ROAD REPAIR AND ACCOUNTABILITY ACT OF 2017
PROJECT BASELINE AGREEMENT

I-680/SR 4 Interchange Improvements - Phases 2A and 4

Resolution TCEP-P-2526-07B
(to be completed by CTC)

1. FUNDING PROGRAM

- ☐ Active Transportation Program
- ☐ Local Partnership Program (Competitive)
- ☐ Solutions for Congested Corridors Program
- ☐ State Highway Operation and Protection Program
- ☑ Trade Corridor Enhancement Program

2. PARTIES AND DATE

2.1 This Project Baseline Agreement (Agreement) effective on 12/4/2025 (will be completed by CTC), is made by and between the California Transportation Commission (Commission), the California Department of Transportation (Caltrans), the Project Applicant, Contra Costa Transportation Authority, and the Implementing Agency, Contra Costa Transportation Authority, sometimes collectively referred to as the "Parties".

3. RECITAL

3.1 Whereas at its 6/26/2025 meeting the Commission approved the Trade Corridor Enhancement Program and included in this program of projects the I-680/SR 4 Interchange Improvements - Phases 2A and 4, the parties are entering into this Project Baseline Agreement to document the project cost, schedule, scope and benefits, as detailed on the Project Programming Request Form attached hereto as ***Exhibit A***, the Project Report attached hereto as ***Exhibit B***, the Performance Metrics Form, if applicable, attached hereto as ***Exhibit C***, as the baseline for project monitoring by the Commission.

3.2 The undersigned Project Applicant certifies that the funding sources cited are committed and expected to be available; the estimated costs represent full project funding; and the scope and description of benefits is the best estimate possible.

4. GENERAL PROVISIONS

The Project Applicant, Implementing Agency, and Caltrans agree to abide by the following provisions:

4.1 To meet the requirements of the Road Repair and Accountability Act of 2017 (Senate Bill [SB] 1, Chapter 5, Statutes of 2017) which provides the first significant, stable, and on-going increase in state transportation funding in more than two decades.

4.2 To adhere, as applicable, to the provisions of the Commission:

- ☐ Resolution _____, "Adoption of Program of Projects for the Active Transportation Program", dated _____
- ☐ Resolution _____, "Adoption of Program of Projects for the Local Partnership Program", dated _____
- ☐ Resolution _____, "Adoption of Program of Projects for the Solutions for Congested Corridors Program", dated _____
- ☐ Resolution _____, "Adoption of Program of Projects for the State Highway Operation and Protection Program", dated _____
- ■ Resolution G-25-42, "Adoption of Program of Projects for the Trade Corridor Enhancement Program", dated 6/26/2025

4.3 All signatories agree to adhere to the Commission's Guidelines. Any conflict between the programs will be resolved at the discretion of the Commission.

4.4 All signatories agree to adhere to the Commission's SB 1 Accountability and Transparency Guidelines and policies, and program and project amendment processes.

4.5 Contra Costa Transportation Authority agrees to secure funds for any additional costs of the project.

4.6 Contra Costa Transportation Authority agrees to report to Caltrans on a quarterly basis; on the progress made toward the implementation of the project, including scope, cost, schedule, and anticipated benefits/performance metric outcomes.

4.7 Caltrans agrees to prepare program progress reports on a on a semi-annual basis and include information appropriate to assess the current state of the overall program and the current status of each project identified in the program report.

4.8 Contra Costa Transportation Authority agrees to submit a timely Completion Report and Final Delivery Report as specified in the Commission's SB 1 Accountability and Transparency Guidelines.

4.9 Contra Costa Transportation Authority agrees to submit a timely Project Performance Analysis as specified in the Commission's SB 1 Accountability and Transparency Guidelines.

4.10 All signatories agree to maintain and make available to the Commission and/or its designated representative, all work related documents, including without limitation engineering, financial and other data, and methodologies and assumptions used in the determination of project benefits and performance metric outcomes during the course of the project, and retain those records for six years from the date of the final closeout of the project. Financial records will be maintained in accordance with Generally Accepted Accounting Principles.

4.11 The Inspector General of the Independent Office of Audits and Investigations has the right to audit the project records, including technical and financial data, of the Department of Transportation, the Project Applicant, the Implementing Agency, and any consultant or sub-consultants at any time during the course of the project and for six years from the date of the final closeout of the project, therefore all project records shall be maintained and made available at the time of request. Audits will be conducted in accordance with Generally Accepted Government Auditing Standards.

5. SPECIFIC PROVISIONS AND CONDITIONS

5.1 Project Schedule and Cost
See Project Programming Request Form, attached as Exhibit A.

5.2 Project Scope
See Project Report or equivalent, attached as Exhibit B. At a minimum, the attachment shall include the cover page, evidence of approval, executive summary, and a link to or electronic copy of the full document.

5.3 Performance Metrics
See Performance Metrics Form, if applicable, attached as Exhibit C.

5.4 Additional Provisions and Conditions *(Please attach an additional page if additional space is needed.)*

In the event of a cost overrun the Trade Corridor Enhancement Program shall not be responsible for any cost increase.

Attachments:

Exhibit A: Project Programming Request Form
Exhibit B: Project Report
Exhibit C: Performance Metrics Form *(if applicable)*

SIGNATURE PAGE
TO
PROJECT BASELINE AGREEMENT

Project Name: I-680/SR 4 Interchange Improvements - Phases 2A and 4

Resolution: TCEP-P-2526-07B

(to be completed by CTC)

Timothy Haile — 10/16/2025

Timothy Haile

Executive Director, CCTA

Project Applicant

Timothy Haile — 10/16/2025

Timothy Haile

Executive Director, CCTA

Implementing Agency

David Ambuehl

David Ambuehl (Oct 20, 2025 10:59:57 PDT)

David Ambuehl

District Director

California Department of Transportation

11/20/2025

Dina El-Tawansy

Director

California Department of Transportation

12/16/2025

Tanisha Taylor

Executive Director

California Transportation Commission

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-6072-2024-0003 v1

Amendment (Existing Project)	☒ YES	☐ NO				Date	11/04/2025 21:21:21
Programs	☐ LPP-C	☐ LPP-F	☐ SCCP	☐ TCEP	☐ STIP	☐ Other	

District	EA	Project ID	PPNO	Nominating Agency	
04	22914	0420000156	0298F	Contra Costa Transportation Authority	
County	**Route**	**PM Back**	**PM Ahead**	**Co-Nominating Agency**	
Contra Costa County	4	R 10.500 R	15.100		
Contra Costa County	680	20.200	22.200	**MPO**	**Element**
				MTC	Capital Outlay

Project Manager/Contact	Phone	Email Address
Brandon Hays	925-256-4737	bhays@ccta.net

Project Title

I-680/SR 4 Interchange Improvements - Phases 2A and 4

Location (Project Limits), Description (Scope of Work)

The Project area extends between Concord Avenue and the East Martinez Underpass on I-680 and between Morello Avenue and 0.4 mile east of SR-242 on SR-4 bordering the cities of Martinez and Concord and unincorporated Pacheco and Clyde in Contra Costa County.
Phase 2A will extend and widen the southbound I-680 collector distributor ramp, one being 480 feet HOV bypass lane, and install a ramp metering facility. Phase 4 will construct a two-lane direct connector from southbound I-680 to eastbound SR 4, remove the existing loop ramp from southbound I-680 to eastbound SR 4, add ramp metering, constructing auxiliary lanes along eastbound SR4 from the entrance of the southbound 680 direct connector to 1,000 feet east of Peralta Road, and complete other associated improvements.

Component	Implementing Agency
PA&ED	Contra Costa Transportation Authority
PS&E	Contra Costa Transportation Authority
Right of Way	Contra Costa Transportation Authority
Construction	Contra Costa Transportation Authority

Legislative Districts

Assembly:	14	Senate:	7	Congressional:	11

Project Milestone		Existing	Proposed
Project Study Report Approved			
Begin Environmental (PA&ED) Phase		08/01/2003	08/01/2003
Circulate Draft Environmental Document	Document Type (ND/MND)/FONSI	08/04/2006	08/04/2006
Draft Project Report		07/31/2006	07/31/2006
End Environmental Phase (PA&ED Milestone)		02/19/2009	02/19/2009
Begin Design (PS&E) Phase		01/02/2021	01/02/2021
End Design Phase (Ready to List for Advertisement Milestone)		10/31/2025	03/31/2026
Begin Right of Way Phase		12/01/2023	12/01/2023
End Right of Way Phase (Right of Way Certification Milestone)		10/31/2025	02/27/2026
Begin Construction Phase (Contract Award Milestone)		03/01/2026	07/06/2026
End Construction Phase (Construction Contract Acceptance Milestone)		12/30/2028	12/31/2029
Begin Closeout Phase		01/02/2029	01/02/2030
End Closeout Phase (Closeout Report)		06/28/2029	06/28/2030

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-6072-2024-0003 v1

Date 11/04/2025 21:21:21

Purpose and Need

Improve operational efficiency of the interchange, reduce traffic congestion and delays, improve safety by eliminating short weaving, and accommodate existing and planned growth within these segments of I-680 and SR4.

NHS Improvements ☒ YES ☐ NO	Roadway Class 1	Reversible Lane Analysis ☒ YES ☐ NO

Inc. Sustainable Communities Strategy Goals ☒ YES ☐ NO Reduce Greenhouse Gas Emissions ☒ YES ☐ NO

Project Outputs

Category	Outputs	Unit	Total
Operational Improvement	Auxiliary lanes	Miles	2.8
Operational Improvement	Ramp modifications	EA	2
Operational Improvement	Interchange modifications	EA	1

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-6072-2024-0003 v1

Date 11/04/2025 21:21:21

Additional Information

PPR ID
ePPR-6072-2024-0003 v1

Performance Indicators and Measures						
Measure	**Required For**	**Indicator/Measure**	**Unit**	**Build**	**Future No Build**	**Change**
Congestion Reduction	TCEP	Change in Daily Vehicle Hours of Delay	Hours	2,653,531	3,436,297	-782,766
	TCEP	Change in Daily Truck Hours of Delay	Hours	371,494	481,082	-109,588
Throughput (Freight)	TCEP	Change in Truck Volume	# of Trucks	81,316,704	78,129,028	3,187,676
	TCEP	Change in Rail Volume	# of Trailers	0	0	0
			# of Containers	0	0	0
Velocity (Freight)	TCEP	Travel Time or Total Cargo Transport Time	Hours	10.4	9.5	0.9
Air Quality & GHG (only 'Change' required)	LPPC, SCCP, TCEP, LPPF	Particulate Matter	PM 2.5 Tons	232,333	223,226	9,107
			PM 10 Tons	290,417	223,226	67,191
	LPPC, SCCP, TCEP, LPPF	Carbon Dioxide (CO2)	Tons	159,904,536	158,880,613	1,023,923
	LPPC, SCCP, TCEP, LPPF	Volatile Organic Compounds (VOC)	Tons	3,368,835	3,180,968	187,867
	LPPC, SCCP, TCEP, LPPF	Sulphur Dioxides (SOx)	Tons	1,568,251	1,506,774	61,477
	LPPC, SCCP, TCEP, LPPF	Carbon Monoxide (CO)	Tons	258,761,370	251,240,630	7,520,740
	LPPC, SCCP, TCEP, LPPF	Nitrogen Oxides (NOx)	Tons	13,184,923	12,556,451	628,472
Safety	LPPC, SCCP, TCEP, LPPF	Number of Fatalities	Number	0.38	0.6	-0.22
	LPPC, SCCP, TCEP, LPPF	Fatalities per 100 Million VMT	Number	0.011	0.017	-0.006
	LPPC, SCCP, TCEP, LPPF	Number of Serious Injuries	Number	25.08	32.04	-6.96
	LPPC, SCCP, TCEP, LPPF	Number of Serious Injuries per 100 Million VMT	Number	0.732	0.897	-0.165
Economic Development	LPPC, SCCP, TCEP, LPPF	Jobs Created (Only 'Build' Required)	Number	2,580	0	2,580
Cost Effectiveness (only 'Change' required)	LPPC, SCCP, TCEP, LPPF	Cost Benefit Ratio	Ratio	6.07	0	6.07

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PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-6072-2024-0003 v1

District	County	Route	EA	Project ID	PPNO
04	Contra Costa County, Contra Costa County	4, 680	22914	0420000156	0298F

Project Title

I-680/SR 4 Interchange Improvements - Phases 2A and 4

Existing Total Project Cost ($1,000s)								
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Implementing Agency
E&P (PA&ED)									Contra Costa Transportation Authorit
PS&E	30,000							30,000	Contra Costa Transportation Authorit
R/W SUP (CT)									Contra Costa Transportation Authorit
CON SUP (CT)									Contra Costa Transportation Authorit
R/W	7,000							7,000	Contra Costa Transportation Authorit
CON				198,500				198,500	Contra Costa Transportation Authorit
TOTAL	37,000			198,500				235,500	
Proposed Total Project Cost ($1,000s)									Notes
E&P (PA&ED)									
PS&E	30,000							30,000	
R/W SUP (CT)									
CON SUP (CT)									
R/W	13,500							13,500	
CON				225,700				225,700	
TOTAL	43,500			225,700				269,200	

Fund #1:	SB1 TCEP - Trade Corridors Enhancement Account (Committed)								Program Code
Existing Funding ($1,000s)									20.30.210.310
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									California Transportation Commissio
PS&E	18,000							18,000	TCEP Regional Share Program Code 20XX73200$18000 PSE voted 05/12/21
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL	18,000							18,000	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									
PS&E	18,000							18,000	
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL	18,000							18,000	

PPR ID
ePPR-6072-2024-0003 v1

Fund #2:	Local Funds - Local Transportation Funds (Committed)								Program Code
	Existing Funding ($1,000s)								20.10.400.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									Metropolitan Transportation Commiss
PS&E	12,000							12,000	Regional Measure 3 (RM3)
R/W SUP (CT)									
CON SUP (CT)									
R/W	7,000							7,000	
CON									
TOTAL	19,000							19,000	
	Proposed Funding ($1,000s)								Notes
E&P (PA&ED)									
PS&E	12,000							12,000	
R/W SUP (CT)									
CON SUP (CT)									
R/W	13,500							13,500	
CON									
TOTAL	25,500							25,500	

Fund #3:	Local Funds - Local Transportation Funds (Committed)								Program Code
	Existing Funding ($1,000s)								20.10.400.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									Metropolitan Transportation Commiss
PS&E									Regional Measure 3 (RM3) selected uncommitted to advance the form to Final
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON				140,500				140,500	
TOTAL				140,500				140,500	
	Proposed Funding ($1,000s)								Notes
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON				167,700				167,700	
TOTAL				167,700				167,700	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-6072-2024-0003 v1

Fund #4:	SB1 TCEP - Trade Corridors Enhancement Account (Committed)								Program Code
Existing Funding ($1,000s)									20.XX.723.200
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									California Transportation Commissio
PS&E									TCEP Regional Share Program Code: 20XX723200 Committed at June 2025 meeting. selected "No" to allow selection of "Final"
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON				58,000				58,000	
TOTAL				58,000				58,000	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON				58,000				58,000	
TOTAL				58,000				58,000	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-6072-2024-0003 v1

Complete this page for amendments only Date 11/04/2025 21:21:21

District	County	Route	EA	Project ID	PPNO
04	Contra Costa County, Contra Costa County	4, 680	22914	0420000156	0298F

SECTION 1 - All Projects

Project Background

The design of the project included Phases 1, 2A, and 4 was completed in June 2024. However, the construction cost has changed tremendously from the time the design began in 2021 due to several factors; prices (inflation), the relocation of the 84" sanitary line, Flood control requirements to embed the sanitary line under Grayson Creek; complexity of the flyover connectors. In July 2024, CCTA decided to move forward with Phases 2A and 4 and seek additional TCEP funding as the capital cost of these two phases can be covered by the available regional fundings and the additional TCEP.
The splitting of the project required the resubmittal of the PS&E package to Caltrans for review and approval, along with redefining the right-of-way needs.

Programming Change Requested

Reason for Proposed Change

The cost of the project was updated to reflect Phases 2A and 4 only, as Phase 1 is being shelved due to lack of construction funding. Additional funding from Regional Measure 3 was added to fully fund the construction and right-of-way phases.

If proposed change will delay one or more components, clearly explain 1) reason for the delay, 2) cost increase related to the delay, and 3) how cost increase will be funded

The delay in achieving the RTL and Right-of-Way certification is due to 1) removing of Phase 1 and the resubmitting of the new PSE package that includes phases 2A and 4 only; 2) the potential for eminent domain process for one of the properties; and 3) obtaining regulatory permits.

Other Significant Information

SECTION 2 - For SB1 Project Only

Project Amendment Request (Please follow the individual SB1 program guidelines for specific criteria)

Adjusting the dates for the milestones and keeping it within the same fiscal year (25/26)

Approvals

I hereby certify that the above information is complete and accurate and all approvals have been obtained for the processing of this amendment request.

Name (Print or Type)	Signature	Title	Date

SECTION 3 - All Projects

Attachments
1) Concurrence from Implementing Agency and/or Regional Transportation Planning Agency

2) Project Location Map

I-680/SR 4 Interchange Improvements – Phases 2A and 4

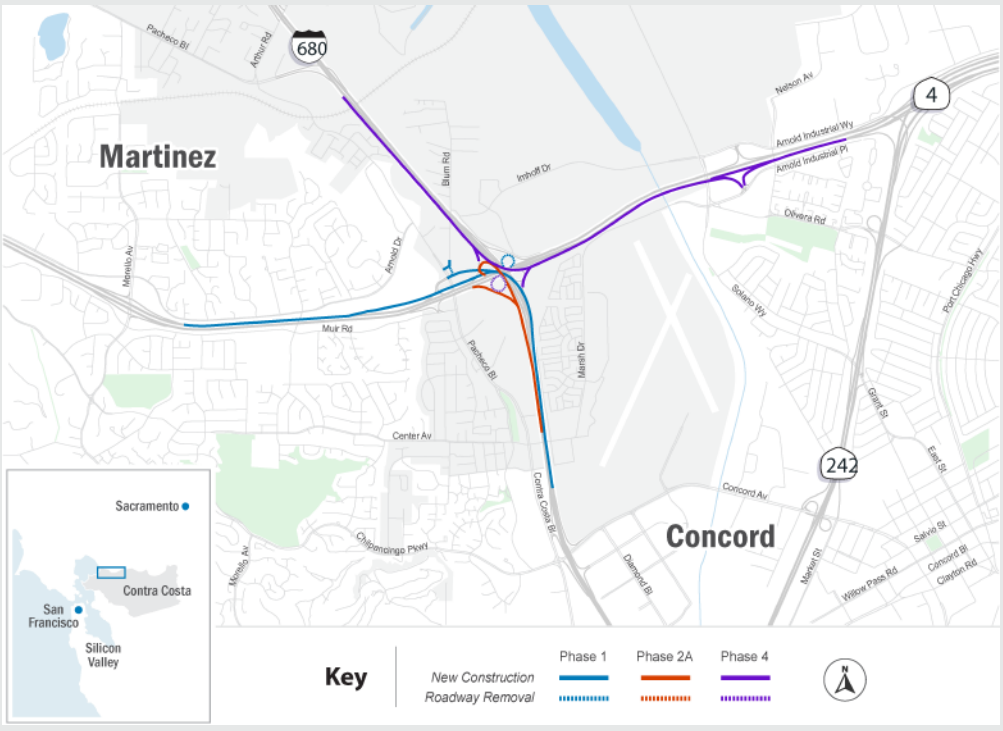
PROJECT OVERVIEW | PURPOSE AND NEED

The State Route 4 (SR-4) corridor serves as the only major east-west transportation link joining the communities of Antioch, Bay Point, Pittsburg and Brentwood with central Contra Costa County and the Bay Area. The Interstate 680 (I-680) corridor serves as the main artery through central Contra Costa County, connecting it with Solano County to the north and Alameda and Santa Clara counties to the south.

The I-680 and SR-4 Highway Corridors are key connectors to Bay Area Global Gateways and freight transportation systems including major maritime facilities at the Port of Oakland, as well as the minor Ports of Richmond, Benicia, San Francisco, and Redwood City, and the Bay Area's international airports which handle international as well as domestic air cargo.

A significant bottleneck for Contra Costa, the I-680/SR-4 Interchange will be reconfigured to improve safety, reduce congestion, and improve traffic operations on these critical corridors.

- **INCREASE SAFETY**
- **CONGESTION RELIEF AND REDUCED CARBON EMISSIONS**
- **IMPROVE TRAFFIC OPERATIONS**
- **SUPPORT GOODS MOVEMENT AND ECONOMIC PROSPERITY**



PHASE 2A AND 4 SCOPE

Extend sounthbound I-680 collector-distributor ramp, construct 2 Lane direct-connector flyover from southbound I-680 to SR 4, add ramp metering, and remove the existing loop ramp.

PHASE 2A AND 4 COST ESTIMATE

PS&E (Design)	$30.0 M
ROW/Utilities	$13.5 M
Construction	$225.7 M
TOTAL COST	$269.2 M
TCEP AWARD	$58.0 M

PROJECT BACKGROUND | THE HISTORY

All phases of the Overall Project underwent an environmental assessment - Initial Study with Negative Declaration/ Environmental Assessment with Findings of No Significant Impact (IS/EA FONSI) in 2008 and determination of independent utility for each phase. The Environmental Document and the Project Report (PR) were approved for the Overall Project in 2008 and 2009 respectively.

California Department of Transportation (Caltrans) approved a Supplemental Project Report (SPR) in 2018 for Phase 3. Phase 3 began construction in the spring of 2019 and was opened to traffic on October 14, 2021.

Following completion of Phase 3, it was determined that completing Phase 1, 2A, and 4 would provide the most benefits if completed next. In 2021, based on the project cost and potential available funding, work on the environmental revalidation, SPR, and final design began for Phase 1, 2A, and 4. Environmental revalidation was completed in summer 2023, in parallel with final design, which is expected to finish in late 2025. The SPR is scheduled for approval November 2025.

PROJECT SCOPE | PHASE 1, 2A, AND 4

Phases 1, 2A, and 4 will construct direct connectors from northbound I-680 to westbound SR-4 (Phase 1) and from southbound I-680 to eastbound SR-4 (Phase 4), with ramp metering at each connector. These improvements will remove the existing short-distance double-weave on SR-4—currently a major source of congestion and collisions at the I-680/SR-4 interchange. Phase 2A will also extend and widen the southbound I-680 collector-distributor ramp to three lanes and add ramp metering. Together, these upgrades will improve safety and significantly reduce travel times.

DELIVERY STRATEGY | ADVANCE PHASE 2A AND 4

Considerable progress has been made so far in advancing this crucial project. The development work for Phases 1, 2A, and 4 is almost finished, and Phase 2A and 4 will be “shovel ready” by spring 2026. CCTA has strategically planned to advance construction of Phase 2A and 4, aiming to maximize public benefit while minimizing risk. Due to the overall project cost and right of way impacts, delivery of Phase 1 will be completed at a later time.

CCTA successfully secured $58 million in Trade Corridor Enhancement Program (TCEP) grant funding through a competitive process to construct Phases 2A and 4 of the Project. This funding will accelerate project delivery and provide near-term safety and operational benefits to the public. Regional Measure 3 funds will serve as the local match for the TCEP grant.

PROJECT DELIVERY MILESTONES

ALL PHASES

2008
Environmental Clearance Approved for Project

2009
Project Report Approved for Project

PHASE 3

2018
Phase 3 Supplemental Project Report Approved

2021
Phase 3 Construction Complete

PHASE 1, 2A, & 4

JULY 2023
Environmental Revalidation Complete (Phase 1, 2A, & 4)

NOVEMBER 2025
Supplemental Project Report Complete (Phase 1, 2A, & 4)

PHASE 2A & 4

DECEMBER 2025
Complete Final Design (Phase 2A & 4)

FEBRUARY 2026
Complete Right of Way and Utilities (Phase 2A & 4)

MARCH 2026
Ready to List (Phase 2A & 4)

JULY 2026
Start Construction (Phase 2A & 4)

DECEMBER 2029
End Construction (Phase 2A & 4)

CCTA

Exhibit C. Performance Metrics Form Trade Corridor Enhancement Program

Existing Average Annual Vehicle Volume on Project Segment	54,395,000
Existing Average Annual Truck Percent on Project Segment	14%
Estimated Year 20 Average Annual Vehicle Volume on Project	60,487,523
Estimated Year 20 Average Annual Truck Percent on Project Segment	14%

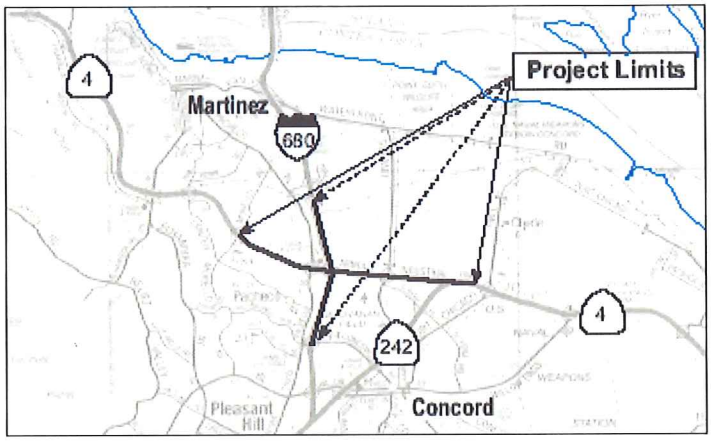
Measure	Metric	Build	Future No	Change	Increase/
Congestion Reduction (Freight)	Change in Daily Vehicle Hours of Delay	2,653,531	3,436,297	(782,767)	Decrease
	Change in Daily Truck Hours of Delay	371,494	481,082	(109,587)	Decrease
	(Optional) Person Hours of Travel Time	4,537,538	5,876,069	(1,338,531)	Decrease
	(Optional) Daily Truck Trips Due to Mode	NA	NA	NA	NA
	(Optional) Daily Truck Miles Travelled Due to	NA	NA	NA	NA
	(Optional) Other Information	NA	NA	NA	NA
Throughput (Freight)	Change in Truck Volume	10,248,557	9,846,806	401,751	Increase
	Change in Rail Volume	NA	NA	NA	NA
	(Optional) Change in Cargo Volume	NA	NA	NA	NA
	(Optional) Other Information	NA	NA	NA	NA
System Reliability (Freight)	Truck Travel Time Reliability Index ("No	NA	NA	NA	NA
	(Optional) Other Information	NA	NA	NA	NA
Velocity (Freight)	Travel time or total cargo transport time	1.3	1.2	0.1	Increase
	(Optional) Change in Average Peak Period	51	47	3	Increase
	(Optional) Average Peak Period Weekday	NA	NA	NA	NA
	Change in Truck Hours of Delay	431,970	559,397	(127,427)	Decrease
Air Quality	Particulate Matter (PM 10) (grams)	36,602	28,134	8,468	Increase
	Particulate Matter (PM 2.5) (grams)	29,282	28,134	1,148	Increase
	Carbon Oxide (CO2) (1000 grams)	20,153,188	20,024,144	129,044	Increase
	Volatile Organic Compounds (VOC) (grams)	424,583	400,906	23,677	Increase
	Sulphur Oxides (SOx) (grams)	197,651	189,903	7,748	Increase
	Carbon Monoxide (CO) (grams)	32,612,374	31,664,515	947,859	Increase
	Nitrogen Oxides (NOx) (grams)	1,661,730	1,582,522	79,208	Increase
Safety	Number of Fatalities	0.38	0.60	(0.22)	Decrease
	Rate of Fatalities per 100 Million VMT	0.011	0.017	(0.006)	Decrease
	Number of Serious Injuries	25.08	32.04	(7)	Decrease
	Number of Serious Injuries per 100 Million	0.732	0.897	(0.165)	Decrease
	Number of PDO	167.26	211.94	(45)	Decrease
	Rate of PDO per 100 Million VMT	4.881	5.934	(1.053)	Decrease
Aggregate Cost Effectiveness Over Analysis Period	Life-Cycle Costs (mil. $)	$253.0			
	Life-Cycle Benefits (mil. $)	$1,535.3			
	Net Present Value (mil. $)	$1,282.3			
	Benefit / Cost Ratio:	6.07			
Economic Development	Jobs Created	5,280		5,280	Increase
	(Optional) Other Information			-	Decrease

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)
04275-229100
HB4C Major Program

Caltrans Metric

PROJECT REPORT



On Routes	I-680 and SR-4
Between	Concord Avenue and East Martinez Underpass on I-680
And Between	Morello Avenue and 0.7 km East of SR-242 on SR-4

I have reviewed the right of way information contained in this Project Report and the R/W Data Sheet attached hereto, and find the data to be complete, current, and accurate:

R.A. MACPHERSON
DEPUTY DISTRICT DIRECTOR – RIGHT OF WAY

APPROVAL RECOMMENDED:

YADOLLAH FATHOLLAHI
PROJECT MANAGER

APPROVED:

HELENA "LENKA" CULIK-CARO
DEPUTY DISTRICT DIRECTOR – DESIGN

2/19/09
DATE

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)
04275-229100
HB4C Major Program

This Project Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

February 9, 2009

SCOTT C. KELSEY
REGISTERED CIVIL ENGINEER
URS CORPORATION

DATE

Table of Contents

TABLES

APPENDICES

ACRONYMS

AC	asphalt concrete
BMPs	Best Management Practices
BNSF	Burlington Northern–Santa Fe
Caltrans	California Department of Transportation
CCCSD	Central Contra Costa Sanitary District
CCTA	Contra Costa Transportation Authority
CCTV	closed circuit television
C-D	collector-distributor
CHP	California Highway Patrol
DPR	Draft Project Report
EA/IS	Environmental Assessment (NEPA) and Final Initial Study (CEQA)/Negative Declaration
EB	eastbound
EOS	edge of shoulder
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMA	Freeway Maintenance Agreement
HOV	high-occupancy vehicle
I-680	Interstate 680
IS-ND/EA	Initial Study (CEQA)/Negative Declaration and Environmental Assessment (NEPA)
ITIP	Interregional Transportation Improvement Program
km	kilometer
km/h	kilometers per hour
KP	kilometer post
LOS	level of service
MTC	Metropolitan Transportation Commission
NPDES	National Pollutant Discharge Elimination System
NB	northbound
ND	Negative Declaration
PCC	Portland Cement Concrete
PDT	Project Development Team
PG&E	Pacific Gas and Electric Company
PS&E	Plans, Specifications, and Estimates
Project	I-680/SR-4 Interchange Improvement Project
PR	Project Report
PSR	Project Study Report
RCR	Route Concept Report
RTP	Regional Transportation Plan

RWQCB	Regional Water Quality Control Board
SB	southbound
SIP	State Implementation Plan
SR-4	State Route 4
SSD	stopping sight distance
STIP	State Transportation Improvement Program
SWDR	Storm Water Data Report
SWPPP	Storm Water Pollution Prevention Plan
TASAS	(Caltrans) Traffic Accident Surveillance and Analysis System
TCCR	Transportation Corridor Concept Report
TOS	Traffic Operations System
TMP	Transportation Management Plan
USACE	U.S. Army Corps of Engineers
WB	westbound

PROJECT REPORT

I. INTRODUCTION

The Contra Costa Transportation Authority (CCTA) and the California Department of Transportation (Caltrans) propose to modify the Interstate 680/State Route 4 (I-680/SR-4) Interchange in Contra Costa County (the project; see Appendix A, Figure A-1). The project area extends between Concord Avenue and East Martinez Underpass on I-680 and between Morello Avenue and 0.7 km east of SR-242 on SR-4.

The preferred alternative is proposed to be implemented over five phases. Each of the five phases can be independently constructed and will provide incremental benefits in meeting the overall project goal to improve operational efficiencies and traffic flow, address safety concerns associated with the existing interchange configuration, and accommodate existing and planned growth for the design year 2037. This necessary aspect of the preferred alternative provides flexibility for planning and implementing the improvements as funding is available. Geometric features and cross sections for each phase are detailed in Appendix C. Illustrations of the construction phases are included in Appendix D. The current non-escalated estimated cost of the proposed project for all five phases is $278,000,000 which includes environmental documentation, project development, engineering, right-of-way acquisition, utility relocation, construction capital, and construction support. All five phases of the project will be funded with Contra Costa County's Measure C funds, Measure J funds, and will likely use State Transportation Improvement Program (STIP) and matching Federal funds for design, construction support, and construction.

The project will require limited right of way acquisition, including some residential and business properties. Due to the substantial increase in traffic volume and the consequent need for interchange reconstruction, this project has been assigned Project Development Category 3. This project will be designed in U.S. Customary units.

II. RECOMMENDATION

It is recommended that the project be approved using the Preferred Alternative, and that the project proceed to design phase. The affected local agencies have been consulted with respect to the recommended plan in this project report, that their views have been considered, and they are in general accordance with the proposed project as presented.

III. BACKGROUND

A. Project History

Improvements to the I-680/SR-4 Interchange were originally requested by the Contra Costa County Board of Supervisors in 1983, after SR-4 was upgraded from conventional highway to freeway standards. However, plans to upgrade the interchange by reconstructing the existing cloverleaf were not implemented, and in 1985 the STIP entry was reduced to right of way preservation only.

In 1993, Caltrans prepared a Project Study Report (PSR)/Project Report to protect right of way in the vicinity of the interchange from future encroachment and to encourage compatible land use. These reports considered a single concept for an ultimate four-level freeway-to-freeway interchange to establish a maximum footprint. No alternative comparison or operational analysis was performed.

Caltrans approved another project affecting the interchange vicinity, the I-680 HOV Lane Project, in April 2000. This project has added HOV lanes on I-680 from south of SR-242 to the Marina Vista Interchange in Martinez, and construction was completed in late 2005. Modifications to the I-680/SR-4 Interchange include construction of collector distributor (C-D) lanes on I-680 in both directions and the associated realignment of all of the existing loop and diagonal ramps.

In 2000, engineering studies were commenced to investigate potential improvements to the I-680/SR-4 Interchange. The studies examined both near-term operational improvements and long-term ultimate improvements. The Conceptual Engineering Report, dated December 14, 2000, summarized the alternatives considered and recommended that the near-term alternatives be dropped for further consideration of an ultimate interchange facility. Alternative D2A[1] was the alternative recommended for additional study under the PSR. The I-680 HOV Lane Project incorporated features identified in the Conceptual Engineering Report and PSR to accommodate I-680/SR-4 Interchange improvements.

The PSR was completed and approved by Caltrans on November 27, 2001. The PSR recommended a five-phase sequence of improvements with a three-level ultimate configuration. This alternative developed in the PSR was further refined in the Draft Project Report (DPR) approved on July 31, 2006. Specific refinements include the proposed alternatives geometry, anticipated traffic volumes and levels of service (LOS) at key locations, and identified right of way required.

In July 2001, Caltrans sponsored a Value Analysis Study of the proposed interchange improvements. The final report, dated October 28, 2001, accepted one of the identified value analysis alternatives and conditionally accepted two others for further evaluation in the DPR. During the preparation of the DPR, the accepted alternative was incorporated and the two conditionally accepted alternatives were further evaluated based on year

[1] Alternative D2A was defined in the Conceptual Engineering Report; the concept included two direct freeway-to-freeway connectors with full Pacheco Boulevard access.

2030 traffic data. Of these alternatives, one was accepted and included in the project. The other alternative was found to not adequately meet traffic demands and was therefore rejected. Two alternatives from the Value Analysis Study have been included in the project.

The project geometry and year 2030 traffic volumes were refined during the preparation of the DPR. In addition, the project with no slip ramps was considered during preparation of DPR for Phases 1 and 2, and is discussed in Sections V.A.

B. Community Interaction

Members of the local and regional community have been given opportunities to provide feedback regarding the proposed interchange improvement. CCTA has presented the project at its community meetings. Driver surveys were conducted at the Pacheco Boulevard/Blum Road Park and Ride lot. Members of the community have submitted comments to the agencies (Caltrans, CCTA, and Contra Costa County) involved at public meetings. In addition, neighborhood meetings at the mobile home parks in the southeast quadrant of the interchange and sound wall meetings will be conducted at the time of each phase is advanced for final design (during the Plans, Specifications, and Estimates [PS&E] phase).

The Environmental Assessment (NEPA) and Initial Study (CEQA), Proposed Negative Declaration was circulated for review in August 2006, and a public hearing was held on August 22, 2006. The public hearing brought to attention the following concerns:

- Traffic noise at Temple Drive neighborhood
- Construction noise and dust
- Flood risk at mobile home park
- Landscaping at Pacheco Boulevard
- Displacement of the self storage business
- Impact to Contra Costa Water District facilities

Individuals and agencies commented on the Environmental Assessment and Initial Study and their concerns were addressed in the Initial Study (CEQA)/Negative Declaration and Environmental Assessment (NEPA), referred to as IS-ND (CEQA)/EA (NEPA).

C. Existing Facility

The existing facility is a freeway-to-freeway cloverleaf interchange connecting I-680 and SR-4 in the Pacheco area of Martinez (see Appendix A, Figure A-1). I-680 is the only north-south corridor in Contra Costa County. It is also part of the Department of Defense Priority Network. SR-4 is the only east-west region-to-region route connecting Contra Costa County communities to San Joaquin County and the Central Valley.

I-680 is a six-lane freeway (three lanes in each direction) extending from the Benicia-Martinez Bridge to U.S. Highway 101 in San Jose. The I-680 has an HOV lane in each direction from the I-680/SR-242 split to Marina Vista Drive in Martinez in the NB

direction and from Marina Vista Drive to North Main Street in Walnut Creek in the SB direction. Collector distributor roads exist on I-680 between the four loop ramps of the I-680/SR-4 Interchange and reconstructed the interchange's eight loop and diagonal ramps.

SR-4 connects with I-80 in Hercules to the west and SR-160 in Oakley to the east and proceeds to Stockton and beyond. SR-4 has two mixed-flow lanes in each direction through the I-680 interchange, widening to three mixed-flow lanes in each direction west of the ramps at Pacheco Boulevard. According to the preliminary draft Transportation Corridor Concept Report (TCCR) dated September 16, 2002, the ultimate configuration for SR-4 between Alhambra Boulevard and the I-680/SR-4 Interchange and between the I-680/SR-4 and SR-242/SR-4 Interchanges is eight lanes (including two HOV lanes).

Pacheco Boulevard lies approximately 400 meters west of, and runs parallel to, I-680 in the project area. Pacheco Boulevard links the City of Martinez with the City of Pleasant Hill and becomes Contra Costa Boulevard at its intersection with Second Avenue, south of SR-4. SR-4 has closely spaced on- and off-ramps to Pacheco Boulevard, which is contributing operational deficiency on SR-4, which are just west of the I-680 on- and off ramps. This also adds to the existing weaving and merging constraints on SR-4 in this area (described in Section IV).

There are three other local connections from Pacheco Boulevard to I-680 and SR-4: (1) at Arthur Road/Pacheco Boulevard north of the I-680/SR-4 Interchange; (2) on SR-4 adjacent to the I-680 Interchange, where hook ramps allow for direct access between Pacheco Boulevard and SR-4 and I-680; and (3) at the split Pacheco Boulevard/Concord Avenue/Burnett Avenue Interchange to the south.

Muir Road is parallel to and just south of SR-4, and functions as a frontage road to the highway. It also has on- and off-ramps to SR-4 just west of the I-680/SR-4 Interchange and just west of Pacheco Boulevard. Drivers on Pacheco Boulevard and Muir Road use these ramps to access or exit WB SR-4 and can connect to SB or NB I-680. Truck restrictions are in effect on Muir Road between Glacier Way and the SR-4 ramps due to a steep grade in this area.

IV. NEED AND PURPOSE

The existing I-680/SR-4 Interchange has a number of deficiencies that contribute to traffic congestion and inefficiency of the interchange operations, including short weaving sections between the loop ramps. The weaving sections are inadequate for current and year 2037 design traffic volumes and create safety, operational, and capacity concerns. Nonstandard features include the limited speeds on the loop ramps and zero-shoulder bridges at the SR-4/Pacheco Boulevard and I-680/SR-4 interchanges.

A. Problem, Deficiencies, and Justification

The purpose of this 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

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 changed significantly as eastern Contra Costa County has experienced tremendous growth. 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. Throughout the past decade, Contra Costa County has experienced both residential and business growth. Many businesses have expanded or relocated to Contra Costa County along the I-680 corridor. Contra Costa County anticipates additional growth in the coming decade and beyond. I-680 and SR-4 serve residents and workers who travel between their homes and workplaces, both from within the county and from more distant regions. SR-4 serves additional regional travel demand as an alternate connection between the I-80 and I-680 corridors.

The existing cloverleaf configuration 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 auxiliary lane between the on-ramps and off-ramps in each direction is relatively short, which limits the merging and weaving distance and causes backups that extend onto the freeway ramps during peak periods. Traffic on the ramps can back up and contribute to congestion on the freeway mainlines. In fact, this is the primary cause of congestion at the interchange on 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.

Caltrans Traffic Accident Surveillance and Analysis System (TASAS) data were analyzed for the current 3-year period from April 1, 2005, to March 31, 2008, for SR-4 and I-680. The data generally showed accident levels higher than the State average for comparable facilities.

Table 1 summarizes the existing levels of service for the weaving sections of the interchange.

Table 1. Weaving Section Level of Service (LOS) Summary

Freeway Segment	LOS	
	AM	PM
NB I-680 between SR-4 on- and off-loops	B	E
SB I-680 between SR-4 on- and off-loops	F	D
WB SR-4 between I-680 on- and off-loops	F	D
WB SR-4 between I-680 on-ramp and Pacheco Boulevard off-ramp	D	C
EB SR-4 between Muir Road on-ramp and I-680 off-ramp	E	F
EB SR-4 between I-680 on- and off-loops	C	D

Source: Fehr & Peers Transportation Consultants, June 2004.

Note: LOS based on the Leisch Method, Chapter 500 (Traffic Interchanges) of the Caltrans *Highway Design Manual*, Section 504.7, Figure 504.7A

As shown in Table 1, the existing weaving conditions do not meet the desired LOS of D for many of the ramps during the peak hours. Improvements proposed by this project would increase capacity and improve safety of the interchange.

B. Regional and System Planning

The proposed modifications by this project are consistent with regional and local planning as discussed below.

1. Systems

I-680 is a north-south route connecting San Jose and US-101in the south and Cordelia – Fairfield and I-80 in the north. It is a vital commuting, freight and recreational link to the inner East Bay and Northern California. I-680 is also the only north-south corridor in Contra Costa County, which is federally classified as a Basic Inter Regional Route of Significance. It is also part of the Department of Defense Priority Network.

SR-4 is an east-west facility that is critical to regional and interregional traffic in the San Francisco Bay Area. It is vital to commuting, freight, and recreational traffic and is one of the most congested freeway facilities in the region. SR-4 serves as a connection between the San Francisco Bay Area and Delta region, linking the Bay Area with recreational destinations in the Delta and Central Valley. SR-4 is also the only east-west region-to-region route in the County connecting Contra Costa County communities to San Joaquin County and the Central Valley. This segment of SR-4 is in the Rural and

Single Interstate Routing System and is classified as a Terminal Access Route in the Surface Transportation Assistance Act. The segment of SR-4 within the project area does not have a State Highway Extra Legal Load rating, but the segment between Brentwood and San Joaquin County does.

2. State Planning

According to the Route Concept Reports (RCRs) prepared by Caltrans in the mid to late 1980s, the Ultimate Transportation Corridor for I-680 is eight lanes total (two of them HOV lanes). The recently completed I-680 HOV Lane Project has extended HOV lanes from the I-680/SR-242 interchange to Marina Vista Drive in Martinez in the NB direction and from Marina Vista Drive to North Main Street in Walnut Creek in the SB direction.

Caltrans District 4 published the Final SR-4 RCR on April 10, 1985, and the Preliminary Draft TCCR on September 16, 2002. The TCCR states that the ultimate configuration for SR-4 between Alhambra Boulevard and the I-680/SR-4 interchange and between the I-680/SR-4 and SR-242/SR-4 interchanges is eight lanes (two of them HOV lanes). The TCCR Planned/Regional Vision Configuration (2010–2025) calls for three mixed-flow lanes and one HOV lane in each direction. A TCCR with Traffic Operations Strategies under preparation by Caltrans for the I-80 to I-5 corridor defines SR-4 as a Basic Interregional Road System Route. The proposed project is consistent with the TCCR and RCRs for SR-4 and I-680.

3. Regional Planning

This project is part of CCTA's overall plan for improvements to the I-680 and SR-4 corridors in Contra Costa County. Construction of interchange improvements was specifically identified and named in the "Measure C— 1998 Strategic Plan, and the cities of Concord and Martinez support the project. In 2004, the electorate of Contra Costa County approved Measure J, which sets aside $36 million in funds for interchange improvements on I-680 and SR-242 (Measure J, Contra Costa's Transportation Sales Tax Expenditure Plan, July 21, 2004, page 4).

Phases 1 through 5 of the project are included in the MTC Transportation 2030 Plan Financially Constrained Element. Phases 1 and 2 have been given the project ID of 21205 in the MTC Transportation 2030 Plan. Phases 1 and 2 would be funded with a combination of STIP and Measure J funds. Phases 3 through 5 have been given the project ID of 22350 in the MTC Transportation 2030 Plan. The MTC Transportation 2030 Plan also includes HOV flyover ramps at the I-680/SR-4 Interchange as part of project ID 22350. Phases 3 through 5 and the HOV flyover ramps would be funded with Interregional Transportation Improvement Program (ITIP) funds.

In the 2002 HOV Lane Master Plan, MTC has identified certain infrastructure improvements on SR-4 and has classified them as Priority 1. The improvements would consist of adding a new HOV lane segment from SR-242 to I-680 and a freeway-to-freeway HOV lane connection between SR-4 and I-680.

Caltrans District 4 Directive 97-03, dated November 11, 1997, calls for implementation of the Ramp Meter Development Plan on selected on-ramp and freeway-to-freeway

connectors. I-680 and SR-4 are within ramp metering corridors. Ramp metering is proposed for all new or modified ramps within the project limits. See Section V.A.6 for details on ramp metering. The proposed project is consistent with the RCRs for SR-4 and I-680.

4. Local Planning

The project would be mainly within existing right of way and would not conflict with local planning. Please refer to 2.1.2.2, Consistency with Land Use Plans in the IS-ND (CEQA)/EA (NEPA) for more information.

5. Transit Operator Planning

No transit operators are directly involved in the preparation of this PR. However, the proposed project includes features that will positively impact transit operators, such as ramp metering with HOV bypass lanes. Furthermore, HOV lanes on I-680 have recently been constructed and HOV lanes on SR-4 are under consideration as possible future projects (see Section IV.B.2).

Two transit operators have bus routes that use the I-680/SR-4 interchange. Benicia Transit operates express buses during commute hours. Central Contra Costa Transit Authority (CCCTA) buses travel on parts of SR-4 and along local streets within the project limits. The majority of CCCTA buses operate on local streets, but Bus Route 308 uses the EB SR-4 to Pacheco Boulevard off-ramp. Bus Route 118 stops at Pacheco Boulevard/Muir Road Intersection. Central Contra Costa Transit Authority is planning to construct a new transit/bus hub on Blum Road adjacent to the interchange. The project will accommodate this future facility.

The North Concord/Martinez Bay Area Rapid Transit station is located to the east of the project limits. The improvements proposed in this project would provide commuters from the west with improved freeway conditions to and from the station.

C. Traffic

1. Current and Forecasted Traffic

Fehr and Peers Transportation Consultants conducted the traffic studies for this PR. The studies were detailed in the following technical memoranda and compiled in the Final Traffic Analysis Report dated October 2008.

- I-680/SR-4 Interchange Study—Existing Conditions (November 19, 2002)
- I-680/SR-4 Interchange Study—Year 2030 Volume Forecasts (December 10, 2002)
- I-680/SR-4 Interchange Study—Year 2030 Operations Analysis (December 18, 2003)
- I-680/SR-4 Interchange Study—Year 2030 No Project Conditions (March 6, 2003)

Volume forecasts for the I-680/SR-4 Interchange ramps in the year 2030 were developed for two scenarios: with and without the slip ramps to and from Pacheco Boulevard. CCTA's "Update 2000" Countywide Comprehensive Transportation Plan model was used to develop year 2030 morning and evening peak hour travel demand forecasts. The model was validated and calibrated, and the 2030 model volumes were adjusted as described in the I-680/SR-4 Interchange Study—Travel Demand Model Calibration Technical Memorandum dated November 19, 2002. Table 2 summarizes the existing and year 2030 peak hour volumes for the I-680/SR-4 Interchange ramps.

Table 2. Peak Hour Volumes for I-680 and SR-4 Interchange Ramps

Ramp/Route Location	Peak Hour Volumes (vehicles per hour)							
	Existing Conditions		Year 2030 with Slip Ramps		Year 2030 without Slip Ramps		Year 2030 No Project Conditions[1]	
	AM	PM	AM	PM	AM	PM	AM	PM
NB I-680 to WB SR-4	1183	2182	1830	2720	1520	2330	1360	2010
NB I-680 to EB SR-4	425	751	330	1540	340	1560	320	920
SB I-680 to WB SR-4	262	286	250	300	250	300	280	260
SB I-680 to EB SR-4	1088	1104	1770	1850	1770	1850	1380	1190
EB SR-4 to SB I-680	1490	1753	1650	1760	2010	2140	1650	1520
EB SR-4 to NB I-680	234	213	270	440	270	440	240	230
WB SR-4 to NB I-680	1168	1031	1800	1650	1800	1650	1200	1440
WB SR-4 to SB I-680	1156	578	1900	710	1920	730	1080	520
WB SR-4 to Pacheco Boulevard	633	614	690	280	690	280	710	630
EB SR-4 to Pacheco Boulevard	389	275	530	300	530	300	500	380
Pacheco Boulevard to WB SR-4	230	489	770	570	770	570	930	460
Pacheco Boulevard to EB SR-4	658	683	660	820	660	820	900	520

Source: Fehr and Peers Transportation Consultants

[1] Year 2030 projected peak hour volumes for the NB I-680 to WB SR-4 and EB SR-4 to SB I-680 ramps are projected to be lower than existing conditions, primarily due to upstream and downstream bottlenecks. See the Final Traffic Analysis Report for further details.

The current construction schedule shows completion of the proposed project in 2017. Further information has been developed to reflect estimated traffic conditions 20 years after completion of construction, or 2037. A qualitative analysis was performed and a chapter has been added to the Final Traffic Analysis Report to discuss the extension of the future year traffic forecasts to 2037. The findings of the 2037 analysis are consistent with the findings of the 2030 analysis. The effects of extending the forecasts to 2037 are relatively minor in comparison to the operations analysis results for year 2030, and likely could be addressed through operational changes such as ramp metering, or potential signalization of unsignalized intersections pending the outcome of thorough signal warrant analysis. The overall project presents several benefits in terms of alleviating bottlenecks, serving higher levels of traffic demand, and reducing the number of freeway

segments and ramps operating at level of service lower than LOS D. The reader is directed to Chapter VII of the Final Traffic Analysis Report for further information. Following the typical project development practice, the traffic forecasts and analysis will be reviewed and refined during each of the final design phases, as part of the detailed design process and to address the 20-year design life of the project.

2. Accident Rates

Accident data were compiled from TASAS for the period from April 1, 2005, to March 31, 2008, for SR-4 and I-680. The accident history investigated includes SR-4 from PM 10.5 to PM 15.1 and I-680 from PM 20.2 to PM 22.2. These accident rates are within the project limits and are summarized in Table 3.

Table 3. Accident Rates for SR-4 and I-680 within Project Limits

Route	Number of Accidents	Actual Accident Rate per MVM[1]			Statewide Average Accident Rate per MVM[1]		
		Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
SR-4	392	0.013	0.30	1.02	0.008	0.32	0.94
I-680	309	0.003	0.32	1.05	0.015	0.36	1.02
SR-4 EB Off to Pacheco	5	0.000	0.00	1.24	0.005	0.61	1.5
SR-4 WB On from Pacheco	2	0.000	0.22	0.45	0.002	0.32	0.8
SR-4 EB On from Pacheco	1	0.000	0.00	0.11	0.003	0.32	0.85
SR-4 WB Off to Pacheco	6	0.000	0.36	0.72	0.004	0.50	1.35
SR-4 EB Off to SB 680	15	0.000	0.18	0.67	0.004	0.15	0.45
SR-4 WB Off to SB 680	4	0.000	0.13	0.53	0.004	0.26	0.90
SR-4 EB Off to NB 680	1	0.000	0.33	0.33	0.004	0.26	0.90
SR-4 WB Off to NB 680	10	0.120	0.24	0.60	0.004	0.15	0.45
I680 NB Off to EB 4	10	0.000	0.49	1.22	0.004	0.15	0.45
I680 SB Off to EB 4	11	0.000	0.21	0.76	0.004	0.26	0.90
I680 NB Off to WB 4	2	0.000	0.05	0.10	0.004	0.26	0.90
I680 SB Off to WB 4	3	0.000	0.26	0.78	0.004	0.15	0.45

Source: SR-4 and I-680 TASAS April 1, 2005, to March 31, 2008, [1] MVM = million vehicle miles

According to TASAS data for the period from April 1, 2005, to March 31, 2008, accidents on SR-4 can be characterized as follows:

SR-4 (Overall)

- 250 (64%) accidents were in the EB direction.
- 142 (36%) accidents were in the WB direction.
- Approximately 68% of accidents were during peak hours and were typically congestion related.
- Approximately 27% of accidents occurred during morning commute hours.
- Approximately 41% of accidents occurred during afternoon commute hours.
- Approximately 97% of accidents occurred with no unusual roadway conditions, and 91% occurred on dry pavement.
- Speeding was cited in nearly 53% of the accidents.
- Five fatalities occurred.

According to TASAS data for the period from April 1, 2005, to March 31, 2008, accidents on I-680 can be characterized as follows:

I-680 (Overall)

- 225 (73%) accidents were in the NB direction.
- 83 (27%) accidents were in the SB direction.
- Approximately 66% of the accidents were during peak hours and were typically congestion related.
- Approximately 12% of accidents occurred during morning commute hours.
- Approximately 54% of accidents occurred in the afternoon commute hours.
- Approximately 95% of accidents occurred with no unusual roadway conditions, and 90% occurred on dry pavement.
- Speeding was cited in nearly 65% of the accidents.
- One fatality occurred.

Accident rates within the project limits are generally close to statewide averages. Of particular concern are the fatal accidents on I-680 and SR-4. Historically, there have been a number of fatal accidents within the project limits. The proposed project addresses many of the interchange's deficiencies and improves both safety and operational characteristics. Areas of concern within the existing facility include the following:

EB 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 connector
- Weave section between loop on- and off-connectors to and from I-680

WB SR-4

- Weave section between the loop on- and off-connectors to and from I-680
- Weave section between the I-680 diagonal connector and the Pacheco Boulevard off-ramp

NB I-680

- Weave section between the loop on- and off-ramps to and from SR-4

SB I-680

- Weave section between the loop on- and off-ramps to and from SR-4 slip on-ramp merge
- Exit ramp to Concord Avenue interchange

Loop Ramps

- I-680 northbound to SR-4 westbound

The existing interchange cannot adequately handle current or future projected traffic volumes, resulting in substantial congestion, travel delays, and safety concerns. The primary cause of congestion at the interchange on both I-680 and SR-4 is due to the limited traffic volume that can pass through the interchange. The project proposes to improve many of the deficiencies of the interchange. These improvements include removing weaving sections between the loop connectors, adding auxiliary lanes in all directions of SR-4 and I-680, adding mainline capacity to SR-4, and increasing the freeway connector speed by replacing the NB I-680 to WB SR-4 and SB I-680 to EB SR-4 loop connectors with flyover direct connectors. These interchange improvements will help decrease the potential for rear-end collisions, which are usually associated with traffic congestion. The removal of the short weaving sections between the loop connectors and the addition of standard lane drop tapers will help in reducing the number of sideswipe collisions. Additional measures to increase traffic flow and driver awareness of traffic conditions, such as ramp metering and changeable message signs, will also be implemented as part of the interchange improvements.

V. ALTERNATIVES

A. Preferred Alternative

1. Overview

The Draft Project Report and Draft Environmental Document presented two build alternatives (with slip ramp and without slip ramp) and a No-Build Alternative. The No-Build Alternative provided a basis of comparison but did not meet the established purposes and needs of the project and was therefore rejected. Comments received through the public review and comment period of the Draft Environmental Document were generally supportive of the project and no comments advocated for the No-Build Alternative. The Build Alternative with slip ramp was selected as the Preferred Alternative with minor enhancement to the design and is described in the sections below. Factors used for evaluation included the ability of each alternative to meet the project's purpose and need, geometric considerations, traffic operations, constructability, right-of-way required, and costs and benefits. A number of other alternatives were investigated in both the PSR and conceptual engineering studies and rejected for the various reasons stated in Section V B, Rejected Alternatives of the Project Report.

Following completion of the initial concept design phase, additional design options for the proposed slip ramps and project geometrics were developed and reviewed during preparation of the Project Report. Features that would further enhance capacity and safety were identified and incorporated into the preferred alternative. These features involved widening the northbound I-680 to eastbound SR-4 diagonal ramp to two lanes and making improvements to enhance sight distance, and including the westbound SR-4 to southbound I-680 two-lane loop ramp. Several options for improving local intersections at nearby interchanges were also considered as possible alternatives to installing the proposed slip ramps at Pacheco Boulevard. Although some of these options could provide benefits to local traffic circulation and could be implemented by city or county jurisdictions independent of this project, they were ultimately rejected as inadequate substitutes for the access to and from the freeway system at Pacheco Boulevard that would be provided by the proposed slip ramps.

The EA/IS was circulated for public and agency review between August 4, 2006 and September 5, 2006 and a public hearing was held on August 22, 2006. The proposed project with slip ramps that was included in the Draft Project Report was identified as the Preferred Alternative. There were no changes to this alternative as a result of the review.

A Concept Acceptance Request for providing the proposed modifications of access points at the I-680/SR4 Interchange was found acceptable by FHWA November 4, 2005.

2. Proposed Engineering Features

The proposed project would provide a three-level interchange with elevated and at-grade two-lane direct connector ramps. The project would construct elevated direct connectors for the NB I-680 to WB SR-4 and SB I-680 to EB SR-4 traffic movements. The project

would also construct at-grade direct connectors for the SB I-680 to WB SR-4, NB I-680 to EB SR-4, EB SR-4 to SB I-680, and WB SR-4 to NB I-680 traffic movements. The project would include widening SR-4 from four to six lanes, which would eliminate the current EB lane drop on SR-4, west of the Pacheco Boulevard interchange. Auxiliary lanes are proposed to connect the I-680/SR-4 Interchange ramps to Morello Avenue and Solano Way on SR-4 and Pacheco Boulevard and Concord Avenue on I-680.

The proposed project would maintain all existing access between Pacheco Boulevard and SR-4. The proposed slip ramps would allow vehicular movements from Pacheco Boulevard to SB I-680 and from NB I-680 to Pacheco Boulevard.

The interchange improvements would be implemented over five phases. The engineering features of each phase are as follows:

- Phase 1 would replace the existing NB I-680 to WB SR-4 loop ramp with a two-lane direct-connector flyover and add auxiliary lanes on I-680 and SR-4. A slip ramp would allow for a continued movement from NB I-680 to Pacheco Boulevard. The proposed features would eliminate the weave on NB I-680 and reduce the weave from SB I-680 to WB SR-4 and WB SR-4 to Pacheco Boulevard. The two-lane direct connector would add capacity to the interchange and improve safety.
- Phase 2 would construct a two-lane diagonal ramp from EB SR-4 to SB I-680. A slip ramp would provide new local access to SB I-680 but maintain the Pacheco Boulevard to SB I-680 movement. Phase 2 would eliminate the existing weave between Pacheco Boulevard/Muir Road to EB SR-4 and EB SR-4 to SB I-680. It would also add capacity and maintain the existing access from Pacheco Boulevard to EB SR-4. These engineering features would improve safety and level of service at the interchange.
- Phase 3 would add two lanes, one in each direction, within the median of SR-4 from Morello Avenue to west of Port Chicago Highway. The added capacity to SR-4 would increase the level of service of the interchange and SR-4.
- Phase 4 would construct a two-lane direct-connector flyover ramp from SB I-680 to EB SR-4. This phase would eliminate the weave from SB I-680 to EB SR-4 and from WB SR-4 to SB I-680. The proposed ramp would increase the safety and capacity of the interchange.
- Phase 5 would consist of a series of improvements. The first would replace the existing WB SR-4 to NB I-680 single-lane diagonal ramp with a two-lane diagonal connector. This connector would provide greater capacity, higher design speeds, and improved safety. The second set of improvements would be constructed concurrently or shortly after each other. This would include replacing the existing single-lane NB I-680 to EB SR-4 ramp with a two-lane diagonal ramp and widening the existing WB SR-4 to SB I-680 single-lane loop ramp to two lanes. The widening of the WB to SB loop ramp would require modifications to the SB I-680 to WB SR-4 diagonal ramp. The

proposed WB to SB loop two-lane loop ramp was determined to be more cost effective than a fourth-level flyover direct connector. Both the WB to SB and NB to EB proposed ramps would increase the capacity of the interchange, and the NB I-680 to EB SR-4 ramp would offer higher design speeds and safety improvements over the existing ramp.

The geometry of the proposed ramps is limited by the physical constraints of the I-680/SR-4 Interchange and the nearby properties. The constraints include the proximity of Buchanan Field Airport and its associated flight approaches, bridge span lengths, and column placement. Other constraints or concerns include Grayson Creek and the Contra Costa Canal, as well as the drainage systems that drain I-680, SR-4, adjacent housing, and Buchanan Field Airport.

Due to right of way and other constraints, sections of graded landscaped areas adjacent to paved areas of I-680 and SR-4 may require 1:2 or 1:3 cross-slopes. For areas steeper than 1:4, an approval from the District Landscape Architect will be sought to assure compliance with the regulations affecting storm water pollution contained in the Federal Clean Water Act. The Design Office Chief approval for this nonstandard advisory standard has been obtained. For the embankment with 1:2 or steeper slope, Metal Beam Guardrails (MBGR) would be installed to prevent severe going off the embankment accidents if height of the embankment meet the requirement in Figure 7-1 of traffic manual.

Widening of outside shoulders will provide a full shoulder width of 3.6 meters. Shoulder width for inside widening on SR-4 will be kept at 3.0 meters.

The locations of retaining walls are summarized in Table 4A below. All walls need to be further evaluated during the preparation of Plans, Specifications, and Estimates (PS&E). The need for retaining walls at these areas will be determined during the PS&E phase when more detailed survey data are available.

Table 4A. Retaining Wall Locations

Retaining Wall Number & Project Phase	Description & Location	Height (meters [feet])	Length (meters [feet])
11 Phase 1	WB SR-4 Begin Lt 96+40 “C5M” Line End Lt 103+20 “C5M” Line	Varies 0–2 (0–6.5)	640 (3,000)
12 Phase 2	EB SR-4 Begin Rt 95+40 “C5M” Line End Rt 101+80 “C5M” Line	Varies 0–2 (0–6.5)	680 (2,231)
13 Phase 2	EB SR-4 Begin Rt 104+10 “C5M” Line End Lt 120+60 “ES” Line	Varies 0–5 (0–16.4)	328 (1,076)
14 Phase 2	EB SR-4 to SB I-680 Ramp Begin Lt 118+90 “ES” Line End Lt 119+20 “ES” Line	Varies 0–3 (0–9.8)	35 (115)
15 Phase 2	Pacheco Boulevard to SB I-680 Slip Ramp Begin Lt 110+20 “RPS” Line End Lt 113+00 “RPS” Line	Varies 0–2 (0–6.5)	280 (919)

Table 4A. Retaining Wall Locations

Retaining Wall Number & Project Phase	Description & Location	Height (meters [feet])	Length (meters [feet])
16 Phase 1	NB I-680 to WB SR-4 Ramp Begin Lt 114+00 “NW” Line End Lt 115+20 “NW” Line	Varies 2–5 (6.5–16.4)	150 (492)
17 Phase 1	NB I-680 to WB SR-4 Ramp Begin Rt 114+00 “NW” Line End Rt 115+00 “NW” Line	Varies 2–5 (6.5–16.4)	120 (394)
18 Phase 1	NB I-680 Begin Rt 97+85 “NM” Line End Rt 100+75 “NM” Line	Varies 6 (19.7)	290 (951)
19 Phase 1	NB I-680 Begin Rt 101+20 “NM” Line End Rt 102+90 “NW” Line	Varies 6 (19.7)	817 (2,680)
20 Phase 5	WB SR-4 to NB I-680 Ramp Begin Lt 115+60 “WN” Line End Lt 117+65 “WN” Line	Varies 1–2 (3.3–6.5)	205 (673)
21 Phase 4	SB I-680 to EB SR-4 Ramp Begin Lt 117+20 “SE” Line End Lt 118+70 “SE” Line	Varies 3–6.5 (9.8–21.3)	150 (492)
22 Phase 4	SB I-680 to EB SR-4 Ramp Begin Rt 117+20 “SE” Line End Rt 118+70 “SE” Line	Varies 3–6.5 (9.8–21.3)	150 (492)
23 Phase 4	SB I-680 to EB SR-4 Ramp Begin Rt 107+55 “SE” Line End Rt 109+70 “SE” Line	Varies 0–4 (0–13)	215 (705)
24 Phase 4	SB I-680 to EB SR-4 Ramp Begin Lt 107+70 “SE” Line End Lt 109+70 “SE” Line	Varies 0–4 (0–13)	200 (656)
25 Phase 2	SB SR-4 Begin Rt 103+60 “NM” Line End Rt 108+35 “NM” Line	Varies 0–5 (0–16.4)	175 (574)
26 Phase 4	EB SR-4 Begin Rt 123+40 “C5M” Line End Rt 124+95 “C5M” Line	Varies 0–2 (0–6.5)	155 (509)
27 Phase 2	SB I-680 Begin 104+00 “ES” Line End 107+20 “ES” Line	Varies 5–10 (16.4–32.8)	320 (1,500)

The project proposes both thrie beam and concrete median barriers on SR-4. Table 4B summarizes the proposed median barrier locations on SR-4.

Table 4B. Median Barrier Locations and Types

Location	Barrier Type
Morello Avenue to Pacheco Boulevard	Thrie
Pacheco Boulevard to I-680 and Grayson Creek	Concrete
East of I-680 and Grayson Creek to Solano Way	Thrie
Solano Way to Peralta Road	Thrie
Peralta Road to SR-242	Thrie
SR-242 to Project Limits	Thrie

Additional engineering features include auxiliary lanes on I-680 and SR-4 in all directions, 40-year pavement (see Section V.A.15), ramp metering (see Section V.A.6), CHP enforcement areas (see Section V.A.8) and identification of probable utility relocations (see Section VI.D.1.a). For details regarding increased highway capacity, LOS, and other traffic data, see the Final Traffic Analysis Report (Appendix B).

3. Nonstandard Mandatory and Advisory Design Features

Mandatory and advisory design exceptions were reviewed during the preparation of the PSR and approved on November 15, 2001. The Supplemental Fact Sheet Exceptions to Mandatory Design Standards was approved on July 28, 2005. Both the Fact Sheet Exceptions and the Supplemental Fact Sheet Exceptions to Mandatory Design Standards were approved by FHWA on April 3, 2006. The Supplemental Fact Sheet Exceptions to Advisory Design Standards were approved on July 16, 2007. The proposed mandatory design exceptions and advisory design exceptions are summarized in Tables 5A and 5B, respectively. Those design exceptions include superelevation rate and transition, and minimum distance between local intersections.

Table 5A. Mandatory Design Exceptions

Design Exception and Highway Design Manual Index	Location	Feature Description
Stopping Sight Distance (SSD) *Index 201.1*	(1) NB I-680 to WB SR-4 freeway-to-freeway connectors (2) SB I-680 to EB SR-4 freeway-to-freeway connectors (3) NB I-680 between NM Line Stations 108+97 and 114+68	The SSDs do not meet standards in three locations. Two of the locations are on the proposed NB I-680 to WB SR-4 and SB I-680 to EB SR-4 freeway-to-freeway connectors. The required SSD is 130 meters, but 112 and 108 meters are proposed for the northwest and southeast ramps, respectively. The third nonstandard location is on NB I-680 between NM Line Stations 108+97 and 114+68. The required SSD is 220 meters, and the proposed is 186 meters.
Nonstandard Superelevation *Index 202.2*	Ramp to Pacheco Boulevard from the NB I-680 to WB SR-4 freeway-to-freeway connector	The proposed superelevation on the existing slip ramp to Pacheco Boulevard from the NB I-680 to WB SR-4 freeway-to-freeway connector is 9 percent, while the standard is 11 percent.

Table 5A. Mandatory Design Exceptions

Design Exception and Highway Design Manual Index	Location	Feature Description
Shoulder Width *Index 302.1*	(1) SR-4: "C5M" 115+54 to 115+58 (2) SR-4: "C5M" 116+74 to 116+78 (3) I-680: "NM" 97+85 to 112+82 (NB direction) (4) I-680: "NM" 114+67 to 130+64 (NB direction) (5) I-680: "NM" 97+85 to 109+00 (SB direction) (6) I-680: "NM" 114+67 to 130 + 64 (SB direction) (7) I-680: "NM" 113+24 to 113+28 (SB) (8) I-680: "NM" 114+55 to 114+59 (SB) (9) I-680: "NM" 115+05 to 115+07 (SB) (10) EB SR-4 to NB I-680: "R3" 113+76 to 114+11 (11) EB SR-4 to NB I-680: "R3" 114+21 to 114+23 (12) WB SR-4 to SB I-680: "R8" 116+04 to 116+09	In 12 locations, the standard shoulder width is not met. The proposed shoulders vary from 0.6 to 3.0 meters, while the standard is 1.5 or 3.0 meters. Locations and proposed shoulder widths are summarized in the Fact Sheet Exceptions to Mandatory Design Standards.
Horizontal Clearance *Index 309.1 (3)(a)*	Same locations as Shoulder Width Design Exception	Horizontal clearance to fixed objects including concrete median barriers and bridge rails do not meet standards in 12 locations. The required clearance is a minimum of 1.2 meters. The proposed clearance varies as shown on the Fact Sheet Exceptions to Mandatory Design Standards.
Spacing of Traffic Interchanges *Index 501.3*	(1) I-680/SR-4 separation to I-680/Concord Avenue (2) I-680/SR-4 separation to I-680/Pacheco Boulevard (3) I-680/SR-4 separation to SR-4/Morello Avenue (4) I-680/SR-4 separation to SR-4/Pacheco Boulevard (5) I-680/SR-4 separation to SR-4/Solano Way	The standard spacing for local street interchanges and freeway-to-freeway interchanges is 3 km. Five local traffic interchanges (as listed in the Location column) do not meet this standard. The distances are as follows: (1) I-680/SR-4 separation to I-680/Concord Avenue, 2.1 km; (2) I-680/SR-4 separation to I-680/Pacheco Boulevard, 2.4 km; (3) I-680/SR-4 separation to SR-4/Morello Avenue, 2.8 km; (4) I-680/SR-4 separation to SR-4/Pacheco Boulevard, 0.4 km; (5) I-680/SR-4 separation to SR-4/Solano Way, 1.6 km.
Minimum Distance Between a Freeway Ramp and a Local Intersection *Index 504.3 (3)*	Exit ramp from the NB to WB connector ramp to Pacheco Boulevard	The proposed exit ramp from the NB to WB connector ramp to Pacheco Boulevard is 95 meters from the proposed Blum Road/Pacheco Boulevard intersection. The standard distance is 125 meters.
Lane Width *Index 301.1*	NB and SB I-680	The standard lane width is 3.6 meters. The proposed width for NB and SB I-680 on the three innermost lanes is 3.4 meters. No modifications to the lane widths are proposed.

Table 5A. Mandatory Design Exceptions

Design Exception and Highway Design Manual Index	Location	Feature Description
Median Width *Index 305.1 (3)(a)*	Locations with nonstandard inside shoulders on mainline I-680: (1) I-680: "NM" 97+85 to 112+82 (NB direction) (2) I-680: "NM" 114+67 to 130+64 (NB direction) (3) I-680: "NM" 97+85 to 109+00 (SB direction) (4) I-680: "NM" 114+67 to 130+64 (SB direction)	The minimum standard for median width is 6.6 meters where restrictive conditions prevail. The proposed median width varies from 1.8 to 6.6 meters. The locations of nonstandard features are shown on the Fact Sheet Exceptions to Mandatory Design Standards.
Vertical Clearance *Index 309.2 (1)(a)*	I-680/SR-4 separation under the EB (Bridge No. 0179R) and WB (Bridge No. 0179L) bridges.	The standard vertical clearance for new construction of freeways is 5.1 meters for the edge of shoulders and traveled ways. The proposed clearances at the I-680/SR-4 separation, which are also the existing clearances, are 4.81 and 4.92 meters under the EB and WB bridges, respectively.
Deceleration Lane Length *Index 504.2(2)*	WB SR-4 to Solano Way off-ramp	The standard deceleration length of 150 meters is required for curve radius of 99 meters. The proposed deceleration length is 133 meters.
Stopping Sight Distance on Metered Freeway-to-Freeway Connectors *Index 504.3(2)c*	NB I-680 to WB SR-4	Installation of ramp meters on connector ramps shall be limited to those facilities that meet or exceed the following geometric design criteria: Standard lane and shoulder widths, tail light SSD for a design speed of 80 km/h. SSD of 130 meters is required for 80 km/h design speed. The proposed connector provides a SSD of 110 meters with ramp metering.

Table 5B. Advisory Design Exceptions

Design Exception and HDM Index	Location	Feature Description
Superelevation Transition-General *Index 202.5 (1)*	SB I-680 to EB SR-4 ramp	The proposed superelevation transition for the SB I-680 to EB SR-4 ramp is 67.9 meters, and the standard is 88 meters.
Superelevation Transition-Runoff *Index 202.5 (2)*	EB SR-4 to SB I-680	The proposed superelevation runoff for the EB SR-4 to SB I-680 is to match the existing superelevation runoff of the Grayson Creek Bridge. To match the existing condition, a design exception is needed.
Median Width *Index 305.1 (1)(a)*	SR-4 from 0.8 km west to 0.6 km east of the I-680/SR-4 separation	The proposed median width for SR-4 from 0.8 km west and 0.6 km east of the I-680/SR-4 separation is 6.8 meters. The advisory standard is 10.8 meters.
Outer Separation *Index 310.2*	NB I-680 alignment to Berry Drive	The outer separation from the proposed NB I-680 alignment to Berry Drive is between 4 and 8 meters. The required outer separation is 8 meters.
Distance Between Successive Exits *Index 504.3 (9)*	NB I-680 to WB SR-4 and NB I-680 to EB SR-4	The standard requires 300 meters, and the distance between NB I-680 to WB SR-4 and NB I-680 to EB SR-4 is 270 meters.
Horizontal Clearance *Index 309.1 (3)*	EB SR-4 to NB I-680 loop ramp	The EB SR-4 to NB I-680 loop ramp (based on the HOV Lane Project plans has a horizontal clearance of 0.6 to 1.5 meters between the edge of shoulder and column barrier). The standard horizontal clearance is 4.5 meters.
Design Speed *Index 504.4 (2)*	EB SR-4 to NB I-680 loop ramp WB SR-4 to SB I-680 loop ramp	The existing design speed (as part of the HOV Lane Project) is 30 kilometers per hour (km/h) and 32 km/h for the EB SR-4 to NB I-680 and WB SR-4 to SB I-680 loop ramps. The standard design speed is 80 km/h. The existing condition is not proposed to be modified.
Reversing Curves *Index 203.6*	NB I-680 to EB SR-4 ramp	Index 203.6: When horizontal curves reverse direction, the connection tangents should be long enough to accommodate the standard superelevation runoffs given in figure 202.5. Proposed: Does not meet standard. At the NB I-680 to EB SR-4 (NE) ramp diverges from I-680 to the northeast (curve right), while NB I-680 is curving to the northwest (curve left). This condition, combined with the ramp's design speed (80 km/h) and curve radius of 260 meters, requires a reverse curve to transition from the northwest direction to the northeast direction. There is no area for a tangent section that would allow for a standard superelevation transition.
Reversing Curves *Index 203.6*	SB I-680 to EB SR-4 ramp	Index 203.6: When horizontal curves reverse direction, the connection tangents should be long enough to accommodate the standard superelevation runoffs given in figure 202.5. Proposed: Does not meet standard. The use of a reverse curve is proposed for the SE ramp as it enters EB SR-4. A tangent section between the reverse curves is not feasible because the use of a tangent section would cause the SE ramp to enter SR-4 further to the east. This would shorten the distance between the SE ramp and EB SR-4 to the Solano Way exit, reducing the weaving length.

Table 5B. Advisory Design Exceptions (continued)

Design Exception and HDM Index	Location	Feature Description
Superelevation Transition—Runoff *Index 202.5 (2)*	NB I-680 to EB SR-4	Index 202.5(2) Required: Two-thirds of the superelevation runoff should be on the tangent and one-third within the curve. Proposed: Does not meet standard. At the NB I-680 to EB SR-4 (NE) ramp diverges from I-680 to the northeast (curve right), while NB I-680 is curving to the northwest (curve left). This condition, combined with the ramp's design speed (80 km/h) and curve radius of 260 meters, requires a reverse curve to transition from the northwest direction to the northeast direction. There is no area for a tangent section that would allow for a standard superelevation transition.
Superelevation Transition—Runoff *Index 202.5 (2)*	SB I-680 to EB SR-4	Index 202.5(2) Required: Two-thirds of the superelevation runoff should be on the tangent and one-third within the curve. Proposed: Does not meet standard. The SB I-680 to EB SR-4 (SE) ramp requires a reverse curve, due to the curvature of SR-4 as the SE ramp enters SR-4. The SE ramp has a left curve while SR-4 is curving to the right as the SE ramp enters SR-4. This change in direction is constrained due to the separation needed between SR-4 and the SE ramp. To minimize the effects of superelevation transition, curves with radii of 1000 meters have been used. This allows a transition from –4 percent to 4 percent.
Superelevation Transition—Runoff *Index 202.5 (2)*	SB I-680 to WB SR-4	Index 202.5(2) Required: Two-thirds of the superelevation runoff should be on the tangent and one-third within the curve. Proposed: Does not meet standard. The SB I-680 to WB SR-4 (SW) ramp is proposed to be modified to allow for widening of the WS loop ramp. A short tangent section is proposed between the existing compound curves to allow for the widening of the loop ramp. The proposed tangent does not allow for the standard superelevation transition. Nonstandard superelevation transition is proposed for the SW ramp due to restrictive geometric conditions. The SW ramp is constrained by the WB SR-4/Pacheco Boulevard structure and the Pacheco Boulevard exit. To meet standard superelevation transition, the SW ramp would need to be reconstructed.
Side Slope *Index 304.1*	SR4 west of Pacheco Boulevard	Index 304.1: Embankment (fill) slopes should be 1:4 or flatter. At the SR-4/Pacheco Boulevard interchange, the existing embankment has 1:2 slope. It is proposed to meet this with a 1:2 slope. There is existing vegetation on the slope, which reduces erosion. Providing a 1:4 slope would require the relocation of the local intersections that serve the SR-4/Pacheco Boulevard on and off ramps at Muir Road and Pacheco Boulevard. Alternatively, a retaining wall can be constructed to eliminate the 1:2 slope.

Table 5B. Advisory Design Exceptions (continued)

Design Exception and HDM Index	Location	Feature Description
Side Slope *Index 304.1*	SR4 at Solano Way	Index 304.1: Embankment (fill) slopes should be 1:4 or flatter. At the SR-4/Solano Way interchange, the existing embankment has 1:2 slope. It is proposed to meet this with a 1:2 slope. There is existing vegetation on the slope, which reduces erosion. Providing a 1:4 slope would require the relocation of the local intersections that serve the SR-4/Solano on and off ramps at Arnold Industrial Place and Arnold Drive. Alternatively, a retaining wall can be constructed to eliminate the 1:2 slope.
Side Slope *Index 304.1*	WB SR4 as Connector for NB I-680 enters SR4	Index 304.1: Embankment (fill) slopes should be 1:4 or flatter. The area along the NB I-680 to WB SR-4 connector near the ramp meter and queuing area is proposed with a 1:2 slope. Additional right of way would be needed to meet standard. Alternatively, a retaining wall can be constructed to eliminate the 1:2 slope.
Side Slope Index 304.1	Slip Ramp to Pacheco Boulevard	Index .304.1. Embankment (fill) slopes would be 1:4 or flatter. The area along the slip ramp to Pacheco Boulevard, the proposed slope is 1:3. A 1:4 slope would impact the Pacheco Transit Hub proposed adjacent to the ramp. Alternatively, a retaining wall can be constructed to eliminate the 1:3 slope.
Design Speed *Index 504.4 (2)*	SB I-680 to WB SR-4 diagonal ramp	Index 504.4(2) Required: 80 km/h. Proposed: 55 km/h. The existing ramp consists of two compound curve radii of 125 meters and 225 meters. The project would keep this geometry and add a small tangent between the two curves to allow for the two-lane WB SR-4 to SB I-680 loop ramp proposed in Phase 5. To meet the standard, the ramp would need to be reconstructed and direct access to Pacheco Boulevard would be eliminated.
Freeway-to-Freeway Connections—Branch Connector Auxiliary Lane *Index 504.4 (6)*	NB I-680 to EB SR-4 ramp	Index 504.4(6) Required: 800 meters. Proposed: 200 meters. The shortened auxiliary lane is due to the SB to EB (SE) ramp that enters downstream of the propose NE ramp, and adds two auxiliary lanes. An extended auxiliary lane would be needed because the SE ramp would add two auxiliary lanes.
Freeway-to-Freeway Connections—Branch Connector Auxiliary Lane *Index 504.4 (6)*	WB SR-4 to SB I-680 ramp on SB I-680	Index 504.4(6) Required: 800 meters. Proposed: no auxiliary lane as the ramp enters I-680. As the ramp enters SB I-680 no auxiliary lane is proposed. The WS ramp enters SB I-680 on the existing auxiliary lane. Limitations due to the separation caused by the I-680/SR-4 bridge columns and freeboard clearance at I-680/Grayson Creek contribute to the lack of an auxiliary lane. To meet the standard would require replacing the loop ramp with a flyover direct connector.
Freeway-to-Freeway Connections—Branch Connector Auxiliary Lane *Index 504.4 (6)*	SB I-680 to WB SR-4	Index 504.4(6) Required: 800 meters. Proposed: 165 meters. As the ramp enters WB SR-4, the existing auxiliary lane length is approximately 165 m. Limitations are due to close proximity of the existing WB Pacheco Boulevard off-ramp.

Table 5B. Advisory Design Exceptions (continued)

Design Exception and HDM Index	Location	Feature Description
Outer Separation *Index 310.2*	SB I-680 to EB SR-4 at Marsh Drive	Index 310.2 Required: 8 meters. Proposed: 7 to 8 meters. The outer separation between the existing Marsh Drive and the proposed SB I-680 to EB SR-4 connector ramp varies from 7 to 8 meters. Realignment of Marsh Drive would require utility relocation and acquiring right of way from Buchanan Field Airport.

4. Interim Features

The interchange improvements would be implemented in five phases as funding becomes available. No interim features are proposed.

5. High-Occupancy Vehicle (Bus and Carpool) Lanes

The existing HOV lanes require two or more passengers during weekday peak hours (typically 5 AM to 10 AM and 3 PM to 7 PM in the San Francisco Bay Area). The HOV lanes serve as mixed-flow lanes during weekends and off-peak hours.

The proposed interchange improvements would not affect the HOV lanes nor add new HOV lanes. However, HOV bypass lanes have been considered for all new or reconstructed on-ramps within the project limits wherever feasible.

No HOV lanes currently exist on SR-4 within the project limits. The MTC 2002 High Occupancy Vehicle (HOV) Lane Master Plan Update – Final Summary Report considers the addition of HOV lanes on SR-4 and an HOV-to-HOV flyover connector at the I-680/SR-4 interchange as a Vision Element project. Section IV.B.2 also discusses possible future improvements for HOV lanes on SR-4.

Preliminary studies were conducted during the PSR and Project Report phases to evaluate an HOV-to-HOV flyover connector connecting NB I-680 to EB SR-4 and WB SR-4 to SB I-680. The studies of an HOV-to-HOV flyover have concluded the following:

- An HOV-to-HOV direct connector should remain a separate project.
- The current project does not preclude a future HOV-to-HOV direct connector.
- Sufficient right of way exists in the median along SR-4 to accommodate an HOV-to-HOV direct connector.
- Direct connector HOV lanes in the median will require additional right of way and realignment of the NB I-680 to EB SR-4 direct connector south of the interchange. Design provisions will be included in this project to accommodate construction with minimal disruption to traffic operations.

6. Ramp Metering

Caltrans District 4 Directive 97-03, dated November 11, 1997, calls for implementation of the Ramp Meter Development Plan on selected on-ramps and freeway-to-freeway

connectors. Caltrans District 4 has determined that all freeway-to-freeway connectors and local service on-ramps within the project limits are included in the plan, which would therefore require installation of ramp metering hardware and provision of HOV preferential lanes. Design exceptions for not providing HOV preferential lanes are identified in Table 6 and were approved on July 25, 2006.

Table 6. Ramp Meter Policy Exceptions

Design Exception and HDM Index	Location	Feature Description
No HOV Preferential Lane	Pacheco Boulevard to WB SR-4	Index: RMDM Chapter 1 (H). Required: HOV preferential lane shall be required on all ramp meter locations. Proposed: No HOV preferential lane. The project does not propose improvements to this ramp other than adding ramp metering hardware. The existing ramp's peak hour volumes are 770 vehicles per hour for the AM and PM hours, respectively. Adding an HOV bypass lane would require rebuilding the ramp. Furthermore, due to the close proximity of the proposed NB I-680 to WB SR-4 ramp, not enough distance between the ramps for standard on-ramp spacing and lane drops.
No HOV Preferential Lane	Pacheco Boulevard to EB SR-4	Index: RMDM Chapter 1 (H). Required: HOV preferential lane shall be required on all ramp meter locations. Proposed: No HOV preferential lane. The project does not propose improvements to this ramp other than adding ramp metering hardware. The existing ramp's peak hour volumes are 660 and 820 for the AM and PM hours, respectively. Adding an HOV bypass lane would require rebuilding the ramp. Furthermore, due to the close proximity of the existing EB SR-4 to NB I-680 loop ramp, limited distance between the ramps for standard lane drops and weaving.
No HOV Preferential Lane	NB I-680 to EB SR-4	Index: RMDM Chapter 1(H). Required: HOV preferential lane shall be required on all ramp meter locations. Proposed: No HOV preferential lane. An HOV preferential lane would require additional right of way and revised alignment of the proposed NB to WB and SB to EB flyover connectors.
No HOV Preferential Lane	WB SR-4 to SB I-680	Index: RMDM Chapter 1(H). Required: HOV preferential lane shall be required on all ramp meter locations. Proposed: No HOV preferential lane. HOV bypass is not feasible because of the width the SR-4/I-680 bridge (two lanes). The right of way is constrained and cannot provide a third lane and the necessary lane drops. The proposed two lanes are needed to handle the projected traffic volumes. In order to meet the standard and provide HOV bypass, a direct-connector flyover would need to be constructed.
No HOV Preferential Lane	SB I-680 to WB SR-4	Index: RMDM Chapter 1(H). Required: HOV preferential lane shall be required on all ramp meter locations. Proposed: No HOV preferential lane. An HOV preferential lane would require relocation of the WB SR-4/Pacheco Boulevard on- and off-ramps, as well as widening of the WB SR-4/Pacheco Boulevard structure.

The proposed project would include both ramp improvements and ramp metering. The recently constructed I-680 HOV Lane Project installed underground ramp metering hardware in the following ramps:

- NB I-680 to EB SR-4
- SB I-680 to WB SR-4
- EB SR-4 to NB I-680
- WB SR-4 to SB I-680

Of these ramps, the NB I-680 to EB SR-4 ramp would be reconstructed in Phase 5, and the underground hardware would not likely be salvageable. Also during Phase 5, even though the WB SR-4 to SB I-680 ramp would be widened, requiring additional hardware, it is anticipated that the existing hardware can be used with minor modifications. The SB I-680 to EB SR-4 ramp would be slightly realigned due to the widening of the WB SR-4 to SB I-680 ramp. Because the ramp alignment would not significantly change, the ramp metering hardware installed would probably be salvageable.

Table 7 summarizes the proposed ramp metering features of this project. The Layout Sheets in Appendix C identify certain ramp metering features, such as the ramp meter limit lines, queuing lanes, and CHP enforcement areas.

All equipment necessary for ramp metering operation will be installed. This includes mainline detectors, ramp demand and passage detectors, ramp queue detectors, conduits and wiring, Type 170 controller/334 cabinet, advanced warning signs, signal standards and heads, telephone and electrical service, and CCTV for ramps. The cost of the ramp metering hardware has been included in the cost estimate (see Appendix E).

Table 7. I-680/SR-4 Interchange Project Ramp Metering

Ramp Location	Existing Peak Hour Volume		Year 2030 Peak Hour Volume[1]		Lane Configuration		Additional Widening	Proposed Design Exceptions (M = Mandatory, A = Advisory, P = Policy)
	AM	PM	AM	PM	Existing Condition	Proposed Ramp Metering		
EB SR-4								
Morello Avenue to EB SR-4	1060	817	1150	960	Single lane, no ramp meter	None	None	None
Muir Road to EB SR-4	658	683	660	820	Single lane, no ramp meter	Single lane, ramp meter	None	P - HOV Bypass
SB I-680 to EB SR-4	1088	1104	1770	1850	Single lane loop ramp, underground ramp meter hardware	2 lane ramp, 3 lane meter	Additional lane for queuing proposed	M - SSD (SSD)
NB I-680 to EB SR-4	425	751	330	1540	Single lane, underground ramp metering hardware	2 lane ramp meter	TBD	P - HOV Bypass
Solano Way to EB SR-4	230	574	290	680	Single lane, ramp meter	2 lane ramp meter	Additional widening of SR-4/Peralta Road structure is needed	None
WB SR-4								
SR-242 to WB SR-4	760	865	980	1070	Single lane, no ramp meter	None	None	None
Solano Way to WB SR-4	415	689	810	790	No existing ramp metering	Single lane, ramp meter	Additional widening of SR-4/Solano Way structure is needed	None
SB I-680 to WB SR-4	262	286	250	300	Underground ramp metering hardware	Single lane, ramp meter	None	M, P - SSD for 80 km/h and HOV Bypass
NB I-680 to WB SR-4	1183	2182	1230	1910	Loop ramp, underground ramp metering hardware	2 lane ramp, 3 lane ramp meter	Construction of flyover and additional queuing lane proposed	M - SSD for 80 km/h
Pacheco Boulevard to WB SR-4	230	489	770	570	Single lane, no ramp meter	Single lane, ramp meter	None	P - HOV Bypass
NB I-680								
EB SR-4 to NB I-680	234	213	270	440	Single lane loop ramp with underground ramp metering hardware	Single lane, ramp meter	None	
WB SR-4 to NB I-680	1168	1031	1800	1650	Single lane, underground ramp metering hardware	2 lane ramp, 3 ramp meter	Additional queuing lane proposed	
SB I-680								
WB SR-4 to SB I-680	1156	578	1900	710	Single lane loop ramp, underground ramp metering hardware	2 lane loop ramp with 2 lane ramp meter	Add second lane to loop ramp	P - HOV Bypass
EB SR-4 to SB I-680 w/ Pacheco slip ramp	1490	1753	2270	2410	Single lane, underground ramp metering hardware	2 lane ramp with single lane slip ramp; 3 lane ramp meter	Reconstruction of ramp	None

Source: Traffic data from Fehr & Peers Transportation Consultants, 2002–2003.
Notes:
1. Year 2030 Peak Hour Volume assumes slip ramps are included.

7. Traffic Operation System

Existing Traffic Operations System (TOS) field elements within the project limits such as closed circuit television cameras (CCTVs) and loop detectors shall be preserved or kept operational during project construction. Additional TOS elements have been included in the project and at a minimum, thirty traffic monitoring stations (maximum at 0.8 km spacing), eight CCTVs, two Changeable Message Signs (CMS), one Highway Advisory Radio (HAR), and six Extinguishable Message Signs (EMS). All CCTVs, CMS, EMS and HAR will be installed in their final locations at the earliest phase of the project and can be used immediately.

8. CHP Enforcement Areas

The proposed project includes many features to assist CHP in law enforcement activities. CHP enforcement areas have been incorporated into the new metered ramps to help the CHP enforce the metering lights and the use of HOV preferential lanes. The design of the CHP enforcement areas complies with the ramp meter design standards.

9. Park and Ride Facilities

There is an existing Park and Ride lot located on State right of way off Blum Road where Blum Road and Pacheco Boulevard intersect. The lot has fifty-two parking spaces. The proposed NB I-680 to WB SR-4 direct connector with the slip ramp to Pacheco Boulevard would cause the lot to lose approximately twenty-two parking spaces. However, this Park and Ride Facility is planned to be replaced by Pacheco Transit Hub which is currently in design and expected to be constructed prior to implementation of this project.

10. Utility and Other Owner Involvement

The utility investigation of the project area included site visits and review of utility locations shown in electronic or hard-copy plans obtained from Caltrans, CCTA, Central Contra Costa Sanitary District (CCCSD), Kinder-Morgan, Phillips 66 Company, and Pacific Gas and Electric (PG&E). Utility and right of way information for the I-680 corridor was obtained from bid documents prepared by Caltrans for the I-680 HOV Lane Project. Where it is feasible, visible features of existing utilities were identified during field reconnaissance studies.

The utility investigation for this PR identified the known utilities that will remain or are proposed to be relocated. These utilities include sanitary sewer, water, natural gas, electrical, gasoline, and other miscellaneous utility structures such as gasoline tanks or water tanks.

The project requires relocation of several high risk and low risk utilities. The preliminary list of utilities to be relocated is included in the Right of Way Data Sheets in Appendix G.

Based on preliminary evaluation of these relocations, eight utilities that would still remain within State right of way and would require longitudinal encroachment exceptions. Based on numerous discussions, including the utility agencies, it was clear

that the detailed evaluation of relocation alternatives and preparation of longitudinal encroachment exceptions cannot be adequately addressed until the final design and until utility owners such as PG&E are willing to discuss relocation requirements. Also, due to right of way and geometric constraints, several of these longitudinal encroachments cannot be eliminated.

It is anticipated that longitudinal encroachment exceptions for these utilities will be approved as these proposed encroachments do not impact highway operations and maintain existing access for maintenance. To account for the cost of relocation of these utilities and the risk of not getting longitudinal encroachments approved, the expected cost of relocation of each utility was estimated based on an estimated probability of not getting the encroachment exceptions approved. The approach and detailed description of each utility are summarized in Table A in Appendix G. For further details about utility relocation in each phase and estimated relocation costs, see Appendix G. Table 8 summarizes the existing utilities affected by the proposed interchange improvements.

Table 8. Existing Utilities Affected by the Project

Phase	Utility	Owner	Description of Conflict	Proposed Changes	Relocation Cost	Probability (Cost)[1]
1	2140-mm Sanitary Sewer Line[2]	CCCSD	Sewer line runs underneath planned NW connector from NW Stations 100+20 to 103+30	Relocate 365 meters of sewer line and construct four manholes. Length of encroachment = 300 meters, from NW Stations 101+50 to 104+50	$1,000,000	10% ($300,000)
1	100-mm PLC Gas Line[2]	PG&E	Gas line runs underneath planned NW connector from NW Stations 101+50 to 102+92	Relocate 270 meters of gas line closer to mobile home community and parallel to 2140-mm sanitary sewer line. Length of encroachment = 130 meters, from NW Stations 101+50 to 102+80.	$70,000	10% ($43,000)
1	Underground 21 kV Electrical Line[2]	PG&E	Electrical line runs underneath planned NW connector from NW Stations 101+60 to 102+95	Relocate 270 meters of electrical line closer to mobile home community and parallel to 2140-mm sanitary sewer line. Length of encroachment = 130 meters, from NW Stations 101+50 to 102+80.	$60,000	10% ($44,000)
1	305-mm Sanitary Sewer	CCCSD	Sewer line is connected to the 2140-mm sewer main which is proposed to be relocated to the east	Extend 20 meters of sewer line and install a 457-mm PVC sleeve for 20 meters at NW Station 101+65.	$15,000	N/A

Table 8. Existing Utilities Affected by the Project (continued)

Phase	Utility	Owner	Description of Conflict	Proposed Changes	Relocation Cost	Probability (Cost)[1]
1	400-mm VC Sanitary Sewer	CCCSD	Sewer line is connected to the 2140-mm sewer main which is proposed to be relocated to the east	Reconnect 20 meters of sewer line with the planned relocated 2140-mm sewer main at NW Station 102+50.	$15,000	N/A
2	305-mm Sanitary Sewer[2]	CCCSD	Sewer line follows the Grayson Creek abutment walls at 45% to the mainline alignment.	Length of encroachment = 120 meters, from NM Stations 109+35 to 110+40.	$0	10% ($75,000)
2	Electrical Overhead 21kV Line[2]	PG&E	Utility pole conflicts with proposed ramp alignment at NM Station 107+45. Existing overhead line crosses I-680 at approximately 45 degrees.	Relocate pole and extend overhead wires outside of proposed roadway but within existing State right of way.	$175,000	25% ($81,000)
2	760-mm Water Line[2]	CCWD	Planned ES connector runs over existing waterline at ES Station 111+80. Transverse crossing ES connector exceeding allowable angle.	Extend current 1067-mm wall casing east for 65 meters along water line. Length of encroachment = 65 meters, between ES Stations 111+65 and 112+10	$90,000	25% ($68,000)
2	203-mm Sewer Line[2]	CCCSD	Sewer line conflicts with proposed roadway improvements.	Relocate 160 meters of sewer line parallel to proposed roadway within existing State right of way. Length of encroachment = 135 meters, between ES Stations 106+80 and 108+15. Proposed manholes will be located outside of State right of way.	$50,000	10% ($195,000)
3	152-mm Water Line	CCWD	Existing utility conflicts with column footing (Bent 2) at C5M line Station 112+15 (I-680 Bridge widening at Pacheco)	Relocate 20 meters of existing waterline to bypass column footing	$6,000	N/A

Table 8. Existing Utilities Affected by the Project (continued)

Phase	Utility	Owner	Description of Conflict	Proposed Changes	Relocation Cost	Probability (Cost)[1]
3	203-mm Water Line	CCWD	Existing utility conflicts with planned bridge column footing (Bent 2) at C5M line Station 112+16	Relocate 20 meters of existing waterline to bypass column footing	$6,400	N/A
4	458-mm Water Line	CCWD	Existing utility conflicts with planned bridge column footing (Bent 3) at SE Station 110+65	Relocate 20 meters of existing waterline to bypass column footing	$11,000	N/A
4	2286-mm Sewer Main	CCWD	Existing sewer main crosses at SE Station 110+77 (Bent 3)	Relocate 60 meters of sewer main and construct new catch basin to bypass column footing	$405,000	N/A
4	Miscellaneous utility/ structures	CHP	Existing utility conflicts with SE connector at SE Station 117+40	Relocate utility structures to CHP right of way	$65,000	N/A
5	991-mm Sanitary Sewer	CCWD	Sanitary sewer line conflicts with bents of widening the Grayson Creek Bridge	Relocate sanitary sewer line by 50 meters to avoid bents	$37,000	N/A
5	76-mm STL Gas Line[2]	PG&E	Existing gas line runs underneath planned WN connector from WN Stations 115+70 through 116+70	Relocate 160 meters of gas line about 6 meters east of planned connector from NM Stations 116+40 to 118+00. Length of encroachment = 160 meters.	$45,000	10% ($26,000)

[1] Probability of not obtaining longitudinal encroachment exception (expected additional cost).
[2] Longitudinal encroachment exceptions are required for these utilities.

It is recommended that further utility investigations be performed to verify all utility data during the final design phase.

11. Railroad Involvement

The BNSF railroad bridge over I-680 is expected to be reconstructed prior to Phase 4 of the I-680/SR-4 Interchange improvements as a separate project and is not within the scope of this project. In order to begin Phase 4 improvements, the BNSF Railroad Bridge must be reconstructed to accommodate the I-680 widening. The railroad bridge is located north of the interchange, approximately at NM Line Station 130+10. Construction and Maintenance agreement with BNSF will be needed before Phase 4 construction.

12. Flight Path Clearance

Buchanan Field Airport is located in the southeastern quadrant of the I-680/SR-4 Interchange. The airport is one of two publicly owned airports in Contra Costa County. Buchanan Field Airport occupies approximately 200 hectares (495 acres) of property and has 20 hectares (50 acres) of control navigation easements. Due to urban development on all sides of the airport, changes in the airport's configuration are considered infeasible, and no plans exist to extend any of the runways (Contra Costa County Airport Land Use Compatibility Plan, December 2000).

There are two runways of concern for the proposed project: Runways 14L-32R and 14R-32L. The runways are located south of SR-4 between C5M Line Stations 124+00 and 126+00. Runway 14L-32R, the larger of the two runways, is 1,402 by 46 meters (4,600 by 151 feet). Runway 14R-32L is 853 by 23 meters (2,800 by 76 feet). The distance from the end of the runway to the centerline of SR-4 is approximately 255 meters (837 feet) for Runway 14L-32R and 235 meters (771 feet) for Runway 14R-32L. Both runways are visual runways and require a 20:1 approach path. According to the Contra Costa County Airport Land Use Compatibility Plan (December 2000), there are no plans to upgrade either runway to instrument-approach runways. Another runway, Runway 1L-19R, runs northeast/southwest and is the most heavily used at Buchanan Field Airport. Runway 1L-19R would not be affected by the proposed project.

Part 77 of the Federal Aviation Regulations establishes mandatory standards to determine impacts to navigable airspace by temporary and permanent obstructions and applies to aircraft approaching the runway. Obstructions include any object of natural growth, terrain, permanent or temporary construction, or alteration, including equipment or materials used therein and apparatus of a permanent or temporary character.

The standards for determining obstructions to navigable airspace for aircraft approaches require the definition of a three-dimensional approach glide path surface. An approach glide path surface consists of a horizontal surface, conical surface, primary surface, approach surface (20:1 slope for visual runways), and transitional side surface (7:1 slope). Interstate highways are required to have a minimum vertical clearance to the glide path surface of 5.2 meters (17 feet). Other public roadways are required to have a vertical clearance of 4.6 meters (15 feet). Any permanent or temporary construction or alteration that affects navigable airspace requires a Federal Aviation Administration (FAA)-approved exception (waiver). Exceptions are requested using prescribed forms for FAA review once the detailed design is complete. The project does not propose any permanent features that will affect the navigable airspace; however, during construction, the contractor will be held responsible for obtaining a temporary permit from the FAA if navigable airspace would be obstructed.

Phase 4 proposes constructing a freeway-to-freeway ramp from SB I-680 to EB SR-4. The ramp would meet EB SR-4 and add an auxiliary lane extending to SR-242 and a second auxiliary lane extending to the Solano Way off-ramp. The edge of shoulder on the ramp is approximately 200 meters (656 feet) from Runway 14R-32L and 225 meters (738 feet) from Runway 14L-32R. To maintain airspace clearances, the proposed ramp profile requires a retaining wall between SR-4 and the SB I-680 to EB SR-4 ramp where the

ramp approaches EB SR-4. No other modifications are needed to the SB I-680 to EB SR-4 ramp or to Buchanan Field Airport runways to accommodate the airspace clearance requirements.

13. Highway Planting

The proposed project will require the removal of trees and vegetation in areas near or along Grayson Creek. Existing planting removed will be replaced per Caltrans policy, and will maintain the corridor's status as an officially classified Landscaped Freeway. Additionally, vine plantings could be implemented on sound walls to reduce glare and deter graffiti. Highway planting will be required within the entire project limits, including the interchange and appropriate linear portions along I-680 and SR-4.

The cost of highway planting is included in the project cost estimate presented in Appendix E. As per Caltrans policy, highway planting will be implemented as a separate contract. Highway planting will be phased to be consistent with phased implementation of the project. Detailed highway planting scope will be covered under a separate or supplemental project report. A three-year plant establishment plan is also proposed. Planting and irrigation work under each phase shall be based on a master landscape plan to be prepared during Phase 1 planting design. Items such as irrigation supply line/conduit crossovers, electrical pull boxes, gore paving, and maintenance vehicle pullouts will installed under the proposed project.

The use of recycled water is preferred for landscaped areas. CCCSD provides recycled water to customers located adjacent to the sewage treatment plant in Pleasant Hill. CCCSD has a 610-millimeter (mm) (24-inch) recycled water main that extends southward from the sewage treatment plant located in the northeast quadrant of the interchange. The approved project-related uses for the recycled water include landscape irrigation and dust control. Due to the proximity of the CCCSD treatment plant and the availability of recycled water, the use of recycled water should be further investigated and considered during final design.

14. Erosion Control

Standard Caltrans erosion control measures will be used to protect the transportation facility and to meet water quality discharge requirements. These measures include seeding, planting, stream bank protection blankets and applicable new technologies such as bonded fiber matrix and turf reinforcement mat. A detailed evaluation of project erosion control measures will be made at the PS&E stage in conjunction with design of storm water control measures using Caltrans guidelines for Best Management Practices (BMPs). Erosion control measures are also summarized in the project's Storm Water Data Report. Erosion control measures will be defined for the project and included in a Storm Water Pollution Prevention Plan (SWPPP) as required by the National Pollution Discharge Elimination System (NPDES) permit. The estimated costs for these erosion control measures have been included in the project cost estimate (Appendix E).

15. Noise Barriers

Noise impacts for I-680 and SR-4 were evaluated during preparation of the EA/IS. The evaluation was performed in accordance with Caltrans Traffic Noise Analyses Protocol including *Traffic Noise Analysis Protocol* (TNAP) (Caltrans 1998a), *Technical Noise Supplement* (Caltrans 1998b). Land uses adjacent to I-680 and SR-4 within the project limits were reviewed for land use activity with respect to FHWA Noise Abatement Criteria (NAC). Noise measurements were made at the land uses that could be affected by existing and project-related traffic noise levels. These included long-term (at least 24 hours) monitoring and short-term (about 10 minutes) measurements, conducted simultaneous with traffic counts. These measurements were made at areas of frequent outdoor use (commonly at residential backyards) at properties along the freeways. The measurements were used to calibrate a noise model used to predict future noise levels with and without the project at sensitive, representative locations throughout the study area. The modeled noise levels were used to determine if a substantial noise increase would occur with the project, and if the predicted highest noise level would approach or exceed the respective NAC for the land use activity at a potentially affected property. A noise increase is considered substantial when the project would raise levels by 12 dBA or more, and 66 dBA is considered the level at which future predicted noise levels are approaching or exceeding the NAC for outdoor activities at residential and community land uses. If these criteria are exceeded, then reasonable and feasible noise abatement measures must be considered. Sound walls were considered as the abatement measures for this project. A minimum of 5 dBA reduction in noise must be achieved for an abatement measure to be considered feasible. Other feasible considerations include the constructability and maintenance of the wall. The determination of whether a noise abatement measure is reasonable involved consideration of costs and benefits, including the cost of constructing the wall, the amount of benefit in noise reduction, residents acceptance, environmental impacts (such as views blocked), public and agency input, the date of construction of the development that would be protected, and the cost per benefited residence. The results of the noise study, and the sound walls that were determined reasonable and feasible (as well as walls studied but not found reasonable and feasible) were identified in the draft IS/EA that was circulated for public review, and were also identified in exhibits at the public meeting. Several residents commented on the absence of an existing or proposed wall in the neighborhood in the southwest quadrant of the interchange, along Temple Drive. However, monitored noise levels were recorded at 56 and 59 dBA in this area, and modeled future noise levels with the project were predicted at 60 dBA, which would not approach or exceed the 66 dBA NAC. No locations within the study area would exceed 12 dBA, and there would not be a substantial increase.. Sound wall options will be re-evaluated if the profile or horizontal alignment of proposed roadways or ramps changes during the PS&E phase. Table 9 summarizes the proposed locations and details for each sound wall that was considered and/or would be constructed for the project.

Table 9. Summary of Sound walls

Sound wall (Project Phase)	Height (meters)	Description	Length (meters)	Total Reasonable Allowance (cost)	Estimated cost
Sound walls Determined as Feasible and Reasonable and Recommended for the Project					
SW1A (Phase 1)	4.2	Along ES of NB I-680 Station 101+20 (conform to existing) to 102+80 on NB I-680 to WB SR-4 connector	~800	$3,010,000	$1,107,000
SW1B Option 1 (Phase 1)	4.2	Along ES of NB I-680 to WB SR-4 connector from Stations 102+80 (conform to SW1A) to 104+80 on NB I-680 and from NB I-680 Stations 109+00 to 111+10	~400	$525,000	$351,000
SW 5 (Phase 2)	4.8	Along ES of EB SR-4 from Stations 89+45 (on Morello Avenue on-ramp) to 95+30 and along right of way from Stations 95+10 to 97+20 (includes overlap)	~800	$806,000	$1,175,000
SW 10 (Phase 3)	4.8	Along right of way of EB SR-4 from Station 150+00 to EB Station 152+80	~280	$210,000	$452,000
SW 11 (Phase 3)	4.8	Along right of way of EB SR-4 from Station 153+40 to EB Station 157+00	~360	$407,000	$581,000
SW 2 (Phase 4)	4.2	Along ES of SB I-680 Station 118+20 to 120+10	~190	$525,000	$159,000
SW 8 (Phase 4)	4.2	Along ES of EB SR-4 Station 136+00 (along on-ramp) to Station 139+40	~340	$580,000	$405,000
SW 3 (Phase 5)	4.2	Along ES of NB I-680 Stations 119+30 to 122+60 (could transition into hillside at north end)	~330	$700,000	$485,000
SW7 Option 1B (Phase 4 & 5)	4.2	Along ES of SB I-680 to EB SR-4 connector from Station 110+80 to 107+70 PLUS along EOS of EB SR-4 from Stations 118+30 to 120+40	~520	$770,000	$806,000

Table 9. Summary of Sound walls

Sound wall (Project Phase)	Height (meters)	Description	Length (meters)	Total Reasonable Allowance (cost)	Estimated cost
Sound walls Studied but Found Not Reasonable or Feasible and Not Recommended for the Project					
SW1B Option 2 (Phase 1)	4.8	Along ROW extending about 190m northeast from Sta 102+80 of NB I680 to WB SR4 Conn.	~190m	$740,000	$199,000
SW6 (Phase 1)	4.2m	Along ES of WB SR4 from Sta. 91+00 to 97+20.	~620m	$95,000	$858,000
SW4 (Phase 4)	4.2m	Along ES of SB I680 Sta. 124+00 to 126+70 then transition to ROW at 127+00 and along ROW to 129+20 (overlapping SW4A).	~540m	$217,000	$784,000
SW7 Options 1A & 2 (Phase 4)	4.8m	Along ROW of EB SR4 from Sta. 110+10 of SB I680 to EB SR4 connector to Sta. 108+00 (along mobile home boundary)	~220m	$350,000	$253,000
SW9 (Phase 4)	4.2m	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.	~540m	$660,000	$318,000

ES = Edge of shoulder

The height of sound walls is 4.9 meters unless constructed within 4.5 meters of the traveled way, where the height is 4.2 meters. Summary explanations for sound walls studied but found not reasonable or feasible as listed in Table 9 were:

- SW1B Option 2 (would have adverse effects on existing views at residences near Grayson Creek, and SW1B Option 1 would alternatively provide noise reduction),
- SW6, SW 4A and 4B (estimated construction costs would exceed the calculated reasonable allowance for cost-effective noise abatement),
- SW7 Options 1A and 2 (would not benefit as many homes as the proposed SW7 Option 1B, and will block some views), and
- SW9 (evaluated along the existing connector ramp from EB SR-4 to SB SR-242, but would not comply with established sight distance requirements)

Additional information on noise analyses and locations of existing and proposed sound walls is provided in the IS-ND (CEQA)/EA (NEPA).

16. Non-motorized and Pedestrian Features

Non-motorized and pedestrian features are limited to areas outside of the freeway right of way. The interchange improvements that affect local streets or recreation areas are limited to the areas at or near Blum Road, Berry Drive, Muir Road, Pacheco Boulevard, and Grayson Creek. The existing pedestrian facilities in the project area will be upgraded to meet Americans with Disability Act standards. The proposed features are summarized by phase in Table 10. All modifications to local streets will comply with the provisions of the Americans with Disabilities Act.

Table 10. Proposed Non-motorized and Pedestrian Features

Phase	Location	Description
1	Blum Road/ Pacheco Boulevard intersection	Sidewalks are proposed for Pacheco Boulevard and Blum Road. Crosswalks are proposed between Blum Road and Pacheco Boulevard and between Blum Road and the Pacheco Transit Hub.
	Berry Drive	Proposed retaining wall will result in relocation of the existing sound wall and sidewalk near the Grayson Creek access gate. Pedestrian features include sidewalk replacement and maintaining controlled access to Grayson Creek for Caltrans and other authorized personnel.
2	Muir Road/EB SR-4 on-ramp	Add signalized intersection and maintain pedestrian crosswalks.
	Pacheco Boulevard/SB I-680 slip ramp	Proposed pedestrian features include a signalized intersection with sidewalk and crosswalk at the slip ramp.

If applicable, additional non-motorized and pedestrian features may be considered during the final design stage.

17. Needed Roadway Pavement Rehabilitation and Upgrading

The existing pavement on I-680 is asphalt concrete (AC). The pavement on SR-4 consists of a combination of AC and Portland Cement Concrete (PCC). SR-4 traveled lanes have PCC pavement within the project limits, except between Grayson Creek and Peralta Road, where the traveled lanes are paved with AC. The shoulders and ramps on SR-4 are generally AC.

An evaluation of existing data for the AC section of pavement on SR-4 between the Grayson Creek crossing and Peralta Boulevard suggests that AC pavement was used in the earlier design to accommodate potential settlement due to cohesive soil materials in this area. Subsequent discussions with Caltrans Materials and Maintenance staff indicated that no significant evidence of pavement settlement exists in this region. It is recommended that PCC pavement be used on SR-4 between Grayson Creek and Peralta Boulevard. Use of PCC pavement on traveled lanes allows the use of 40-year pavement design on the outside lanes, minimizes maintenance costs, and makes the pavement materials consistent with other project areas. It is also recommended that additional geotechnical investigations be performed in this area during the PS&E phase to confirm

the feasibility of the use of engineered fill that minimized settlement and accommodates AC pavement.

The 2007 Pavement Management System Inventory indicates that the roadway of I-680 within the project limits is in good condition but the roadway of SR-4 requires pavement rehabilitation. A field review of the project would be made at the start of each final design phase. Costs for pavement rehabilitation and overlay work identified as of the preparation of this PR are considered and included in the preliminary cost estimate summaries.

Based on average daily traffic and truck volumes in the project area and discussions with Caltrans Materials, the following pavement configurations are recommended for the project:

- All new pavement sections on SR-4, including shoulders, will be PCC. Outside lanes will be designed for 40-year life and inside lanes will be designed for standard 30-year life.
- All pavement sections on I-680 will be AC matching recently constructed I-680 HOV Lane Project pavement sections.

PCC and AC pavement thicknesses suggested for the project are summarized in Table 11. The estimated thicknesses of various components of PCC sections are based on Caltrans *Highway Design Manual* Table 603.2, using a conservative TI of 15 and R value of 15. An additional 25 millimeters (1 inch) was added for 40-year pavement design. The AC pavement was based on recently constructed I-680 HOV Lane Project pavement sections. The actual thickness of various pavement sections for this project will be determined based on detailed geotechnical investigations and analyses. The pavement sections suggested here are considered a conservative representation of actual pavement sections, and the construction cost of these additional pavement sections is included in the project cost estimate presented in Appendix E.

Table 11. Recommended Pavement Thicknesses

Material	Thickness (mm [inches])
40-Year Pavement Section	
PCC Pavement	325 (12.8)
Lean Concrete Base	150 (5.9)
Class IV Aggregate Subbase	215 (8.5)
Standard PCC Pavement Section	
PCC Pavement	300 (11.8)
Lean Concrete Base	150 (5.9)
Class IV Aggregate Subbase	215 (8.5)
AC Pavement Section	
Open Graded AC	30 (1.2)
Rubberized AC (Type G)	45 (1.8)
AC (Type A)	375 (14.8)
Class IV Aggregate Subbase	150 (5.9)

Based on discussions between CCTA and Caltrans, life cycle cost analyses are not required for this project. The pavement design was developed consistent with the Caltrans procedures for considering 40-year pavement design prior to recent changes involving life cycle cost analyses. If the proposed 40-year pavement design approach is modified during design phase, a life cycle cost analyses will be conducted for the project.

The Pavement Strategy Committee Review was not conducted for this project as the project is not yet funded and the design phase is not anticipated to start till 2011. The project will be presented to the Pavement Strategy Committee for review as soon as the design phase commences.

18. Needed Structural Rehabilitation and Upgrading

The Structure Replacement and Improvement Needs (STRAIN) Report dated February 2009 does not identify any structural rehabilitation within the project limits. Advanced Planning Studies were completed during the PSR and updated for the I-680/SR-4 separation, the SR-4/Pacheco Boulevard Undercrossing, the SR-4/Grayson Creek Bridge, the SR-4/Walnut Creek Bridge, the SR-4/Solano Way Undercrossing, and the SR-4/Peralta Road Undercrossing.

The BNSF railroad bridge over I-680 must be reconstructed prior to the commencement of Phase 4 construction activities. The reconstruction will be funded by CCTA as a separate project.

19. Cost Estimates

A preliminary cost estimate was prepared for each phase of the project and is included in Appendix E. Quantities used in the cost estimates were based on updated project geometry presented in this report. Unit costs were derived using 2006 Caltrans Contract Cost Data. The following is a summary of estimated project costs.

Phase 1:

Roadway:	$29,974,000
Structure:	$35,012,000
Right of Way:	$ 3,894,500
Construction Cost:	**$68,880,500**

Phase 2:

Roadway:	$25,328,000
Structure:	$15,446,000
Right of Way:	$ 2,169,000
Construction Cost:	**$42,943,000**

Phase 3:

Roadway:	$23,028,000
Structure:	$12,676,000
Right of Way:	$ 12,400
Construction Cost:	**$35,716,400**

Phase 4:

Roadway:	$19,850,000
Structure:	$20,711,000
Right of Way:	$ 672,000
Construction Cost:	**$41,233,000**

Phase 5:

Roadway:	$26,348,000
Structure:	$ 5,722,000
Right of Way:	$ 142,500
Construction Cost:	**$32,212,500**

Total **Capital Cost** of Project excluding Support Cost (Phases 1–5): **$220,985,400**
(Say $221,000,000)

Support Cost	
PA & ED Phase	$ 2,500,000
Final PS&E Phase @ 12%	$26,518,000
R/W Services	$ 1,000,000
Construction Admin @ 12%	$26,518,000
Support Total:	**$56,536,000**
	(Say $57,000,000)

PROJECT TOTAL: $278,000,000

20. Effect of Special Funded Proposal on State Highway

The I-680/SR-4 Interchange improvement is a special funded project. The project will eliminate existing weaving problems caused by short distances between on-ramps and off-ramps that result in traffic backups extending into freeway ramps during peak periods. The project will also significantly reduce the congestion problems at the I-680/SR-4 Interchange.

21. Aesthetic Treatments

Sound walls, retaining walls, bridge abutments, columns, and slope paving will receive architectural treatments of color, texture, and patterning that closely matches similar adjacent existing structures within the corridor. A minimum of two design alternatives for sound walls will be considered during the PS&E phase.

B. Rejected Alternatives

During the conceptual engineering studies phase, 17 alternative concepts were identified and evaluated. Twelve of the concepts were dropped because they did not meet the project's purpose and need in terms of traffic operations or maintaining local access; did not prove to be cost-effective; or did not meet acceptable geometric standards for interchange design. The five remaining alternatives were further evaluated by the PDT with input from FHWA, the local Pacheco Municipal Advisory Committee, and TRANSPAC. Alternative D2A was advanced as the only alternative that could maintain all existing traffic movements and directions. In response to FHWA requests, reviews were conducted of additional interchange ramp options and configurations as well as possible improvements to local roadways and intersections at nearby interchanges on I-680 and SR-4 to determine if they could be sufficiently improved to meet the identified purpose and need. Ultimately, all alternatives including the viable alternative without slip ramp were eliminated from further consideration. Rejected alternatives and options are discussed in detail in the IS-ND (CEQA)/EA (NEPA).

In November 2003, a study of potential improvements to the Concord Avenue/I-680 Interchange and Morello Avenue/SR-4 Interchange was developed to address the FHWA requirement to support the proposed use of slip ramps to provide nonstandard access to I-680. The study examined possible options to improve the next-nearest existing interchange access points on I-680 and SR-4. Twenty-two potential improvements to the existing interchanges at Concord Avenue/I-680 and at Morello Avenue/SR-4 were identified and evaluated for their advantages, disadvantages, right of way requirements, bicycle and pedestrian facility conflicts or requirements, and estimated cost.

Individually, the options provide a range of potential benefits but are not sufficient to address the purpose and need of the I-680/SR-4 Interchange Improvement Project. Logical combinations of some of the options could provide local benefits. However, several conclusions were reached that ultimately eliminated these options from further consideration as alternatives to the project with slip ramps. 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 twenty-two options were not advanced for further consideration.

An additional study was performed in March 2004 to examine any other alternatives to the proposed slip ramps connecting to Pacheco Boulevard. 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. The study concluded that none of the designs analyzed would provide an equivalent connection to the proposed slip ramps. Two options that would combine the I-680 NB to EB and WB SR-4 off-ramps could degrade traffic operations on I-680.

VI. CONSIDERATIONS REQUIRING DISCUSSION

A. Hazardous Waste

An Initial Site Assessment (Hazardous Waste Study) was conducted for the proposed project and completed on December 20, 2002. The Caltrans District 4 Hazardous Materials Coordinator confirmed that the Initial Site Assessment findings are still valid. The assessment 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.

Four properties were identified as potential hazardous waste sites during the regulatory database search and site reconnaissance because hazardous materials are handled on-site. 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. None of the four properties at which hazardous materials are handled had recorded contamination at the time the Initial Site Assessment was conducted. These sites are located within or in the vicinity of the proposed project's right of way. All four sites are located within the northwestern quadrant of the project area. The properties are Big Tex Trailers between Blum Road and I-680, Bay Area Bobcat at 5031 Blum Road, the BNSF railroad bridge over I-680 (in the immediate vicinity of the tracks), and the CHP office between Blum Road and I-680. These properties are described in Table 2.2-1 of the IS-ND (CEQA)/EA (NEPA).

In addition to the potential presence of pesticides and lead in surface soil within the project area, a low potential exists for hydrocarbon-contaminated soil and groundwater to also be present due to fueling, storage, or maintenance of vehicles at various locations. Further investigations of the four potential hazardous waste sites are recommended during design phase to evaluate the potential for hydrocarbon impacts. Completion of these studies prior to construction avoids unnecessary delays and helps ensure work safety. No cumulative impacts other than the potential impacts identified above are anticipated. For additional information on potentially hazardous waste sites, see Chapter 2.2 Hazardous Waste and Material in the IS-ND (CEQA)/EA (NEPA).

B. Value Analysis

In October 2001, a Value Analysis Study was completed in which nine value analysis alternatives were identified. Of these, Alternatives 7.0 and 8.0 were accepted. Alternative 7.0 improved the EB SR-4/Pacheco Boulevard off-ramp by extending the SR-4 outside lane to a mandatory exit at Pacheco Boulevard. Alternative 8.0 proposed signalizing the Muir Road/SR-4 EB ramp intersection. Alternatives 7.0 and 8.0 have been accepted, incorporated into the project, and included in the project's cost estimate.

Alternative 4.0 proposed constructing a C-D road on EB SR-4 to provide access from EB SR-4 to SB I-680 while maintaining access from Pacheco Boulevard/Muir Road to EB

SR-4 and SB I-680. As part of the studies for this project, an analysis of Alternative 4.0 was completed and submitted to Caltrans in April 2003. It was revised in October 2003 without further comments from Caltrans. The analysis used year 2030 traffic projections. The 2030 traffic data suggest that the weaving on the proposed EB SR-4 C-D road does not meet the operational requirements of LOS D or greater. Because of the unfavorable weaving conditions, Alternative 4.0 has been eliminated from consideration. Additionally, the SB I-680 to EB SR-4 direct connector ramp would need to be constructed to eliminate the weave and add capacity to the interchange, thus making Alternative 4.0 unfavorable.

C. Resource Conservation

Any existing AC pavement that is removed will be recycled if it is economically and logistically advantageous. Additional features such as barricades, signs, crash cushions, signals, thrie/metal beam guard rails, and lighting will be salvaged and reused if they are in working condition and if doing so would be economically and logistically advantageous. Rubberized AC will also be utilized for widening along I-680.

D. Right of Way

1. Right of Way Required

Right of way costs for each phase are summarized in the right of way data sheets included in Appendix G. These data sheets include land acquisition and related costs for the properties listed in Table 12.

A total of eight parcels would be impacted by the project. Table 12 summarizes the parcel data and extent of impact. Relocation Assistance Program (RAP) costs would be incurred due to the impact to six mobile homes in Parcel 125-020-058. An existing CHP facility in Assessor's Parcel No. 159-150-021 owned by the State and operated by the CHP would be impacted by the construction of the SB I-680 to WB SR-4 ramp. Based on preliminary discussions with Caltrans and the CHP on August 5, 2003, a land swap between adjacent parcels 159-150-021 and 159-150-032 is proposed to allow for relocation of the CHP's facility. Also, Caltrans would need to acquire the right to cross the CHP-controlled property to allow maintenance access to a retaining wall constructed along the southwest boundary of the property.

Table 12. Right of Way Required for the Project

No.	Phase	Assessors Parcel No.	Address	Comment	Impact
1	1	125-020-058	245 Aria Drive, Pacheco, 94553	Needed utility and construction easement to relocate 2134-mm sanitary sewer line. Six mobile homes would be removed or relocated.	Partial Acquisition
2	1	159-210-041	Martinez	Southeast corner of parcel would be taken to relocate Blum Drive.	Partial Acquisition
3	1	159-210-024	4999 Pacheco Boulevard, Martinez, 94553	The whole parcel would be occupied by the relocated Blum Drive.	Full Acquisition
4	2	125-220-002	5166 Pacheco Boulevard, Pacheco, 94553	Northwest corner of parcel would be taken for Pacheco Boulevard/SB I-680 slip ramp construction.	Partial Acquisition
5	2	125-240-029	95 North First Avenue, Pacheco, 94553	Portion of easement side of parcel would be taken for EB SR-4 to SB I-680 ramp construction.	Partial Acquisition
6	4	110-130-049	1599 Solano Way, Concord, CA 94520	Partial take of mini-warehouse facility.	Partial Acquisition
7	5	159-100-002	Arnold Industrial, Concord, CA 94520	Partial take of mini-warehouse facility.	Partial Acquisition
8	4	159-150-021	5001 Blum Road, Martinez, 94553	Portion of the parcel (CHP Parcel) would be occupied by the construction on SB I-680 to WB SR-4 ramp. Land swap with APN# 159-150-032 is proposed.	Partial Acquisition

2. Right of Way Data

Right of way costs for each phase are summarized in the right of way data sheets included in Appendix G. These data sheets include land acquisition and related costs for the five properties listed in Section VI.D.1, Table 12. Consistent with the right of way data sheet guidelines, no land acquisition costs are included for areas involving transfer of ownership among State agencies.

3. Relocation Impact Studies

A Relocation Impact Study/Statement/Technical Memorandum was prepared in January 2003.

In Phase 1 of the project, right of way would need to be acquired along Berry Drive for the NB I-680 to EB SR-4 ramp and along Blum Road for the NB I-680 to Pacheco Boulevard slip ramp. Right of way along Berry Drive would be needed to relocate approximately 365 meters of a 2140-mm sanitary sewer line. An estimated five to seven mobile homes located in the Concord Cascade Mobile Home Park would need to be relocated. Options to relocate the sanitary sewer line to avoid impacts to the mobile homes were considered but determined to be both impractical and cost prohibitive.

Based on current real estate information for Central Contra Costa County, a sufficient number of single-family homes appear to be for sale and rent to relocate the affected households. A survey of mobile home listings in September 2007 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. 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.

The camper shell business located at the corner of Blum Road and Pacheco Boulevard would also require relocation in Phase 1. To maintain access to this area of Pacheco Boulevard from NB I-680, the proposed slip ramp and associated realignment of Blum Road would be required. It is not geometrically feasible to realign Blum Road without acquisition of right of way. For additional information on residences and businesses affected, see the Right of Way Data Sheets in Appendix G.

The proposed Phase 4 SB I-680 to EB SR-4 connector project require a partial acquisition of CHP parcel on Blum Road through a land swap between State and CHP. The CHP refilling facility does not need to be relocated; however, an "Agreement for the Transfer of Control and Possession of Land Owned by the State for Highway Purposes" is needed.

The right of way acquisitions identified in the project's relocation impact study have not changed for the Preferred Alternative as described above.

4. Airspace Lease Areas

No airspace leases are known to exist within the project limits. Caltrans may consider airspace lease proposals in the future. All proposals should comply with Caltrans' Wireless Licensing Program, Encroachment Permits, Airspace Lease Environmental Checklist, Airspace Lease Plant Setback List, and Licensing Fees.

E. Environmental Issues

The IS-ND (CEQA)/EA (NEPA) has been prepared in accordance with federal and state environmental regulations and guidelines and Caltrans environmental procedures. This final environmental document, and a Finding of No Significant Impact (FONSI) under NEPA, was approved on November 26, 2008. The signed Negative Declaration and FONSI are included in Appendix I of this Project Report.

The IS-ND (CEQA) /EA (NEPA) determined that the proposed project would not have any significant effects 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, and Utility and Service Systems.
- Potential impacts to Aesthetics, Geology and Soils, Water Quality and Hydrology, Biological Resources, Noise, Population and Housing,

Transportation and Traffic, and Wetlands would be avoided, minimized, or mitigated to less-than-significant levels.

The proposed project would employ impact avoidance and minimization measures as part of the project design. The following measures would apply to all five phases of the project, except where noted, and would be implemented to reduce potential impacts to the environment:

- Aesthetics: Landscaping would be incorporated into the project design to minimize for adverse visual impacts. New sound walls would have aesthetic treatments (colors, textures, and patterns) that are consistent with existing sound walls in the vicinity to mitigate for glare, visual impacts, and potential for graffiti.
- Geology and Soils: Engineering design would incorporate measures to minimize potential impacts due to fault rupture and subsidence, earthquake shaking, liquefaction and lateral spreading, expansive soil, landsliding, and erosion.
- Water Quality:

– Construction Mitigation: The overall mitigation requirements for water quality impacts are to be in compliance with the Caltrans and the State NPDES permits, other planning agreements, and the expected need for the 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 BMPs and compliance with the new NPDES permits, temporary construction-related water quality impacts would be avoided or minimized. 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.

– Long-Term Mitigation: The project design would incorporate permanent soil erosion control measures and permanent measures to control pollutant discharges. These include biofiltration swales and strips.

- Hydraulics and Hydrology:

  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 at the two-lane direct connector planned for Phase 1 of the project. The purpose of these studies was to evaluate the project impacts within the local floodplain.

  The studies indicated that flood risk already exists in this area and changes resulting from this project would be minimal. The studies concluded that the

additional piers added for I-680 and SR-4 bridge widening would result in a 2 cm (1 inch) increase in the flood level upstream of the I-680 Grayson Creek Bridge, near Pacheco Boulevard. With completion of Phase 5, the increase would be a maximum of 0.09 meter (3.5 inches). The north levee of Grayson Creek was already increased in height during construction of the I-680 HOV Lane Project, and the levee would accommodate the predicted water elevation changes from the I-680/SR-4 project. No increased flooding or impact would occur on the north side of Grayson Creek. To address the minor change in flood elevation at the south levee, minor amount of fill is required on the existing levee access road. Placement of this fill would not have an adverse environmental impact and is addressed in the IS-ND (CEQA)/EA (NEPA). Contra Costa County Flood Control and Water Conservation District will be responsible for this work and the schedule for this work will be determined during the design phase of the project.

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 does not have the capacity to convey the 100-year flood event 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 proposed improvements are not considered longitudinal to the 100-year floodplain or the high-tide waters of the identified floodplain. Therefore, the project (phases 1 through 5) would not be considered a longitudinal floodplain encroachment.

- Biological Resources: Project construction will conform to the California Fish and Game Code 3503 and the Migratory Bird Treaty Act, which protects bird and raptor species. Migratory birds may try to nest on the ground or in trees and other vegetation within the project limits. CCTA shall retain a qualified biologist to conduct a pre-construction bird survey. If migratory birds or raptors are found to be nesting in or near the project area, a no disturbance buffer zone shall be established around the nest to avoid disturbance of the nest site. Tree and shrub removal shall occur outside the nesting season of each year (September 1 and February 15) or they would be inspected for presence of active nests. If occupied nests are identified, tree removal will be delayed until the young have fledged and are capable of independent survival. Tree losses would be replaced as part of landscaping mitigation. Wetland and other sensitive biological resources located adjacent to the project boundary

would be fenced off and will not be used for construction access, staging, or storage.

- Noise: Sound walls would be constructed to abate for long-term noise impacts.
- Population and Housing: Relocation assistance payments and counseling[2] would 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 would be provided equitably to all residential and business relocatees without regard to race, color, religion, age, national origin, or disability, as specified under Title VI of the Civil Rights Act of 1964.
- Transportation and Traffic: Construction of each phase of the proposed project is anticipated over a 2-year period.[3] 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.
- Wetlands: Wetland studies were performed for all five phases of the I-680/SR-4 Interchange improvements to ensure evaluation of the cumulative impacts that are of concern to Federal and State regulatory agencies. Cumulative impacts are the net impacts on the environment resulting from the incremental effect of the project when added to other closely related past, present, and reasonably foreseeable future actions. The major projects in the vicinity that were used to derive the cumulative impacts to wetlands and other waters of the United States for the proposed project include: (1) the completed SR-242 widening project, (2) the completed I-680 HOV Lane Project, and (3) all phases of the I-680/SR-4 Interchange improvement project.

  Development of Phases 1 through 5 of the interchange improvements would result in the loss of approximately 90 sqm (969 sqft) of wetlands and waters of the United States. These waters are characterized in detail in the Wetland Delineation Report (April 2003). Impacts to wetlands and waters of the United States from Phases 1 through 5 combined appear to qualify for authorization under the U.S. Army Corps of Engineers (USACE) nationwide authorization program under Section 404 of the Clean Water Act. The USACE would determine the Section 404 authorization following submittal of a formal application for the project.

  The following measures are proposed to avoid or minimize any potential impacts to wetlands and other waters of the United States.

[2] It is anticipated that the relocation is only applicable to Phase 1.
[3] If funding is available, multiple phases may be constructed simultaneously.

- Disturbance to existing grades and vegetation will be limited. Placement of all roads, staging areas, and other facilities will avoid and limit disturbance to wetland habitat. Existing ingress or egress points will be used. Following completion of the work, the contours of the area will be returned to preconstruction condition or better.
- Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, straw bales, or silt fences) will be incorporated into the project design and implemented at the time of construction. These devices will 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 before October 31 and after construction is completed. Treatment includes temporary seeding and sterile straw mulch. Erosion control blankets will be installed on any disturbed soils on a gradient of over 30 percent. Permanent revegetation and tree replanting with native species will take place in small openings in the erosion control blanket.
- The total impacts to wetlands are very small (90 sqm or 969 sqft 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 maintained to pass floodwaters. Compensatory mitigation can be provided 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 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. An established wetlands mitigation bank, the Springtown Natural Community Reserve, can provide mitigation credits following approval by the USACE, and CCTA is working with Muir Heritage Land Trust to develop wetland mitigation for their projects.
- Work within Grayson and Walnut creeks will be seasonally restricted to the dry season (June 1 through October 31) to avoid potential impacts to the California Central Valley Evolutionarily Significant Unit steelhead and chinook salmon. 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.

F. Air Quality Conformity

Project level conformity requirements have been met.[4] The project is included in the Metropolitan Transportation Commission's currently conforming Transportation 2030 Plan (RTP), and the 2007 Regional Transportation Improvement Program (RTIP). The current conformity determinations for the RTP and RTIP were approved by FHWA and the Federal Transit Administration on October 2, 2006. The description of the project is unchanged from the project that was described and modeled in the RTP and RTIP, and the FHWA has found that the project meets regional air quality conformity requirements. In support of the conformity documentation, a localized carbon monoxide analysis was also performed following the required Transportation Project-Level Carbon Monoxide Protocol. The analysis demonstrated that the project would not create any new violation of the carbon monoxide standards or increase the severity or number of existing violations. Based on the information provided, FHWA found that the project conforms to the State Implementation Plan (SIP) in accordance with 40 C.F.R. Part 93.

G. Water Quality

A Storm Water Data Report (SWDR) was completed and approved on April 11, 2005. The signature page of the SWDR is included as Appendix F. The project has not been changed since the approval of the SWDR. The SWDR will be updated during each of the design phases to meet the regulation of RWQCB-2 at that time.

The Storm Water Data Report prepared for the project includes summarizing the actions taken in compliance with the Caltrans Statewide NPDES permit. The SWDR has identified that the project area is within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB). Receiving waters potentially affected by the project include Grayson Creek, Pacheco Creek, Walnut Creek, and the Contra Costa Canal. Temporary water pollution control BMPs, including non-storm water dewatering control measures, will be implemented during construction. The primary Permanent Pollution Prevention BMPs proposed are the use of biofiltration swales/strips. The primary water quality impact of the project would be an increase in the volume of runoff within the project limits due to the creation of new impervious surfaces. Runoff from the project area currently discharges directly to surface water bodies (Grayson and Walnut creeks). Due to site hydraulic and space constraints, large hydro modification facilities, such as detention or infiltration basins, are not feasible for this project. Storm drain outlet systems and related treatment system requirements are addressed in the SWDR. Project features to address storm water issues will include the following:

- Vegetated swales will be designed to minimize velocity and erosive conditions.

[4] FHWA's conformity determination for this project is included in Appendix H of IS-ND (CEQA)/EA (NEPA), letter dated July 15, 2008 from Gene Fong, FHWA to Bijan Sartipi, Caltrans

- Slopes will be revegetated to help reduce erosion and sediment loads.
- Flared end sections and energy dissipation devices in the form of rock slope protection will be installed at the outlet of all storm drains to prevent scour.
- An erosion control plan will be developed and provided to the District Landscape Architect during the PS&E phase for review and comment.
- Vegetated surfaces will include native plants. A survey of existing vegetated surfaces will be conducted in the PS&E phase.
- Biofiltration swales/strips will be used as the primary permanent treatment BMP.
- The project will have no impacts to groundwater supply sources within the project area because there are no known groundwater supply sources.

Additional details on these features are included in the SWDR.

H. Title VI Considerations

The project will be designed to comply with Title VI considerations as stated in the Project Development Procedures Manual. Access to and from transportation facilities along Pacheco Boulevard and other local streets affected by the project will be designed with consideration of low-mobility groups and in conformance with the Americans with Disabilities Act. Such facilities include ramped curbs at intersections and accessible locations for public transit stops. The project will also have no significant impact on minority and low-income populations.

VII. OTHER CONSIDERATIONS AS APPROPRIATE

A. Public Hearing Process

The EA/IS was circulated for public and agency review between August 4, 2006 and September 5, 2006. The availability of the EA/IS for review was advertised and noticed in a major regional newspaper (Contra Costa Times, on August 5 and 19, 2006), a mailer was sent on August 7, 2006 to residents adjacent to the project, copies of the environmental document were made available at local libraries, and letters were sent to local, state, and federal elected officials. The public hearing/open house was held on August 22, 2006 in Pacheco, a community meeting was held at the Concord Cascade Mobile Home Park on August 16, 2006, and a presentation was made to the Pacheco Town Council on August 23, 2006. Six individuals issued spoken comments at the public hearing/open house, and ten individuals, businesses, and State and local officials provided written comments. Comments from individuals generally requested consideration of a noise wall in the vicinity of Temple Drive and Pacheco Boulevard, which was studied in the EA/IS but the highest noise level (60 dBA) does not exceed the FHWA and Caltrans threshold (66 dBA) used to evaluate noise abatement. The Contra Costa Water District and the Central Contra Costa Sanitary District requested that specific utility information be included in the EA/IS, which was added to the final document. The Contra Costa County Community Development Department identified concerns with phasing, pedestrian and bicycle facilities, signal timing, and landscaping, all of which are addressed in the IS-ND/EA with FONSI. Other concerns include existing flooding (the project will not change the existing conditions), impact to a local self storage business (located on Caltrans-leased land, the lease can be terminated with a 30-day notice), and request for information on new, impervious surfaces (the information was added to the IS-ND/EA with FONSI). The proposed alternative with slip ramps that was presented in the Draft Project Report was identified as the Preferred Alternative. There were no changes to this alternative as a result of the public hearing and comment period.

B. Route Matters

A Freeway Agreement covering the I-680/SR-4 Interchange dated May 5, 1981, was executed between the State and the County that supersedes the portion of the Freeway Agreement dated August 14, 1973, from 0.1 km west of Pacheco Boulevard to Grayson Creek. This project proposes to reconfigure the existing interchange. Under the proposed project, two new local connections would be added to I-680, and freeway agreement/amendments are required.

No highway route adoption is required for this project.

C. Permits

Permits from the following agencies may be required for the project:

- RWQCB (NPDES permit and Water Quality Certification)

- California Department of Fish and Game
- Federal Aviation Administration
- USACE (Section 404 Nationwide Authorization)

The project (all five phases) will have temporary impacts to jurisdictional wetlands and other waters of the United States totaling 0.41 hectare (1.01 acres), and permanent impacts totaling 0.009 hectare (0.023 acre). The project appears to qualify for a Nationwide Permit #14, linear transportation projects, and Nationwide Permit #33, temporary construction access and dewatering activities.

Permit requirements were identified based on current information of the project. Additional permit requirements may be identified during the preparation of the design documents. Generally, permits will be processed during the preparation of the PS&E; the Water Quality Certification (401) should be processed during each design phase.

D. Cooperative Agreements

An existing Master Cooperative Agreement (No. 4-1376-C) for preparing project approval and environmental document for projects under Measure C program. The agreement was executed between Caltrans and CCTA on March 6, 1992. A copy of the Master Cooperative Agreement is provided in Appendix K. This project will be broken into several construction contracts for the delivery purposes. Separate cooperative agreements to cover CCTA and Caltrans responsibilities for the design, right of way, and construction phases will be prepared and executed. Caltrans is interested in performing the design for this project. Separate cooperative agreement reports will be prepared to authorize the execution of these agreements.

It is anticipated that Caltrans would be the responsible agency for advertising, awarding, and administering the construction contracts. The construction contract administration will be performed by Caltrans and may be supplemented by consultants hired by CCTA.

E. Other Agreements

The project limits are currently covered by the two freeway maintenance agreements (FMA) listed below:

- The FMA dated January 22, 1963, executed between the State and County on State Highway Route 75 (now known as I-680).
- The FMA dated October 17, 1978, executed between the State and County on State Highway Route 4/242 to address the responsibility and expense associated to maintain their respective areas.

To address maintenance responsibilities for the proposed signalized ramp intersections at Muir Road and on Pacheco Boulevard, local street undercrossings and sound walls and retaining walls abutting local right of way, these agreements will need to be amended or superseded by new agreements with County of Contra Costa during the design phase.

An existing gas refilling station in State-owned parcel and operated by CHP would be impacted by the construction of the SB I-680 and WB SR-4 ramp. The project proposes to relocate the gas refilling station to an adjacent State-owned parcel. To allow this land swap, Agreement for the Transfer of Control and Possession of Land Owned by the State of Highway Purposes is needed between the CHP and Caltrans.

F. Involvement with a Navigable Waterway

Not applicable.

G. Transportation Management Plan for Use during Construction

A Transportation Management Plan (TMP) will be required during the construction phase to minimize delay and inconvenience to the traveling public. The proposed construction will require lane closures and detours. The proposed five-phased sequence of construction will require minimum of temporary roadwork and/or detouring. Preliminary costs based on anticipated construction staging are summarized in the TMP data sheets and included as Appendix B.

The TMP for the project will be further developed in the final design phases and supported by additional traffic studies to evaluate traffic operations. The need for necessary lane closures during off-peak hours or at night, or short-term detour routes for ramp closures, will be identified as required. The TMP will include press releases to notify and inform motorists, business, community groups, local entities, emergency services, and politicians of upcoming closures or detours.

Various TMP elements such as portable Changeable Message Signs and CHP Construction Zone Enhanced Enforcement Program (COZEEP) and local law enforcement may be utilized to alleviate and minimize delay to the traveling public. Existing TOS field elements such as CCTV cameras and loop detectors within the project limits will be preserved or kept operational during the course of construction.

H. Maintenance Considerations

The following maintenance issues will be considered during preparation of project PS&E.

- The shoulder width at retaining walls and sound walls will be increased to 3.6 meters where right of way is available. Where feasible, sound walls will be located on right of way lines.
- The design should include ditches to remove surface water from the slope and avoid sheet flow down the slope. An “Air Blown Mortar” lined ditch with access for maintenance is one possible type for consideration.
- Maintenance vehicle pullouts are needed near features such as overhead signs, signal boxes, controllers, etc. During the design phase, maintenance vehicle pullout locations will be identified in coordination with appropriate Caltrans Maintenance staff.

- Where appropriate, the thrie beam barrier will be replaced by concrete in the median.
- Access roads will be included in the PS&E design to provide for equipment access behind sound walls that are not on right of way lines and at retaining walls where sufficient right of way is available.
- Access right to cross the CHP property located northwest of the interchange will be obtained in order to maintain a proposed retaining wall. A 4-meter wide maintenance easement and a double wide gate with 3-meter gate panels will be provided.
- Where slopes are steeper than 1:4, the design should consider benching, minimizing softscape features, and providing stairs to improve maintenance access.
- The gore and narrow strip area will be paved.
- There will be no median planting except for grasses that can be mowed once or twice a year. All roadside planting should be simple to maintain. As highway planting is a separate contract, Caltrans Maintenance should be involved with the highway planting design process.

I. Stage Construction

Caltrans will perform Level 1 35%, 65%, and 95% constructability reviews during PS&E. As discussed in Section I (Introduction), the proposed project would be constructed in five phases. Each phase of the project would be constructed in stages to minimize disruption to the traveling public. The following presents feasible and reasonable construction sequencing for the purpose of identifying construction and right of way impacts. The construction sequencing and staging descriptions would be further refined during PS&E preparation.

Each of the construction stages would maintain the existing number of traffic lanes on I-680 and SR-4 in each direction throughout the construction period, except during critical short-term construction activities. Temporary closures of I-680 and SR-4 would be required during placement and removal of falsework girders for new structures. Some short-term closures of existing interchange ramps could be necessary. Traffic would be detoured to the adjacent interchanges during these periods.

To maintain traffic flow along I-680 and SR-4 during structure placement and construction, a portion of each structure would be built and traffic would be detoured to that newly constructed portion while the rest of the structure is demolished and rebuilt.

Retaining walls would be constructed with the associated widening work in each stage, and sound walls would be constructed as early in each stage as practicable to help mitigate construction noise.

The following paragraphs describe a possible construction sequence of the major construction activities of each phase.

Phase 1

- Complete local street modifications at Pacheco Boulevard, construct new segment of Blum Road, redirect traffic and demolish old Blum Road segment.
- Shift traffic on NB I-680 and WB SR-4 toward the median.
- Realign Berry Drive near mobile homes to accommodate freeway widening.
- Complete outside lane widening and appropriate footings/columns/abutments and embankments.
- Shift mainline traffic toward outside lanes and construct median columns and footings.
- Complete construction of direct-connector flyover including slip ramp and widening of SR-4 Bridge over I-680.
- Remove NW loop ramp, shift westbound SR-4 traffic to inside lanes to accommodate widening, and add additional lanes to WB to SB loop ramp.

Phase 2

- Shift traffic toward the median on EB SR-4 and SB I-680.
- Construct I-680 and SR-4 outside lanes.
- Construct EB SR-4 to SB I-680 direct connector and slip ramp.
- Remove existing connector and re-stripe existing Collector-Distributor road.

Phase 3

- Shift traffic on SR-4 to outside lanes.
- Complete median widening.

Phase 4

- Shift traffic on SB I-680 and EB SR-4 toward the median.
- Realign SB I-680 to WB SR-4 connector and access ramps at Solano Avenue.
- Widen SB I-680 and EB SR-4 on outside.
- Shift freeway mainline traffic to outside to accommodate construction of direct connector columns and footings in the median.
- Complete construction of direct connector and remove SB I-680 to EB SR-4 loop ramp.

Phase 5

- Shift WB SR-4 and NB I-680 traffic toward the median.
- Widen WB SR-4 and NB I-680 on the outside and realign WB to NB diagonal ramp.

- Realign existing SB to WB direct connector and widen WB to SB loop ramp.

J. Accommodation of Oversize Loads

I-680 is part of the Department of Defense Priority network and can accommodate oversized loads. SR-4 can also accommodate oversized loads. However, some segments within the project limits have limited horizontal or vertical clearances and design exceptions are further detailed in Section V.A.3.

No permanent restriction to the movement of oversized loads would result from the project. During falsework installation and bridge construction, a temporary reduction in vertical and horizontal clearances (lane widths and shoulder restrictions) may occur. These reductions will meet falsework design standards for minimum vertical clearance and minimum width of traffic openings.

K. Graffiti Control

Some highway signs within the project limits have been subjected to graffiti. Specific measures such as use of form liners and textured surfaces will be included in the design of retaining walls and sound walls to discourage graffiti.

L. Risk Assessment

Risks associated with this project include the need for longitudinal encroachment variances, the limitations on funding, the possible need for FAA approval, change of environmental laws and unforeseen railroad involvement. The project assumes that longitudinal encroachment policy variance request will be approved for all the existing utilities. If the variance request were not approved, then based on this probability assessment, a portion of the estimated relocation costs has been included in the project cost estimate. If all of the variance requests are denied, project costs would significantly increase due to the need to relocate utilities. Currently, the project does not violate FAA airspace restrictions. However, if Buchanan Field Airport is converted to instrument-approach runways or if runways are extended, FAA approval of a breach in restricted airspace may be required. The delay in the replacement of the BNSF railroad bridge near the northern limits of the project at I-680 would delay the completion of the widening of I-680 in Phase 4.

The project is not fully funded and the proposed schedule is at risk if timely funding is not secured. The project cost estimates was prepared based on the latest available cost information. Because all phases are anticipated to be completed by 2017, the environmental conditions and impacts could change over time and may require re-verification.

VIII. PROGRAMMING

A. Programming

The MTC 2009 Transportation Improvement Program (TIP) includes environmental clearance for all phases of the project and initial funding for right-of-way acquisition for all five phases within the TIP period for a total of $297,546,000. All five phases of this project are included in the Financially Constrained Element of the 2005 RTP, the Transportation 2030 Plan. Phases 1 and 2 have been given the project ID number of 21205 for a total of $112,000,000. Phases 3, 4, and 5 have been given a project ID number of 22350 for a total of $182,000,000.

The anticipated project schedule is as follows:

Milestone	Date
Phases 1 and 2	
Approve PSR	November 2001
Project Approval and Environmental Document	March 2009
PS&E	July 2012
Right of Way Certification and Ready to List	November 2012
Approve Contract	April 2013
Job Completion	December 2015
Phase 3 Completion	2017
Phase 4 Completion	2017
Phase 5 Completion	2017

B. Funding

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. The 2008 Measure C Strategic Plan has programmed $3.5 million for project development activities. The current Measure C sales tax is scheduled to expire in 2009. Measure J, which passed on November 2, 2004, extends the existing sales tax by 25 years to fund additional transportation projects and improvements.The 2007

Measure J Strategic Plan includes $36 million for the I-680/SR-4 Interchange improvements.

In addition, $1.3 million for the design is programmed in the 2008 State Transportation Improvement Program for the 2012/2013 fiscal year. CCTA is also actively seeking supplemental funding including federal demonstration funds, future State Transportation Improvement Program funds, and other local funds.

IX. REVIEWS

The Project Report was reviewed and the proposed project concurred with by Mike Thomas, Design Coordinator, Division of Design on November 11, 2008. FHWA reviewed and approved both the Fact Sheet Exceptions to Mandatory Design Standards and the Supplemental Fact Sheet Exceptions on April 3, 2006. FHWA also approved the Request for Determination of Acceptability on November 4, 2005, which provides FHWA's conceptual approval of the modification of access points at the I-680/SR-4 Interchange and the proposed alternatives with and without the local slip ramp connectors. Final FHWA approval of the proposed modification of access points at the I-680/SR-4 Interchange was obtained on February12, 2009. As required by the FHWA/Caltrans Stewardship Agreement, a financial plan has been prepared. The Environmental Assessment (EA) portion of the draft environmental document was reviewed by Leland Dong and approved by Gene Fong, both of FHWA. Dale Jones of Caltrans approved the Initial Study (IS). Both the CEQA and NEPA portions of the final environmental document were reviewed by Caltrans District 4 Office of Environmental Analysis staff, who also prepared the FONSI under responsibilities assigned to Caltrans by the FHWA pursuant to 23 U.S.C.327. This project has been delegate to Caltrans under the current FHWA/Caltrans Stewardship Agreement. The final environmental document, the ND, and the FONSI were approved by Caltrans District 4 Director Bijan Sartipi on November 26, 2008 (see Appendix I).

X. PROJECT PERSONNEL

Position	Caltrans	CCTA	URS
Project Manager	Yadollah Fathollahi (510) 286-6018	Susan Miller (925) 256-4736	Scott Kelsey (510) 874-3217
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Project Development Unit Supervisor	Bonnita Chow (510) 286-6156		Ramesh Sathiamurthy (510) 874-3141
Project Development Unit Project Engineer			Erdal Karataylioglu (510) 874-3024
Environmental Unit Coordinator	Wahida Rashid (510) 286-5935		Jeff Zimmerman (510) 874-3005
Right of Way Branch Team Leader	Linda Emadzadeh (510) 286-6340		ML Handa (510) 874-3011
Environmental Unit Supervisor	Howell Chan (510) 286-5623		
Environmental Team Leader	Melanie Brent (510) 286-5231		

XI. LIST OF ATTACHMENTS

Appendix A. Project Location and Vicinity Map
Appendix B. TMP Data Sheets
Appendix C. Preliminary Plans, Typical Cross Sections and Advanced Planning Studies
Appendix D. Proposed Construction Phasing
Appendix E. Preliminary Project Cost Estimate Summary
Appendix F. Storm Water Data Report Signature Page
Appendix G. Right of Way Data Sheets
Appendix H. FHWA Approval
Appendix I. Initial Study with Negative Declaration / Environmental Assessment with Finding of No Significant Impact
Appendix J. Risk Management Plan
Appendix K. Cooperative Agreement

APPENDIX - A

PROJECT LOCATION AND VICINITY MAP

APPENDIX – B

TMP DATA SHEETS

APPENDIX – C

PRELIMINARY PLANS, TYPICAL CROSS SECTIONS, AND ADVANCED PLANNING STUDIES

(Attached Under Separate Cover)

APPENDIX – D

PROPOSED CONSTRUCTION PHASING

APPENDIX – E

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

APPENDIX – F

STORM WATER DATA REPORT SIGNATURE PAGE

APPENDIX –G

RIGHT OF WAY DATA SHEETS

APPENDIX - H
FHWA APPROVAL

APPENDIX – I

INITIAL STUDY WITH NEGATIVE DECLARATION (CEQA) / ENVIRONMENTAL ASSESSMENT WITH FINDING OF NO SIGNIFICANT IMPACT (NEPA)

(Attached Under Separate Cover)

APPENDIX – J

RISK MANAGEMENT PLAN

APPENDIX – K

COOPERATIVE AGREEMENT