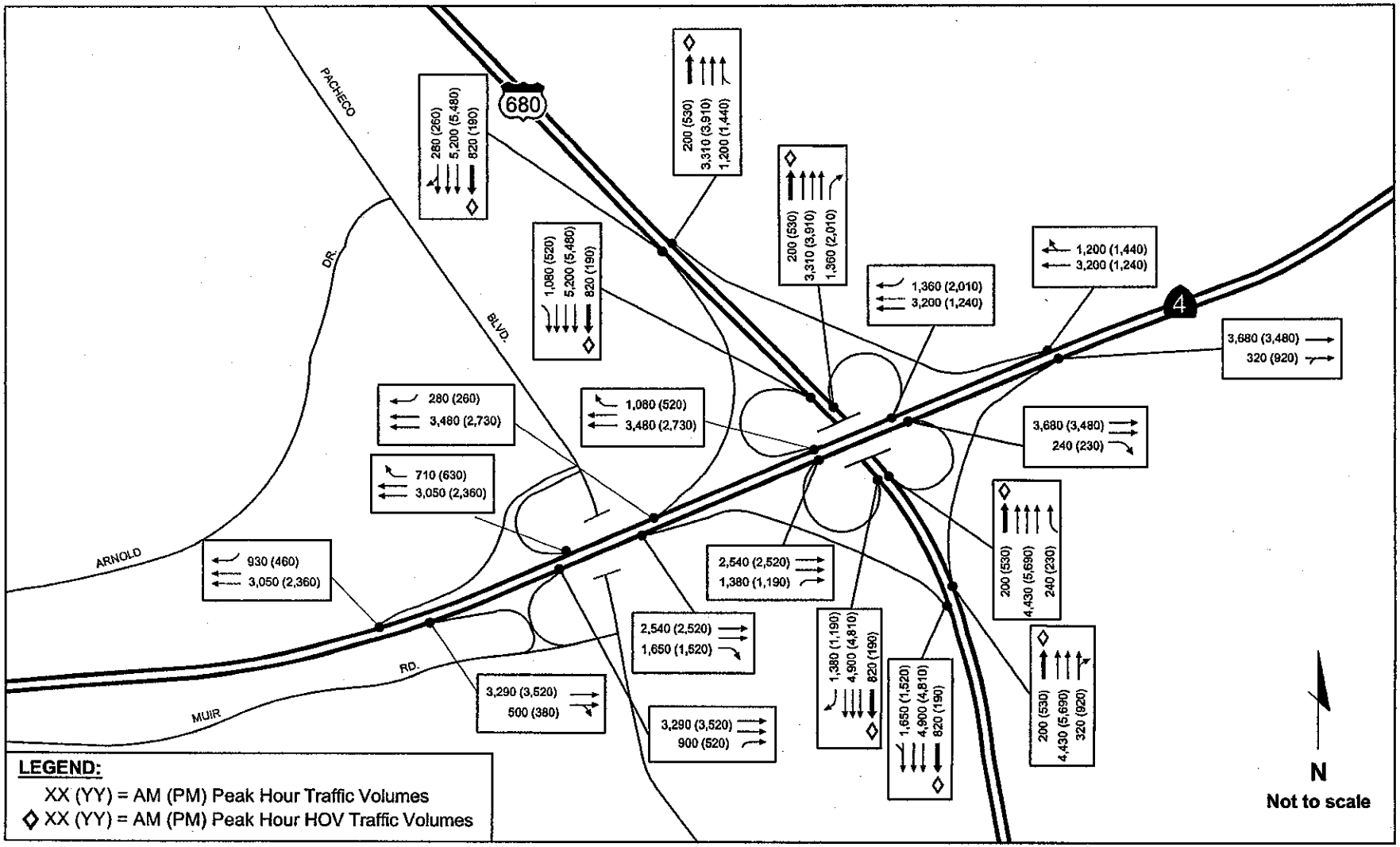


FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-01b 1-04

I-680/SR4 Interchange

2030 NO PROJECT CONDITIONS
FREEWAY PEAK HOUR DEMAND VOLUMES AND LANE CONFIGURATIONS
FIGURE 5A

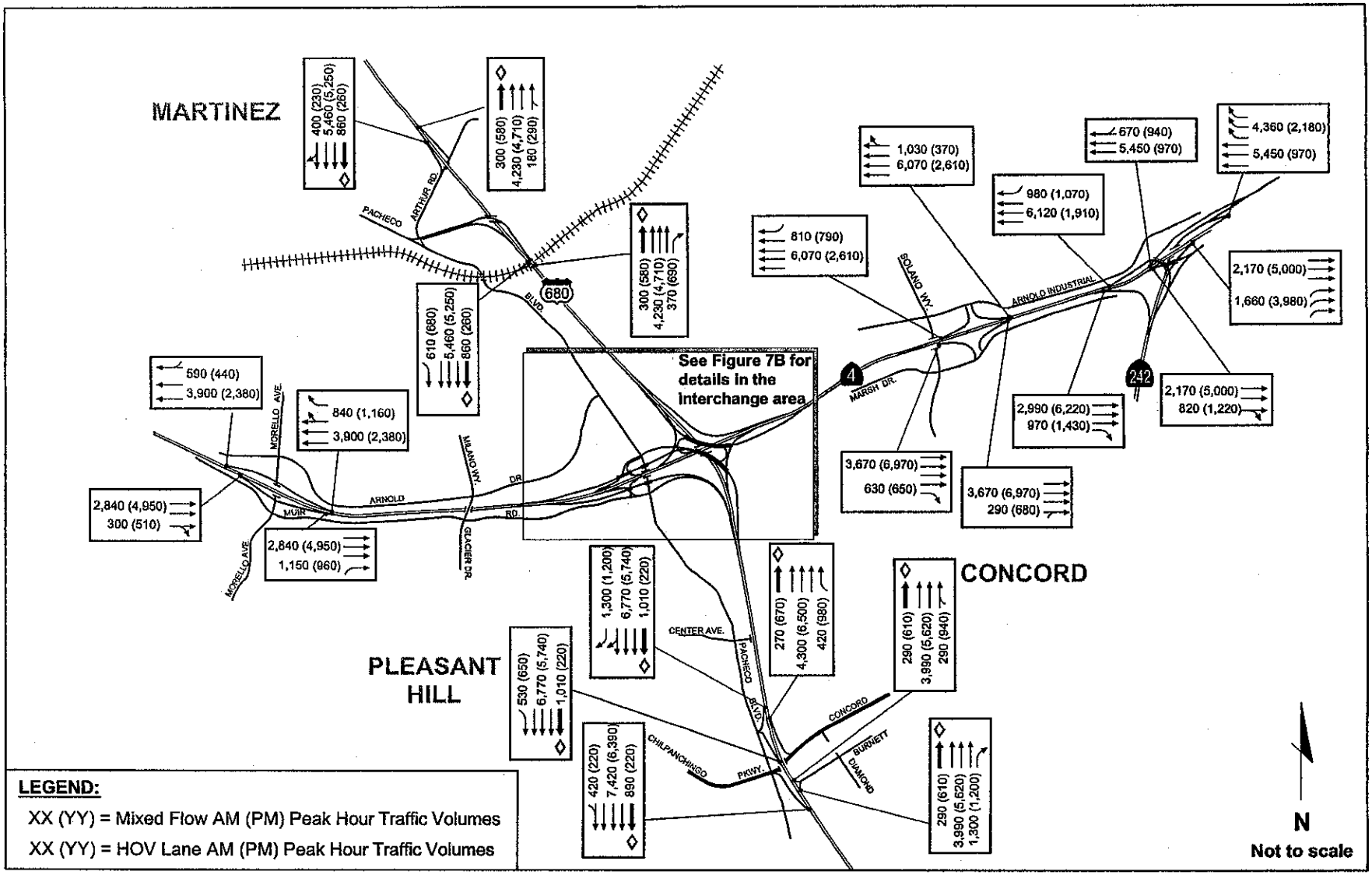


FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-01b 1-04

I-680/SR4 Interchange

2030 NO PROJECT CONDITIONS
FREEWAY PEAK HOUR DEMAND VOLUMES AND LANE CONFIGURATIONS
FIGURE 5B

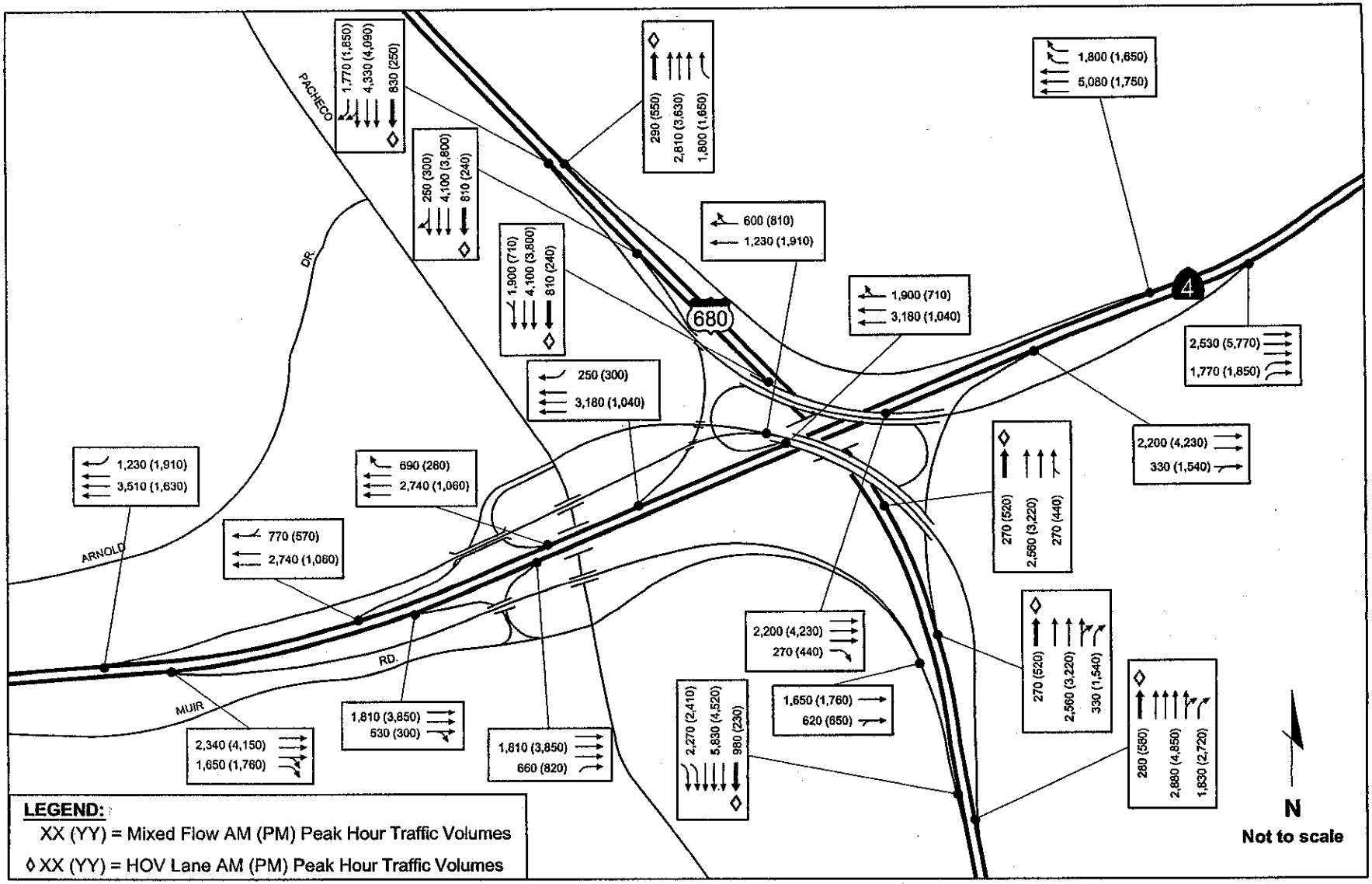


FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-05 1-04 2030 vol slip ramps

I-680/SR4 interchange

2030 FULL PROJECT CONDITIONS
FREEWAY PEAK HOUR VOLUMES AND LANE CONFIGURATIONS
FIGURE 7A

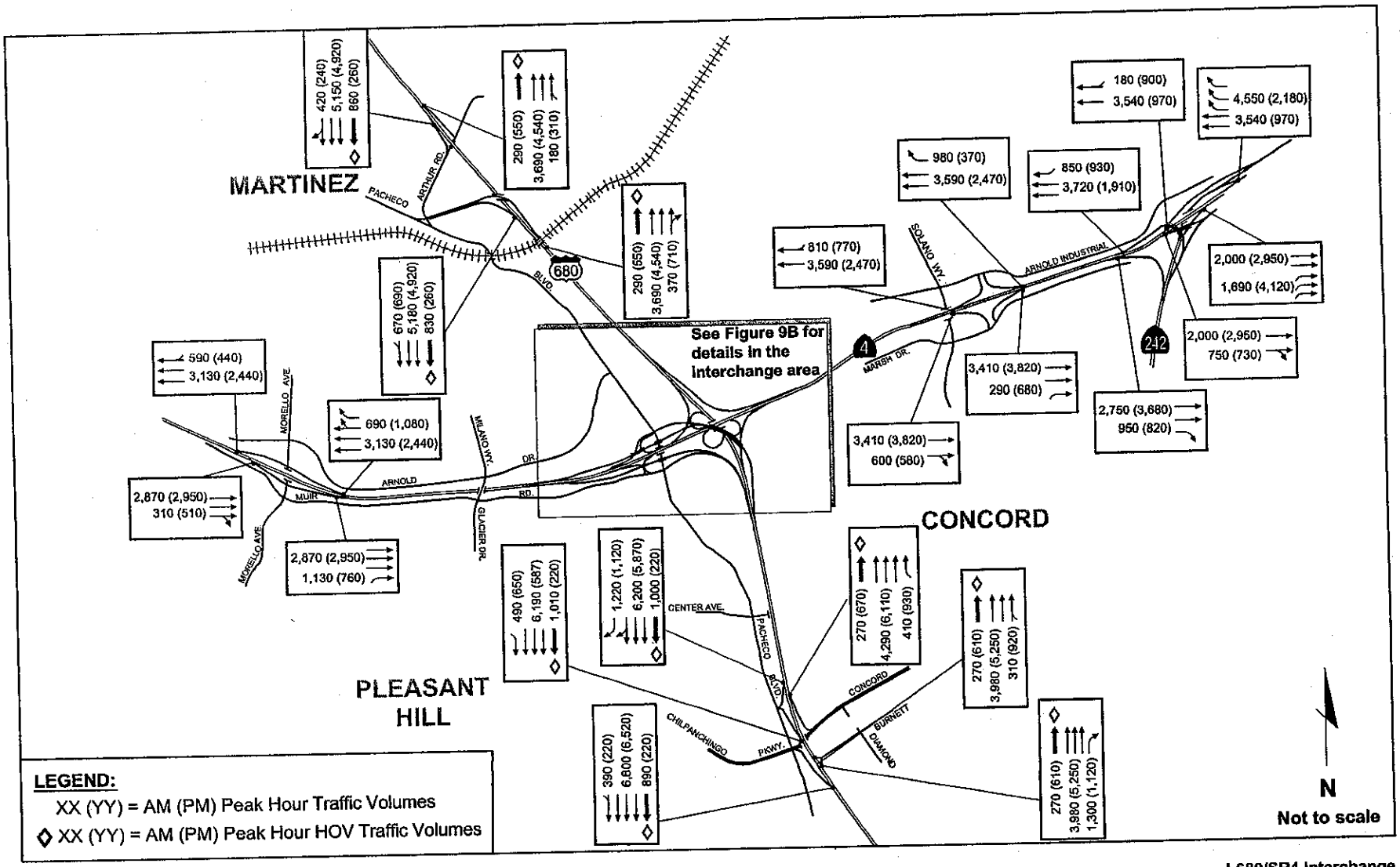


FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-05 1-04 2030 vol interchange with slip ramps

I-680/SR4 Interchange

2030 FULL PROJECT CONDITIONS
FREEWAY PEAK HOUR VOLUMES AND LANE CONFIGURATIONS
FIGURE 7B

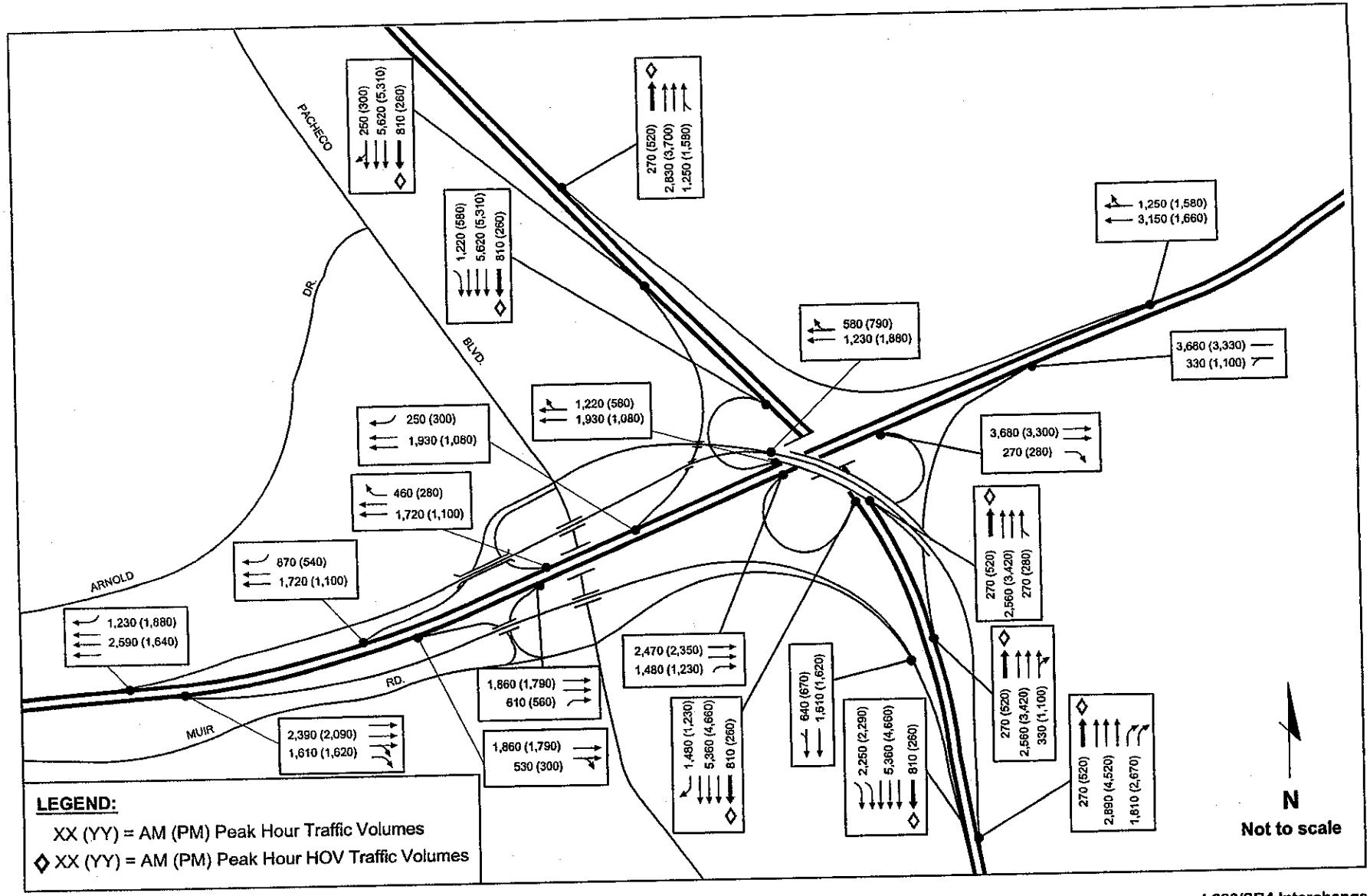


I-680/SR4 Interchange

FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-02a 1-04

2030 PHASES 1 AND 2 CONDITIONS
FREEWAY PEAK HOUR DEMAND VOLUMES AND LANE CONFIGURATIONS
FIGURE 9A

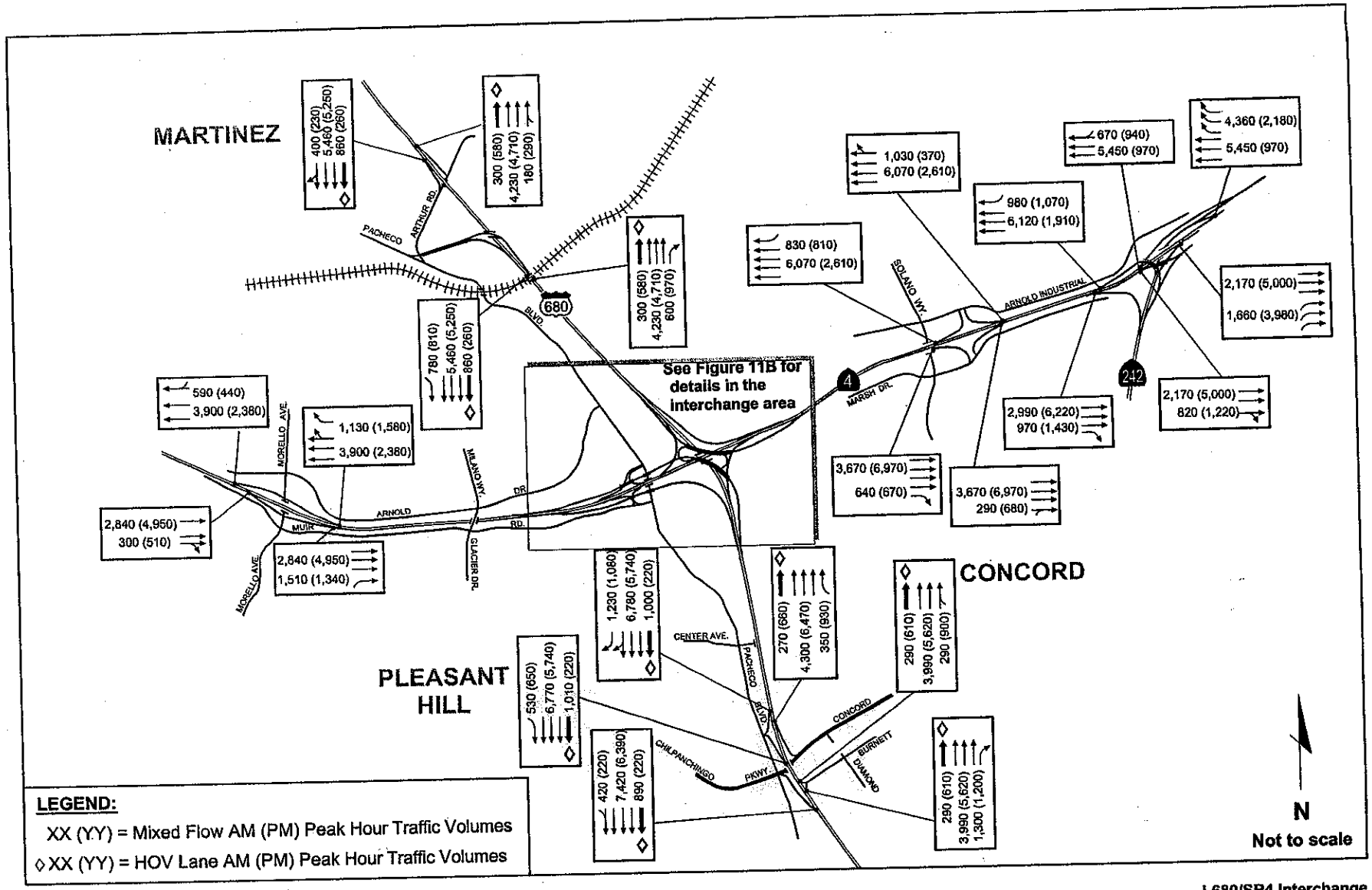


I-680/SR4 Interchange

FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-02a 1-04

2030 PHASES 1 AND 2 CONDITIONS
FREEWAY PEAK HOUR DEMAND VOLUMES AND LANE CONFIGURATIONS
FIGURE 9B

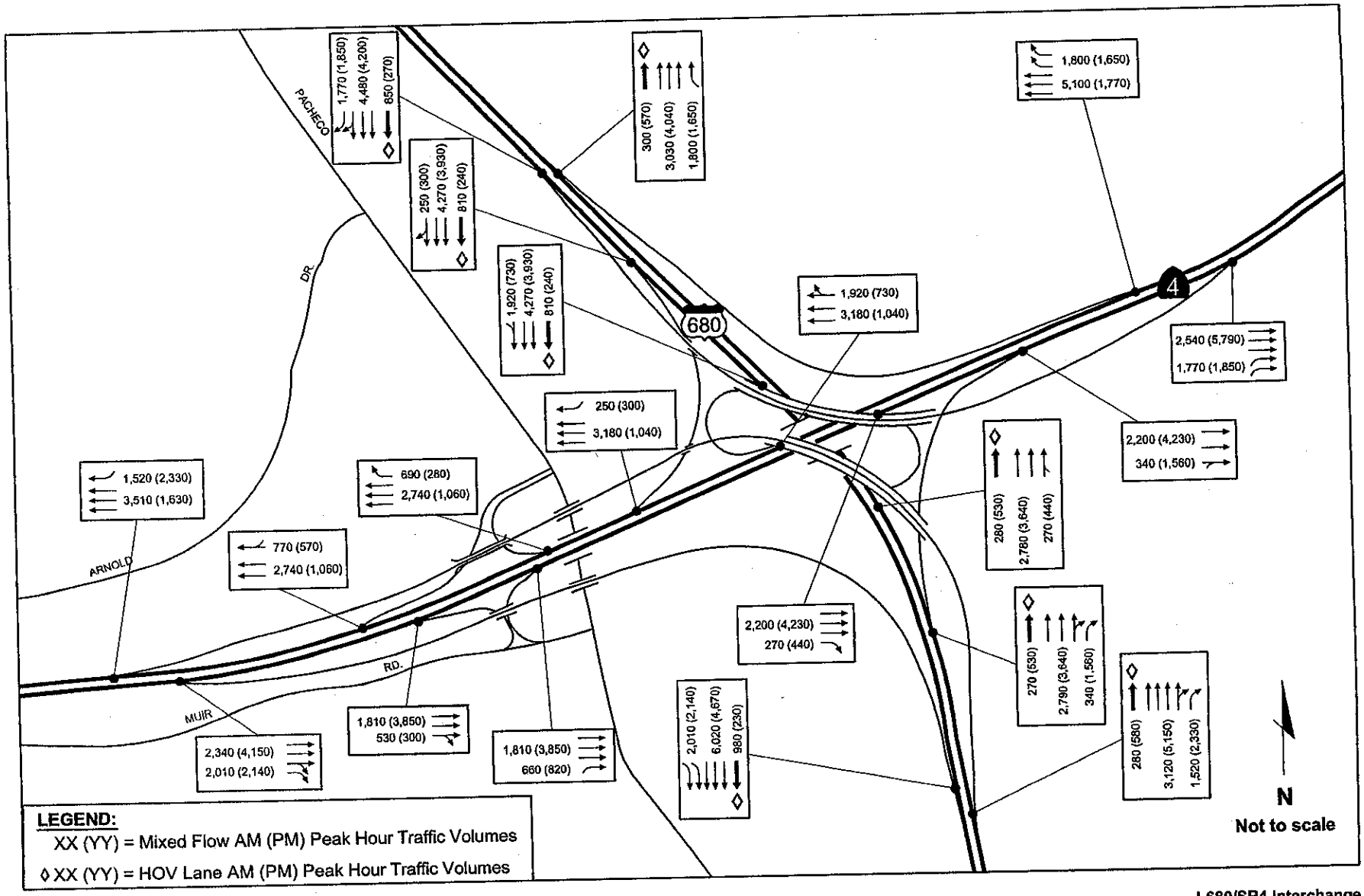


I-680/SR4 Interchange

FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1814-06 1-04 2030 vol without slip ramps

2030 NO SLIP RAMPS
FREEWAY PEAK HOUR VOLUMES AND LANE CONFIGURATIONS
FIGURE 13A



I-680/SR4 Interchange

FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004

1814-06 1-04 2030 vol interchange without slip ramps

2030 NO SLIP RAMPS

FREEWAY PEAK HOUR VOLUMES AND LANE CONFIGURATIONS

FIGURE 13B