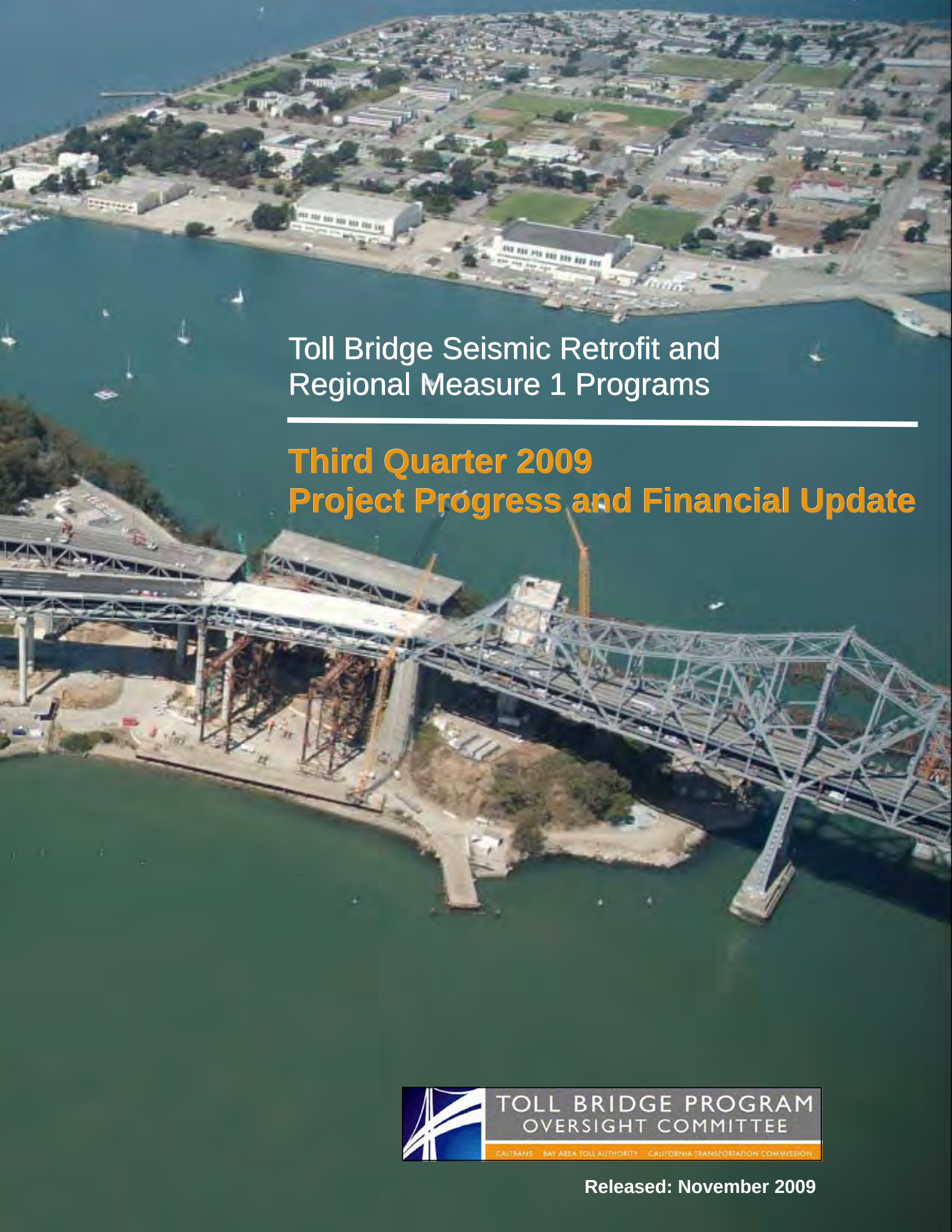


# Toll Bridge Seismic Retrofit and Regional Measure 1 Programs

## Third Quarter 2009 Project Progress and Financial Update

TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

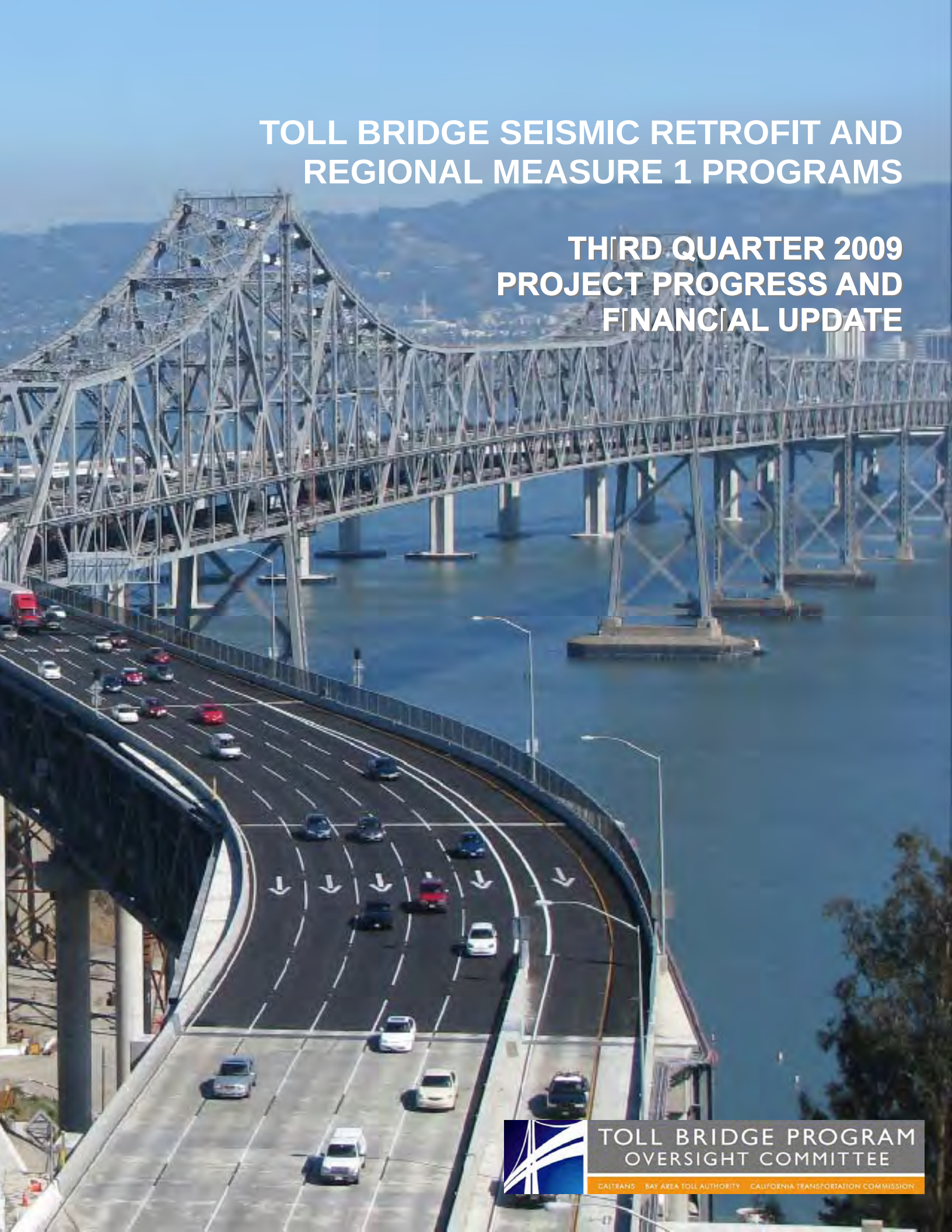
CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

**Released: November 2009**

**Overview of the Completed Detour on the right and Demolition of old Bridge in Progress**

# TOLL BRIDGE SEISMIC RETROFIT AND REGIONAL MEASURE 1 PROGRAMS

## THIRD QUARTER 2009 PROJECT PROGRESS AND FINANCIAL UPDATE



TOLL BRIDGE PROGRAM
OVERSIGHT COMMITTEE

CALTRANS · BAY AREA TOLL AUTHORITY · CALIFORNIA TRANSPORTATION COMMISSION

TOLL BRIDGE PROGRAM
OVERSIGHT COMMITTEE

Toll Bridge Program Oversight Committee
Department of Transportation
Office of the Director
1120 N Street
P.O. Box 942873
Sacramento, CA 94273-0001

November 13, 2009

Mr. Gregory Schmidt
Secretary of the Senate
State Capitol, Room 3044
Sacramento, CA 95814

Mr. E. Dotson Wilson
Chief Clerk of the Assembly
State Capitol, Room 3196
Sacramento, CA 95814

Dear Messrs. Schmidt and Wilson:

The Toll Bridge Program Oversight Committee (TBPOC) is pleased to submit the Third Quarter 2009 Project Progress and Financial Update. The TBPOC consists of the Director of the Department of Transportation (Caltrans), the Executive Director of the Bay Area Toll Authority (BATA), and the Executive Director of the California Transportation Commission.

On the San Francisco-Oakland Bay Bridge East Span Seismic Replacement Project, significant progress has been made on several areas. Over an extended Labor Day weekend, Caltrans and our contractors closed the Bay Bridge to roll out a section of the existing bridge and to roll in a new section that opens a new detour viaduct from the existing bridge to the Yerba Buena Tunnel. Since Labor Day, Caltrans has been working in cooperation with the California Highway Patrol to post additional signage and conduct more enforcement activities in order to reduce the speed of traffic on the detour structure.

The reopening of the bridge would have occurred early if not for the discovery of a failed eyebar on the existing main east span. Due to the hard work and dedication of our contractors, consultants, and Caltrans staff, we avoided major gridlock on our roadways and kept people moving. Unfortunately, the temporary repair of the eyebar made over the Labor Day weekend failed on October 27th, resulting in the Bay Bridge being closed until the morning of November 2nd (see details of the repairs in the attached fact sheets). Currently, a revised temporary repair has been reinstalled on the bridge. A permanent repair to the eyebar will be performed in the near future that will require an additional closure of the Bay Bridge.

On the Self Anchored Suspension Span (SAS) contract, we had hoped for our first deliveries of roadway sections for the SAS to arrive this fall. At this time, the first shipment of roadway boxes is expected at the end of this year, while the first tower segments are not expected until next year. The complexity of the design and fabrication of the bridge has resulted in delays that will likely prevent the westbound opening of the bridge in 2012, but we remain optimistic for a full opening of the bridge in 2013. We are currently negotiating with the contractor to expedite ongoing work in both China and Canada to make up for the lost time.

As explained in past quarterly reports, we have encountered and will continue to encounter these types of challenges in keeping the project on schedule. Risk assessments have identified a number of cost and schedule risks to the program. Based on current program scope, the risk management process now projects an 80 percent probability that the program's contingency funding will be adequate to complete the East Span Project.

On other TBPOC activities, Governor Schwarzenegger signed Assembly Bill (AB) 1175 on October 11, 2009, which added the Dumbarton and Antioch Bridges to the Toll Bridge Seismic Retrofit Program (TBSRP). BATA has now initiated efforts to raise tolls on the seven State-owned toll bridges in the Bay Area to, in part, fund the seismic retrofit of the bridges. BATA has already funded design plans for both bridge projects in anticipation of them being advertised in early 2010. The total estimated cost of these retrofits has been revised from $950 million to $750 million, as project plans have been refined with reduced scope, which has minimized cost risks. As AB 1175 takes effect on January 1, 2010, we will start incorporating formal financial and schedule reporting on the Dumbarton and Antioch Bridge seismic retrofits in our First Quarter 2010 Project Progress and Financial Update Report.

On August 29, 2009, Caltrans, BATA and a number of dignitaries celebrated the substantial completion of the rehabilitation of the 1962 Benicia-Martinez Bridge. As the last major contract of the New Benicia-Martinez Bridge Project, the rehabilitation project added a new southbound traffic lane, new shoulders, and a new bicycle/pedestrian pathway to the old bridge. Work is now essentially complete, except for punchlist work and an upcoming landscaping project.

This report is designed to keep the Legislature apprised of the progress and financial status of the TBSRP pursuant to California Streets and Highways Code Section 30952.2. The TBPOC is committed to providing the Legislature with comprehensive and timely reporting on the TBSRP. If there are any questions, or if any additional information is required, please do not hesitate to contact the members of the TBPOC.

Sincerely,

**STEVE HEMINGER**
TBPOC Chair
Executive Director
Bay Area Toll Authority

**BIMLA G. RHINEHART**
TBPOC Vice-Chair
Executive Director
California Transportation Commission

**RANDELL H. IWASAKI**
Director
California Department of Transportation

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Director
California Department of Transportation

# EYEBAR REPAIR FACTSHEET

**LABOR DAY WEEKEND, A CRACK WAS DISCOVERED IN A CRITICAL MEMBER OF THE ORIGINAL EAST SPAN**

During the 2009 Labor Day weekend closure of the San Francisco-Oakland Bay Bridge, engineers inspecting the bridge discovered a crack in an eyebar, a critical piece of structural steel on the East Span.

Although the crack was unrelated to the weekend's connection of a detour on Yerba Buena Island, it was significant enough to have closed the bridge on its own.

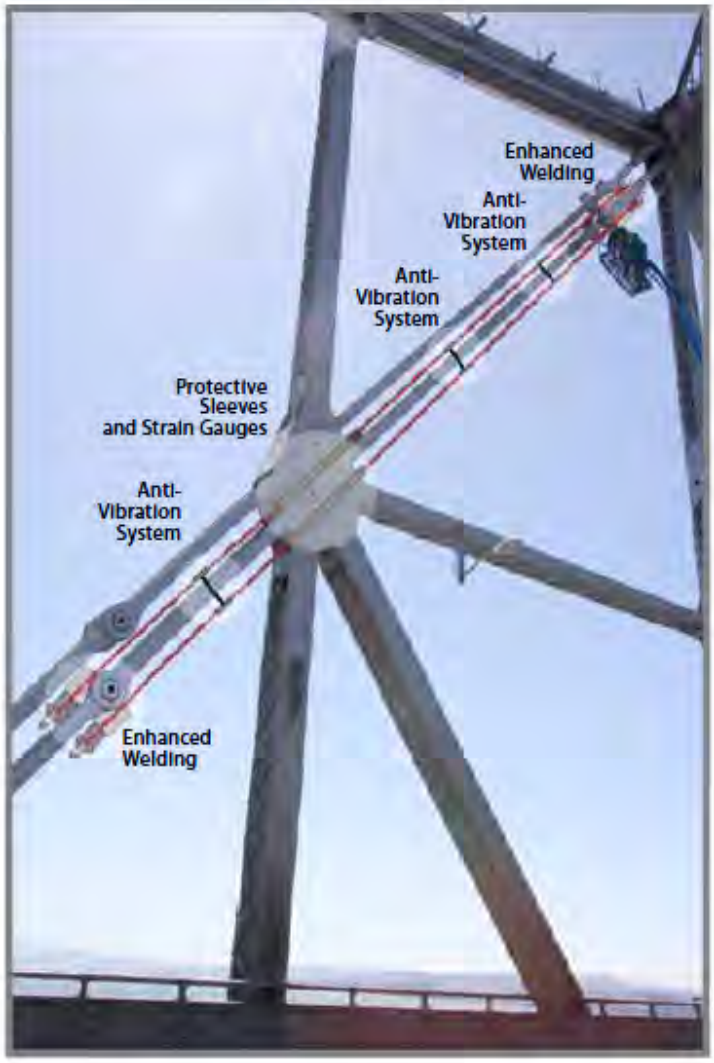
Engineers found the damaged eyebar – one of 1,680 on the bridge – during a regularly scheduled inspection. Caltrans conducts thorough inspections every two years as mandated by federal law. The crack had occurred in the two years between inspections; rust in the crack indicated that it was not caused by the weekend's detour construction.

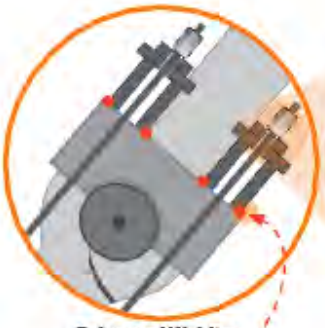
Workers and much of the material to fix the crack were already on site for the unrelated construction. Crews worked nearly 70 hours nonstop to repair the damaged eyebar.

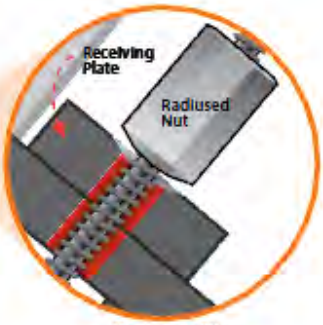
During the evening of Tuesday, Oct. 27, a high-strength tie rod failed, due to fatigue-stress, most likely caused by excessive movement of the rod during high-winds resulting in metal-on-metal contact.

The failed tie rod pulled down another tie rod and a steel cross bar from the top saddle which fell onto the upper deck of the Bay Bridge. Caltrans immediately closed the Bay Bridge and began designing repairs.

# DESIGN




Radiused Nut Centers Tie Rod in Hole

Anti-Vibration System

Protective Sleeves

Engineers developed a design that would augment and enhance the system put in place during Labor Day weekend, which addresses the lost load carrying capacity of the damaged eyebar. This updated design has achieved three things:

- ***Significantly reduced vibration in the tie rods***
  Engineers achieved this by developing a turnbuckle system that lashed the tie rods and eyebars together.
- ***Reduced potential for metal-on-metal contact***
  Radiused nuts were used to secure the tie rods, which keeps them centered in their holes to minimize any metal-on-metal contact.

  Additionally, protective sleeves were wrapped around the tie rods to prevent them from rubbing against the eyebars.
- ***Secured the repair system components in place***
  Enhanced welds connect the cross bars to the saddles.

  Tie rods are secured by a new anti-vibration system

  Saddles and tie rod ends are secured by tethering straps and cables.

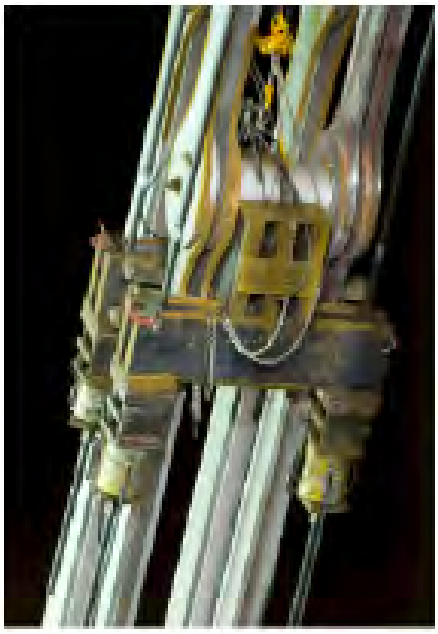
# INSTALLATION

Installing the updated repair entailed replacing all four tie rods, enhancing the welds, installing the anti-vibration system, centering the rods, and maintaining alignment of those rods.

The installation also included extensive cutting, grinding and custom fitting to minimize the potential for metal-on-metal contact.

Crews worked for nearly 130 hours to complete the enhanced repair and support system.

# TESTING & INSPECTION



Once the repair was installed and stress testing was completed, the enhanced system was scrutinized by independent and respected experts—members of the Federal Highway Administration; Professor Frieder Seible, Dean of Jacobs School of Engineering at the University of California at San Diego, member of the Toll Bridge Program's Seismic Safety Peer Review Panel and Professor Ahmad Itani, of the Department of Civil and Environmental Engineering at the University of Nevada at Reno.

Initial daily inspections will be conducted of the repair system. The eyebars will also be inspected every three months. Other future inspections may require full bridge closures.

A long term repair to the eyebar will be performed in the near future that will require an additional closure of the Bay Bridge.

**BAY BRIDGE PUBLIC INFORMATION OFFICE**
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Oakland, CA 94607
(510) 286-7167
**Info@BayBridgeInfo.org**

# Table of Contents


**Introduction** ..... 1

Summary of Major Project Highlights, Issues, and Actions ..... 2

Toll Bridge Seismic Retrofit Program Cost Summary ..... 6

Toll Bridge Seismic Retrofit Program Schedule Summary ..... 7

Regional Measure 1 Program Cost Summary ..... 8

Regional Measure 1 Program Schedule Summary ..... 9

**Toll Bridge Seismic Retrofit Program (TBSRP)** ..... **11**

San Francisco-Oakland Bay Bridge Seismic Retrofit Strategy ..... 12

San Francisco-Oakland Bay Bridge East Span Replacement Project Summary ..... 15

Yerba Buena Island Detour (YBID) ..... 16

YBID East Tie-in Opening Activities ..... 18

Yerba Buena Island Transition Structures (YBITS) ..... 20

Self-Anchored Suspension (SAS) Bridge ..... 22

SAS Construction Sequence ..... 24

SAS Superstructure Fabrication Activities ..... 26

SAS Superstructure Field Activities ..... 29

Skyway ..... 32

Oakland Touchdown (OTD) ..... 33

Other Contracts ..... 34

Quarterly Environmental Compliance Highlights ..... 36

Other Completed TBSRP Projects ..... 38

Risk Management ..... 40

Program Funding Status ..... 48

**Seismic Retrofit of Dumbarton and Antioch Bridges** ..... **51**

Dumbarton Bridge Seismic Retrofit Project ..... 52

Antioch Bridge Seismic Retrofit Project ..... 54

Project Cost and Schedule Summaries ..... 56

**Regional Measure 1 (RM1) Toll Bridge Program** ..... **59**

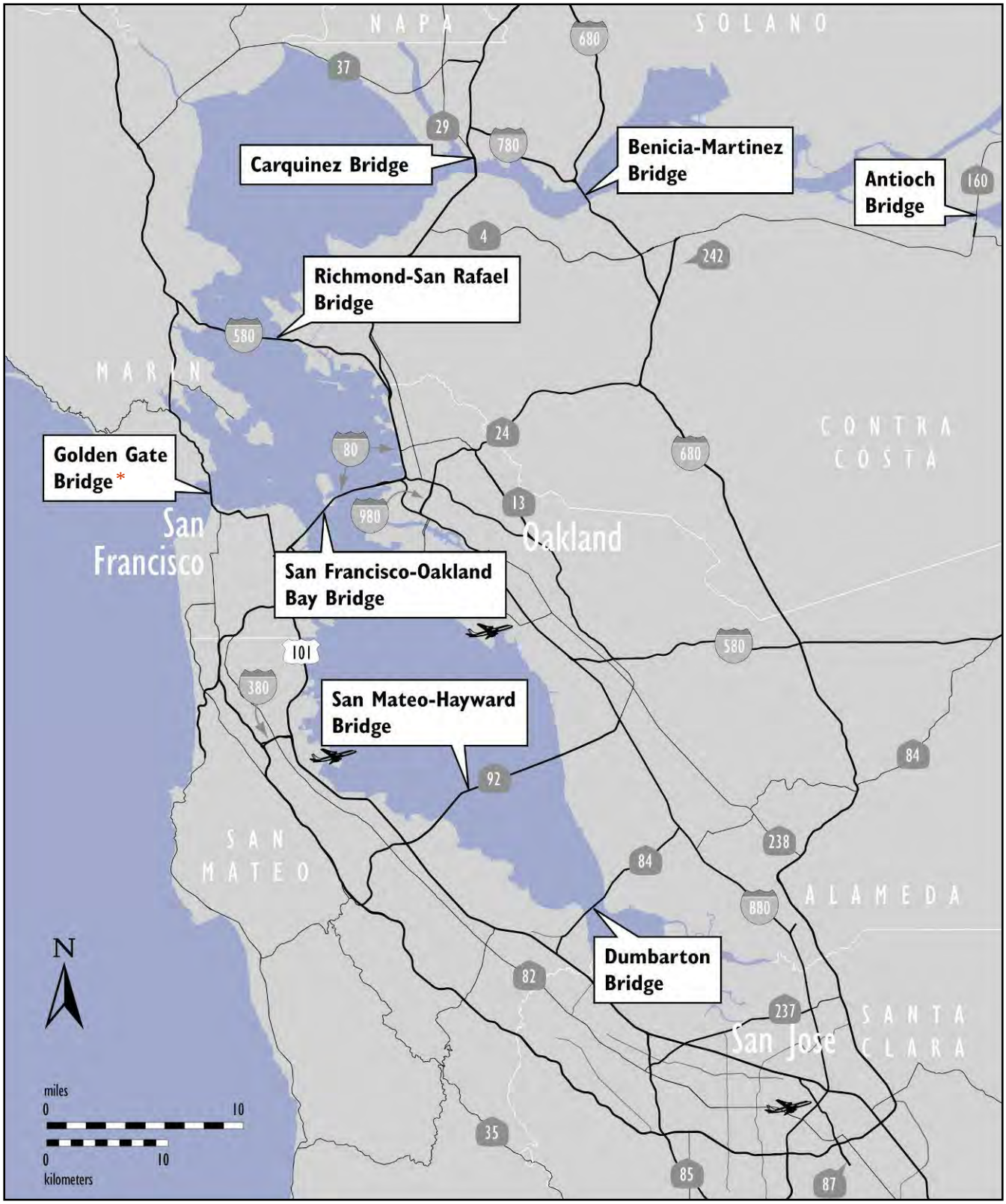
New Benicia-Martinez Bridge Project ..... 60

Interstate 880/State Route 92 Interchange Reconstruction Project ..... 62

Other Completed RM1 Projects ..... 64

**Appendices** ..... **67**

# Map of Bay Area Toll Bridges




* The Golden Gate Bridge is owned and operated by the Golden Gate Bridge, Highway, and Transportation District.

# Introduction

In July 2005, Assembly Bill (AB) 144 (Hancock) created the Toll Bridge Program Oversight Committee (TBPOC) to implement a project oversight and project control process for the Benicia-Martinez Bridge and State Toll Bridge Seismic Retrofit Program projects. The TBPOC consists of the Caltrans Director, the Bay Area Toll Authority (BATA) Executive Director and the Executive Director of the California Transportation Commission (CTC). The TBPOC's project oversight and control processes include, but are not limited to, reviewing bid specifications and documents, providing field staff to review ongoing costs, reviewing and approving significant change orders and claims in excess of $1 million (as defined by the committee) and preparing project reports.

AB 144 identified the Toll Bridge Seismic Retrofit Program and the new Benicia-Martinez Bridge Project as being under the direct oversight of the TBPOC. The Toll Bridge Seismic Retrofit Program includes:

| Toll Bridge Seismic Retrofit Projects | Seismic Safety Status |
|---|---|
| San Francisco-Oakland Bay Bridge East Span Replacement | Construction |
| San Francisco-Oakland Bay Bridge West Approach Replacement | Complete |
| San Francisco-Oakland Bay Bridge West Span Seismic Retrofit | Complete |
| San Mateo-Hayward Bridge Seismic Retrofit | Complete |
| Richmond-San Rafael Bridge Seismic Retrofit | Complete |
| 1958 Carquinez Bridge Seismic Retrofit | Complete |
| 1962 Benicia-Martinez Bridge Seismic Retrofit | Complete |
| San Diego-Coronado Bridge Seismic Retrofit | Complete |
| Vincent Thomas Bridge Seismic Retrofit | Complete |

The new Benicia-Martinez Bridge is part of a larger program of toll-funded projects called the Regional Measure 1 (RM1) Toll Bridge Program under the responsibility of BATA and Caltrans. While the rest of the projects in the RM1 program are not directly under the responsibility of the TBPOC, BATA and Caltrans will continue to report on their progress as an informational item. The RM1 program includes:

| Regional Measure 1 Projects | Open to Traffic Status |
|---|---|
| Interstate 880/State Route 92 Interchange Reconstruction | Construction |
| 1962 Benicia-Martinez Bridge Reconstruction | Open |
| New Benicia-Martinez Bridge | Open |
| Richmond-San Rafael Bridge Deck Overlay Rehabilitation | Open |
| Richmond-San Rafael Bridge Trestle, Fender & Deck Joint Rehabilitation | Open |
| Westbound Carquinez Bridge Replacement | Open |
| San Mateo-Hayward Bridge Widening | Open |
| State Route 84 Bayfront Expressway Widening | Open |
| Richmond Parkway | Open |

# SUMMARY OF MAJOR PROJECT HIGHLIGHTS, ISSUES, AND ACTIONS

SAS Tower Lifting up Lift 1 South Shaft Tower to Vertical Position

SAS Tower Lift 1 South Shaft in Vertical Position

## Toll Bridge Seismic Retrofit Program Risk Management

A major element of the 2005 Assembly Bill 144, the law creating the TBPOC, was legislative direction to implement a more aggressive risk management program. Such a program has been implemented in stages over time to ensure development of a robust and comprehensive approach to risk management. We have reached a milestone with our risk management program with all elements now fully incorporated, resulting in one of the most detailed and comprehensive risk management programs in the country today.

A comprehensive risk assessment is performed for each project in the program. Based upon those assessments, a forecast is developed using the average cost of risk. These forecasts can both increase and decrease as risks are identified, resolved or retired. Nonetheless, we want to ensure that the public is informed of the risks we have identified and the possible expense they could necessitate.

Based upon the Second Quarter 2009 Risk Management Report, we have identified a $500-$700 million in risks to the program contingency, which is a slight increase from the last quarter. It is important to note that our $690 million budgeted program contingency is sufficient to cover the risks to an 80 percent confidence level. We will continue to work on mitigating these risks to reduce the potential draw on contingencies. Further details on identified risks are included in the contract summaries. Additional information on the risk management program is included on page 40.

## San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Replacement Project

### SAS Superstructure Contract

The prime contractor constructing the Self-Anchored Suspension Bridge from the completed Skyway to Yerba Buena Island is a joint venture of American Bridge/Fluor (ABF). The primarily steel bridge is being fabricated around the world in components. Temporary steel structures have been and are continuing to be erected in the San Francisco Bay to support the new bridge during construction.

The contractor has reported that fabrication of the steel tower and roadway boxes has fallen 15 months behind schedule due to the complexity of the design and fabrication. The first shipment of roadway boxes (segments 1 through 4) are anticipated by the end of 2009, while the first tower segments are not expected until next year. All components have undergone a rigorous quality review by Shanghai Zhenhua Heavy Industry Co. Ltd. (ZPMC), ABF, and Caltrans to ensure that only bridge components that have been built in accordance to the specifications will be shipped.

On the critical path to completing the bridge is the fabrication of the last two roadway sections at the east end of the new span (Segments 13 and 14). Fabrication of these segments has fallen behind schedule due to delays in the fabrication drawing preparation process. The TBPOC is exploring options to improve review times and communication, including locating additional design staff with shop drawing drafters in Vancouver, Canada. These delays are likely to prevent the westbound opening of the bridge in 2012, but we continue to push for full opening of the bridge in 2013.

Caltrans has established risk management teams to evaluate these challenges and to identify future potential risks to completing the project on time and on budget. In particular, teams are reviewing cable erection plans and mitigation actions. Based on the latest risk management assessment, there is a potential for a $260 million increase on the SAS contract.

## Yerba Buena Island Detour Contract

The Yerba Buena Island Detour contractor, C.C. Myers, has rolled out the existing bridge span and rolled in the new east tie-in span of the detour structure that diverts traffic off the existing bridge to the detour structure that now ties into  the Yerba Buena Island Tunnel. The traffic switch occurred as scheduled on Labor Day weekend. The contractor continues to make progress on a number of accelerated foundations for the future transition structure from the Self-Anchored Suspension (SAS) bridge to the tunnel.

Based on the last completed risk management assessment, which retired 20 million dollars in previously reported risks, there remains a potential for an $11 million increase for the contract. This assessment is expected to continue; however to decrease next quarter. Remaining risks include unexpected construction challenges during demolition of the old structure. These challenges are being addressed via collaborative on-site meetings between Caltrans and the contractor to actively identify and resolve issues early and at the lowest cost.

**Detour Structure East Tie-In Span Completed over the Labor Day Weekend**

# SUMMARY OF MAJOR PROJECT HIGHLIGHTS, ISSUES, AND ACTIONS

Oakland Touchdown Mole Substation

Eastbound OTD Hinge Pipe Beam Support Installation

Dumbarton/Antioch Bridges Mock-Up of Dumbarton Pier Columns Undergoing Seismic Testing

## Oakland Touchdown Contract

In early August, the Oakland Touchdown (OTD) contractor, MCM, continues to be ahead of schedule and has opened construction access on the new westbound OTD structure to the Skyway. Work continues on the eastbound structure.

## TBSRP Capital Outlay Support

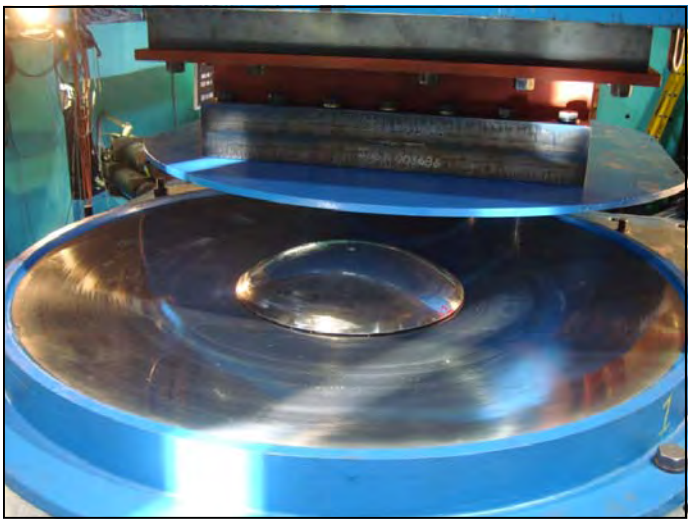
Based on initial discussions with our contractors, early completion of the East Span Project was believed to be possible and sufficient to mitigate potential identified support cost increases. The support cost increases are due primarily to the need to re-advertise the SAS contract and to decisions made to increase our opportunities for early completion of the East Span Project and potential for support cost savings. These decisions include a 12-month schedule extension provided during bid time to attract the maximum number of bidders for the SAS contract and extension of the YBI Detour contract to advance future foundation and column work of the transition structure and west-end deck reconstruction. Since we now judge early completion and the intended cost savings to be unlikely, we forecast a potential drawdown of $244 million from the program contingency for project support. Further increases in project support costs would be expected if the project is delayed beyond the 2013 forecast bridge opening date.

## TBSRP Programmatic Risks

This category includes risks that are not yet scoped within existing contracts and/or that spread across multiple contracts. The interdependencies between all of the contracts in the program result in the potential for delays on one contract to impact the other contracts.

## Seismic Retrofit of the Dumbarton and Antioch Bridges

When first conceived, the Toll Bridge Seismic Retrofit Program only identified seven of the nine state-owned toll bridges to be in need of seismic retrofit, which excluded the Dumbarton and Antioch Bridges. Further seismic vulnerability studies were completed by Caltrans and BATA on those structures and determined that both structures were in need of retrofit based on current seismic standards. On October 11, 2009, Governor Schwarzenegger approved Assembly Bill 1175 which added the Dumbarton and Antioch Bridges to the Toll Bridge Seismic Retrofit Program. BATA has now initiated efforts to raise tolls on the seven State-



Prototype of Bearing for the Antioch Bridge Seismic Retrofit Project

New Pedestrian Bicycle Path on Benicia-Martinez Bridge Under Construction

Site Preparation for New Route 92 and Interstate 880 Separator

owned toll bridges in the Bay Area to, in part, fund the seismic retrofit of the Dumbarton and Antioch Bridges.

BATA has already funded design plans for both bridge projects in anticipation of the projects being advertised in early 2010. The total estimated cost of these retrofits have been recently revised from $950 million to $750 million as project plans have been refined with reduced scope which have has minimized cost risks.

## Regional Measure 1 Toll Bridge Program (RM1)

## New Benicia-Martinez Bridge Project

On August 29, 2009, Caltrans, BATA and a number of dignitaries celebrated the substantial completion of the rehabilitation of the 1962 Benicia-Martinez Bridge. As the last major contract of the New Benicia-Martinez Bridge Project, the rehabilitation project converted the existing bridge to carry southbound-only Interstate 680 traffic. The work included adding a new southbound traffic lane (opened in early August 2009), shoulders and a new bicycle/pedestrian pathway. Work is now essentially complete on the new bridge project, except for punchlist work and an upcoming landscaping project.

## Interstate 880/State Route 92 Interchange Reconstruction Project

On this interchange reconstruction contract, the new east Route 92 to North Interstate 880 direct connector structure (ENCONN) was completed and opened to detour traffic on May 16, 2009. Work is ongoing on a new separator structure. The Department and BATA have revised the support forecast for the project. An increase in support is due to extended advertisement for the project and weather delays. The project is still forecast to be completed as planned in June 2011.

# Toll Bridge Seismic Retrofit Program Cost Summary

| | Contract Status | AB 144/SB 66 Budget (Jul 2005) | TBPOC Approved Changes | Current TBPOC Approved Budget (September 2009) | Cost to Date (September 2009) | Current Cost Forecast (September 2009) | Cost Variance | Cost Status |
|---|---|---|---|---|---|---|---|---|
| | | a | b | c = a + b | d | e | f = e - c | |
| SFOBB East Span Seismic Replacement | | | | | | | | |
| Capital Outlay Construction | | | | | | | | |
| Skyway | Completed | 1,293.0 | (38.9) | 1,254.1 | 1,236.9 | 1,254.1 | - | ● |
| SAS Marine Foundations | Completed | 313.5 | (32.6) | 280.9 | 275.0 | 280.9 | - | ● |
| SAS Superstructure | Construction | 1,753.7 | - | 1,753.7 | 821.5 | 2,014.1 | 260.4 | ● |
| YBI Detour | Construction | 132.0 | 360.8 | 492.8 | 384.2 | 504.0 | 11.2 | ● |
| YBI Transition Structures (YBITS) | | 299.3 | (23.2) | 276.1 | - | 285.9 | 9.8 | ● |
| YBITS 1 | Advertised | - | | - | - | *223.2* | - | ● |
| YBITS 2 | Design | - | - | - | - | *59.4* | - | ● |
| YBITS Landscaping | Design | - | | - | - | *3.3* | - | ● |
| Oakland Touchdown | | 283.8 | - | 283.8 | 193.2 | 289.0 | 5.2 | ● |
| OTD 1 | Construction | - | | - | *185.3* | *211.0* | - | ● |
| OTD 2 | Design | - | | | - | *64.0* | - | ● |
| OTD Electrical Systems | Design | - | | - | - | *4.4* | - | ● |
| Submerged Electric Cable | Completed | - | | | *7.9* | *9.6* | - | ● |
| Existing Bridge Demolition | Design | 239.2 | | 239.2 | - | 232.1 | (7.1) | ● |
| Stormwater Treatment Measures | Completed | 15.0 | 3.3 | 18.3 | 16.7 | 18.3 | - | ● |
| Other Completed Contracts | Completed | 90.3 | - | 90.3 | 89.2 | 90.3 | - | ● |
| Capital Outlay Support | | 959.3 | - | 959.3 | 771.9 | 1,203.1 | 243.8 | ● |
| Right-of-Way and Environmental Mitigation | | 72.4 | - | 72.4 | 51.2 | 72.4 | - | ● |
| Other Budgeted Capital | | 35.1 | (3.3) | 31.8 | 0.7 | 7.7 | (24.1) | ● |
| Total SFOBB East Span Replacement | | 5486.6 | 266.1 | 5,752.7 | 3,840.5 | 6,251.9 | 499.2 | |
| SFOBB West Approach Replacement | | | | | | | | ● |
| Capital Outlay Construction | Completed | 309.0 | 41.7 | 350.7 | 328.1 | 338.1 | (12.6) | ● |
| Capital Outlay Support | | 120.0 | - | 120.0 | 116.6 | 117.0 | (3.0) | ● |
| Total SFOBB West Approach Replacement | | 429.0 | 41.7 | 470.7 | 444.7 | 455.1 | (15.6) | |
| Completed Program Projects | Completed | 1,839.4 | (97.5) | 1,741.9 | 1,712.6 | 1,741.9 | - | ● |
| Miscellaneous Program Costs | | 30.0 | - | 30.0 | 24.7 | 30.0 | - | ● |
| Net Programmatic Risks | | - | - | - | - | 165.4 | 165.4 | ● |
| Program Contingency | | 900.0 | (210.3) | 689.7 | - | 40.7 | (649.0) | ● |
| Total Toll Bridge Seismic Retrofit Program | | 8,685.0 | - | 8,685.0 | 6,022.5 | 8,685.0 | - | ● |

● Within approved schedule and budget
● Identified potential project risks that could significantly impact approved schedules and budgets if not mitigated
● Known project impacts with forthcoming changes to approved schedules and budgets

# Toll Bridge Seismic Retrofit Program Schedule Summary

| | AB144/SB 66 Project Completion Schedule Baseline (Jul 2005) | TBPOC Approved Changes (Months) | Current TBPOC Approved Completion Schedule (September 2009) | Current Completion Forecast (September 2009) | Schedule Variance (Months) | Schedule Status | Remarks/Notes |
|---|---|---|---|---|---|---|---|
| | g | h | i = g + h | j | k = j - i | l | |
| SFOBB East Span Seismic Replacement | | | | | | | |
| Contract Completion | | | | | | | |
| Skyway | Apr 2007 | 8 | Dec 2007 | Dec 2007 | - | ● | See Page 32 |
| SAS Marine Foundations | Jun 2008 | (5) | Jan 2008 | Jan 2008 | - | ● | See Page 22 |
| SAS Superstructure | Mar 2012 | 12 | Mar 2013 | Mar 2013 | - | ● | See Page 23 |
| YBI Detour | Jul 2007 | 41 | Dec 2010 | Dec 2010 | - | ● | See Page 16 |
| YBI Transition Structures (YBITS) | Nov 2013 | 12 | Nov 2014 | Nov 2014 | - | | See Page 20 |
| YBITS 1 | | | Sep 2013 | Sep 2013 | - | ● | |
| YBITS 2 | | | Nov 2014 | Nov 2014 | - | ● | |
| YBITS Landscaping | | | TBD | TBD | - | ● | |
| Oakland Touchdown | Nov 2013 | 12 | Nov 2014 | Nov 2014 | - | | See Page 33 |
| OTD 1 | | | May 2010 | May 2010 | - | ● | |
| OTD 2 | | | Nov 2014 | Nov 2014 | - | ● | |
| OTD Electrical Systems | | | TBD | TBD | - | ● | |
| Submerged Electric Cable | | | Jan 2008 | Jan 2008 | - | ● | |
| Existing Bridge Demolition | Sep 2014 | 12 | Sep 2015 | Sep 2015 | - | ● | |
| Stormwater Treatment Measures | Mar 2008 | - | Mar 2008 | Mar 2008 | - | ● | |
| SFOBB East Span Bridge Opening and Other Milestones | | | | | | | |
| OTD West bound Access | | | Jan 2010 | Jan 2010 | - | ● | |
| YBI Detour Open | | | Sep 2009 | Sep 2009 | - | ● | See Page 18 |
| Westbound Open | Sep 2011 | 12 | Sep 2012 | Dec 2012 | 3 | ● | |
| Eastbound Open | Sep 2012 | 12 | Sep 2013 | Sep 2013 | - | ● | |
| SFOBB West Approach Replacement | | | | | | ● | |
| Contract Completion | Aug 2009 | (7) | Jan 2009 | Jan 2009 | - | ● | |

Notes: 1) Figures may not sum up to totals due to rounding effects.
2) TBSRP Forecasts for the Monthly Reports are generally updated on a quarterly basis in conjunction with quarterly risk analysis assessments for the TBSRP Projects.

# Regional Measure 1 Program Cost Summary

| | Contract Status | BATA Baseline Budget (Jul 2005) | BATA Approved Changes | Current BATA Approved Budget (September 2009) | Cost to Date (September 2009) | Current Cost Forecast (September 2009) | Cost Variance | Cost Status |
|---|---|---|---|---|---|---|---|---|
| | | a | b | c = a + b | d | e | f = e - c | |
| New Benicia-Martinez Bridge | | | | | | | | |
| Capital Outlay Construction | Construction | 861.6 | 174.0 | 1,035.6 | 995.2 | 1,035.6 | - | ● |
| Capital Outlay Support | | 157.1 | 35.1 | 192.2 | 190.7 | 192.2 | - | ● |
| Capital Outlay Right-of-Way | | 20.4 | (0.1) | 20.3 | 17.0 | 20.3 | - | ● |
| Project Reserve | | 20.8 | 3.6 | 24.4 | - | 24.4 | - | |
| Total New Benicia-Martinez Bridge | | 1,059.9 | 212.6 | 1,272.5 | 1,202.9 | 1,272.5 | - | |
| Interstate 880/Route 92 Interchange Reconstruction | | | | | | | | |
| Capital Outlay Construction | Construction | 94.8 | 60.2 | 155.0 | 77.3 | 155.0 | - | ● |
| Capital Outlay Support | | 28.8 | 34.6 | 63.4 | 49.6 | 63.4 | - | ● |
| Capital Outlay Right-of-Way | | 9.9 | 7.0 | 16.9 | 11.7 | 16.9 | - | ● |
| Project Reserve | | 0.3 | 9.4 | 9.7 | - | 9.7 | - | |
| Total I-880/SR-92 Interchange Reconstruction | | 133.8 | 111.2 | 245.0 | 138.6 | 245.0 | - | |
| Completed Program Projects | | 918.9 | (30.0) | 888.9 | 878.6 | 888.9 | - | |
| Total Regional Measure 1 Toll Bridge Program | | 2,112.6 | 293.9 | 2,406.4 | 2,220.1 | 2,406.4 | - | |

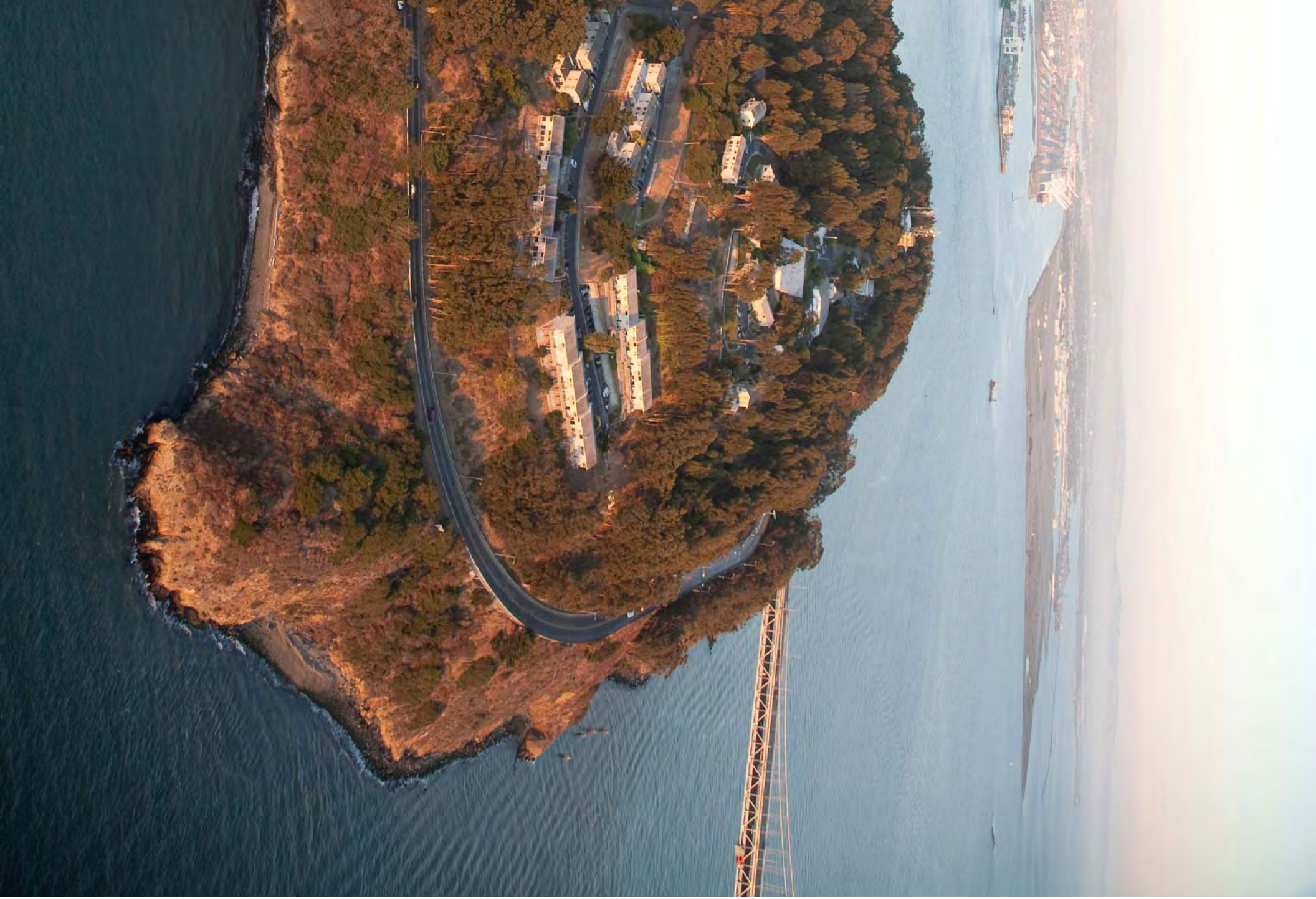
● Within approved schedule and budget
● Identified potential project risks that could significantly impact approved schedules and budgets if not mitigated
● Known project impacts with forthcoming changes to approved schedules and budgets

# Regional Measure 1 Program Schedule Summary

| | BATA Baseline Completion Schedule (Jul 2005) | BATA Approved Changes (Months) | Current BATA Approved Completion Schedule (September 2009) | Current Completion Forecast (September 2009) | Schedule Variance (Months) | Schedule Status | Remarks/Notes |
|---|---|---|---|---|---|---|---|
| | g | h | i = g + h | j | k = j - i | l | |
| New Benicia-Martinez Bridge | | | | | | | |
| Contract Completion | | | | | | | |
| 1962 BM Bridge Reconstruction | Dec 2009 | (4) | Aug 2009 | Aug 2009 | - | ● | See Page 54 |
| New Benicia-Martinez Bridge Opening Date | | | | | | | |
| New Bridge | Dec 2007 | (4) | Aug 2007 | Aug 2007 | - | ● | |
| | | | | | | | |
| Interstate 880/Route 92 Interchange Reconstruction | | | | | | | |
| Contract Completion | | | | | | | |
| Interchange Reconstruction | Dec 2010 | 6 | Jun 2011 | Jun 2011 | - | ● | See Page 56 |

Notes: 1) Figures may not sum to totals due to rounding effects.

Aerial View of Yerba Buena Island Looking East toward Oakland



# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# San Francisco-Oakland Bay Bridge Seismic Retrofit Strategy

When a 250-ton section of the upper deck of the East Span collapsed during the 7.1-magnitude Loma Prieta Earthquake in 1989, it was a wake-up call for the entire Bay Area. While the East Span quickly reopened within a month, critical questions lingered: How could the Bay Bridge—a vital regional lifeline structure—be strengthened to withstand the next major earthquake? Seismic experts from around the world determined that to make each separate element seismically safe on a bridge of this size, the work must be divided into numerous projects. Each project presents unique challenges. Yet there is one common challenge — the need to accommodate the more than 280,000 vehicles that cross the bridge each day.

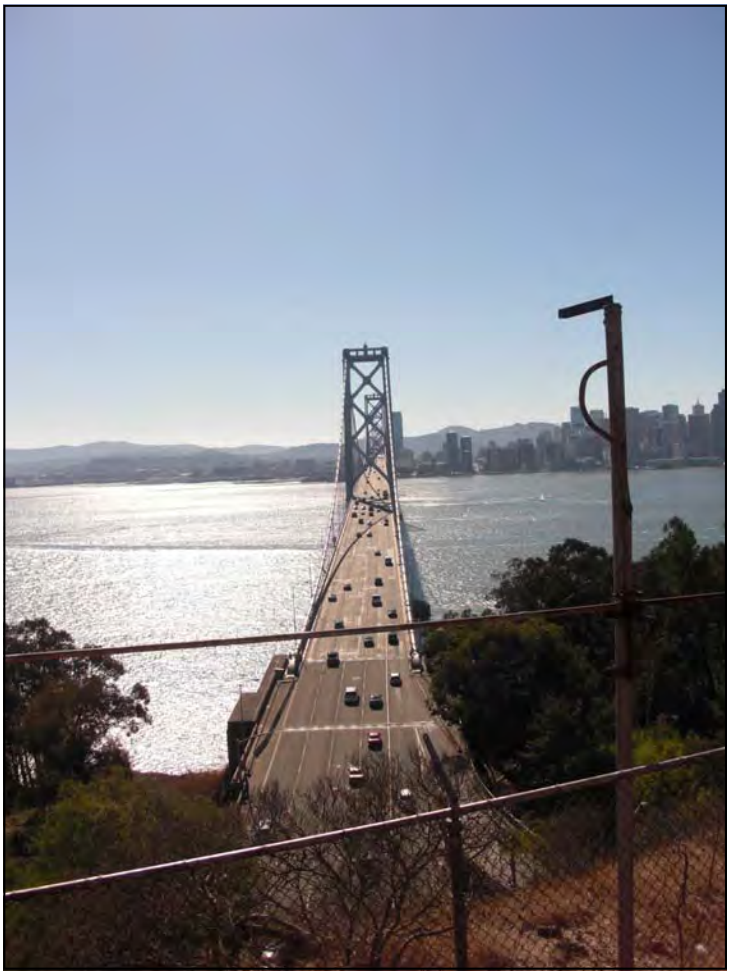
Overview of the Completed West Approach Replacement Structure

## West Approach Seismic Replacement Project
## Project Status: Completed 2009

Seismic safety retrofit work on the West Approach in San Francisco—bounded on the west by 5th Street and on the east by the anchorage of the west span at Beale Street—involved completely removing and replacing this one-mile stretch of Interstate 80, as well as six on- and off-ramps within the confines of the West Approach's original footprint. This project was completed on April 8, 2009.

## West Span Seismic Retrofit Project
## Project Status: Completed 2004

The West Span lies between Yerba Buena Island and San Francisco and is made up of two complete suspension spans connected at a center anchorage. Retrofit work included adding massive amounts of steel and concrete to strengthen the entire West Span, along with new seismic shock absorbers and bracing.



West Span of the Bay Bridge

## East Span Seismic Replacement Project

Rather than a seismic retrofit, the two-mile-long East Span is being completely rebuilt. When completed, the new East Span will consist of several different sections, but will appear as a single streamlined span. The eastbound and westbound lanes of the East Span will no longer include upper and lower decks. The lanes will instead be parallel, providing motorists with expansive views of the bay. These views also will be enjoyed by bicyclists and pedestrians, thanks to a new path on the south side of the bridge that will extend all the way to Yerba Buena Island. The new span will be aligned north of the existing bridge to allow traffic to continue to flow on the existing bridge as crews build the new span.

The new span will feature the world's longest Self-Anchored Suspension (SAS) bridge that will be connected to an elegant roadway supported by piers (Skyway), which will gradually slope down toward the Oakland shoreline (Oakland Touchdown). A new transition structure on Yerba Buena Island (YBI) will connect the SAS to the YBI Tunnel and will transition the east span's side-by-side traffic to the upper and lower decks of the tunnel and west span.

When construction of the new east span is complete and vehicles have been safely rerouted to it, the original east span will be demolished.

**Architectural Rendering of the New Self-Anchored Suspension Bridge on the East Span of the Bay Bridge**

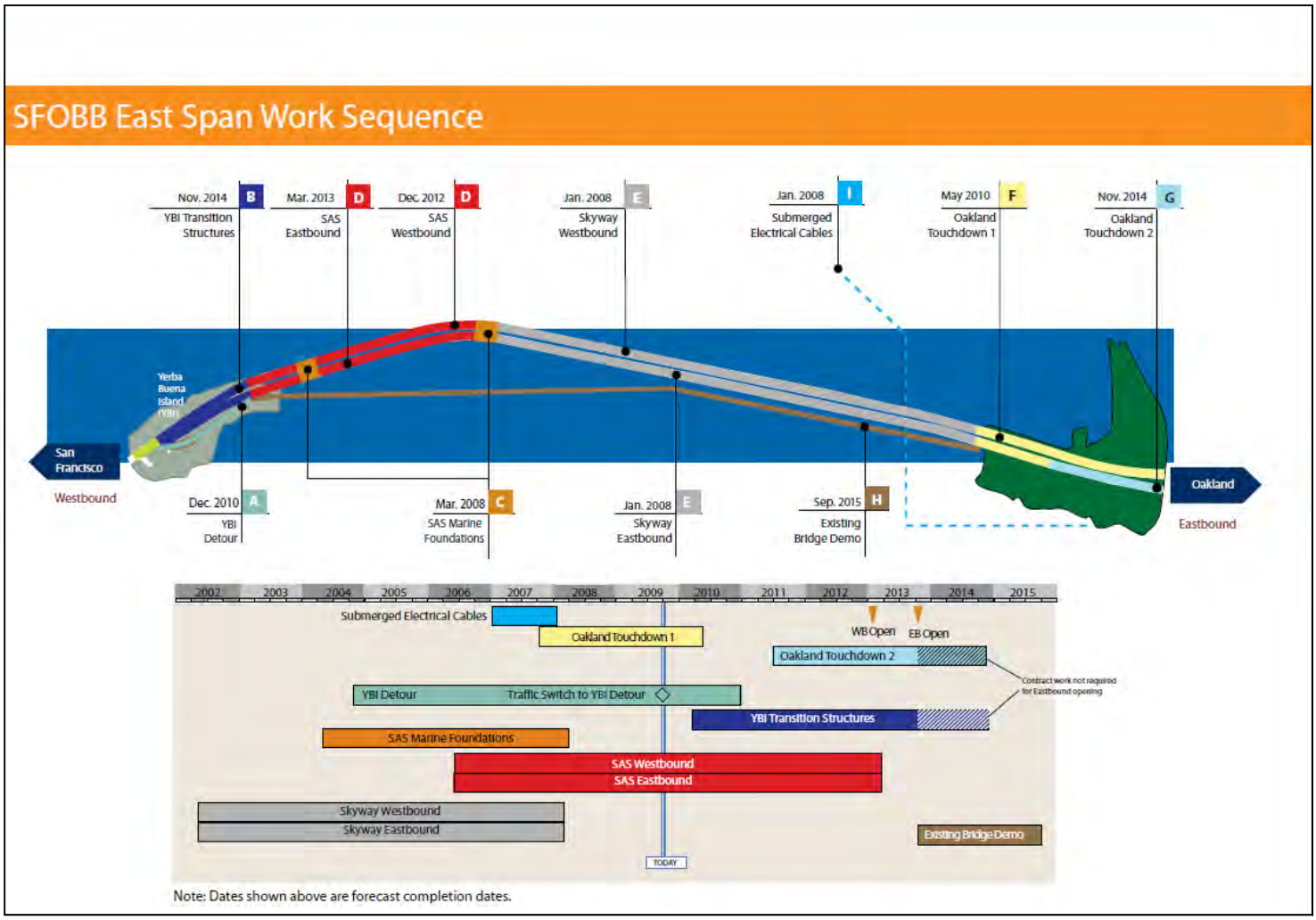
**View of the SAS Construction Area from the Skyway Looking toward Yerba Buena Island**

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## San Francisco-Oakland Bay Bridge East Span Replacement Project Summary

The new East Span bridge can be split into four major components—the Skyway and the Self-Anchored Suspension bridge in the middle and the Yerba Buena Island Transition Structures and Oakland Touchdown approaches at either end. Each component is being constructed by one to three separate contracts that all have been sequenced together.

Highlighted below are the major East Span contracts, including their schedules. The letter designation before each contract corresponds to contract descriptions in the rest of the report.



TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# San Francisco-Oakland Bay Bridge East Span Replacement Project
# Yerba Buena Island Detour (YBID)

As with all of the Bay Bridge's seismic retrofit projects, crews must build the Yerba Buena Island Transition Structures (YBITS) without disrupting traffic. To accomplish this daunting task, YBID eastbound and westbound traffic was shifted off the existing roadway and onto a temporary detour on Labor Day weekend 2009. Drivers will use this detour, just south of the original roadway, until traffic is moved onto the new East Span.

## A YBID Contract

Contractor: C.C. Myers Inc.
Approved Capital Outlay Budget: $492.8 M
Status: 79% Complete as of September 2009

This contract was originally awarded in early 2004 to construct the detour structure for the planned 2006 opening of the new East Span. Due to the re-advertisement of the SAS superstructure contract in 2005 because of a lack of funding at the time, the bridge opening was rescheduled to 2013. To better integrate the contract into the current East Span schedule and to improve seismic safety and mitigate future construction risks, the TBPOC has approved a number of changes to the contract, including adding the deck replacement work near the tunnel that was rolled into place over Labor Day weekend 2007, advancing future transition structure foundation work and making design enhancements to the temporary detour structure.

These changes have increased the budget and forecast for the contract to cover the revised project scope and potential project risks.

**Successful Labor Day Weekend 2007 Roll-In Structure to the Tunnel**

### *Tunnel Approach Roadway Replacement*

The first in a series of activities to open the detour viaduct was completed in 2007 with the replacement of a 350-foot-long stretch of upper-deck roadway just east of the Yerba Buena Island Tunnel. During this historic milestone, the entire Bay Bridge was closed over the 2007 Labor Day weekend so crews could demolish and replace the old section of the deck with a seismically upgraded 6,500-ton precast section of viaduct that was literally pushed into place (see photo above).

**Status:** Completed.

### *Detour Viaduct Fabrication and Construction*

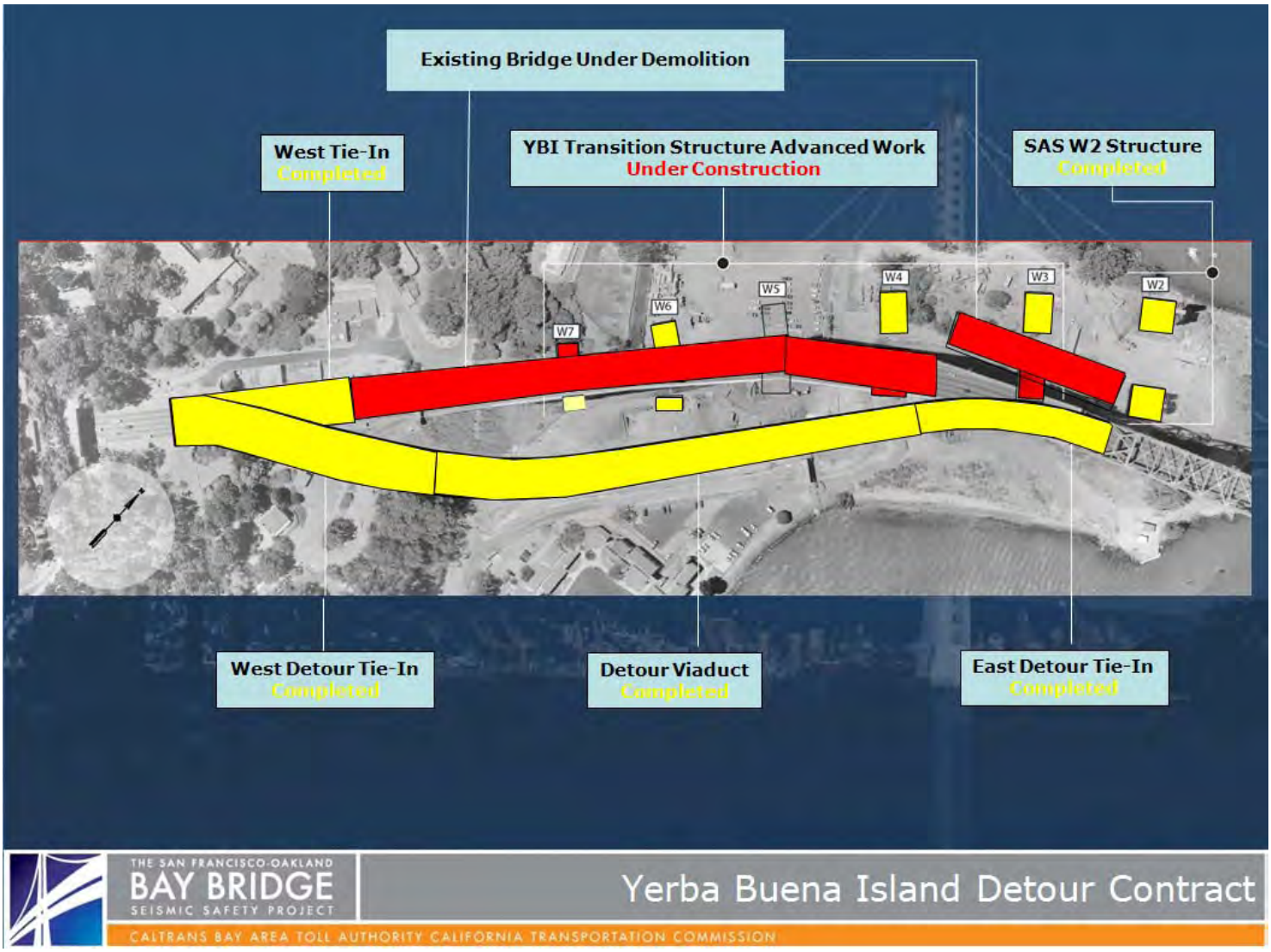
The detour viaduct runs parallel to the existing lanes on the island and ties back into the existing bridge and tunnel. Speed limits have been reduced due to the turns needed to get on and off the detour. The viaduct looks quite similar to the existing bridge, with steel cross beams and girders and a concrete roadway deck. To ensure a good fit, the steel viaduct truss members were pre-fitted during fabrication in South Korea and Oregon. Opening of the detour to traffic is discussed on the following page.

**Status:** Completed.

### *Demolition of Existing Viaduct*

After shifting traffic onto the detour structure, crews will focus on the demolition of the existing bridge structure into the tunnel. The old transition structure will need to be removed before construction of the new transition structures from the SAS bridge to the YBI Tunnel can be completed.

**Status:** Started in early September 2009 and is forecast to be completed in May 2010.




**Overview of Yerba Buena Island Detour Contract Scope of Work and Current Status**

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM
## *Yerba Buena Island Detour (YBID) East Tie-in Opening Activities*

Shifting traffic to the Yerba Buena Island Detour was the most significant realignment of the bridge to date. To accomplish this, crews cut away a 288-foot portion of the existing truss bridge and replaced it with a connection to the detour. This dramatic maneuver involved aerial construction that occurred more than 100 feet above the ground. Vehicles will travel on the detour until the completion of the new East Span.

A detailed step-by-step construction sequence for the roll-out of the existing span and roll-in of the new truss at the east tie-in to the detour viaduct structure is provided on the facing page.

**Status:** The East Tie-In is completed.

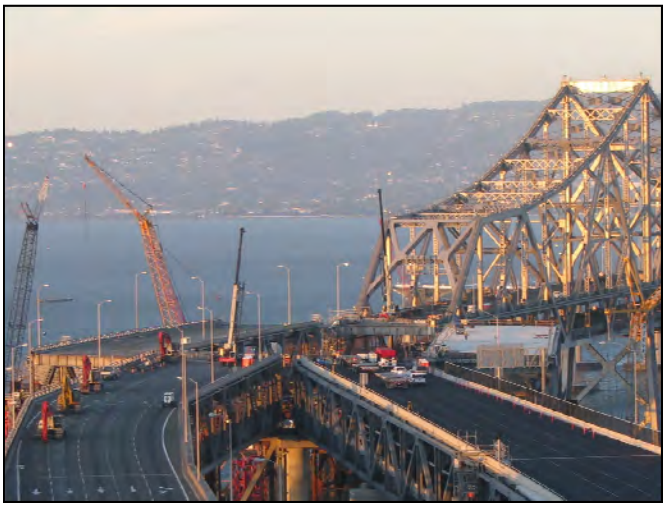
Yerba Buena Island Detour Roll-In Structure

Completed Yerba Buena Island Detour East Tie-In Roll-Out/Roll-In Structure

# San Francisco-Oakland Bay Bridge East Span Replacement Roll-Out/Roll-In Sequence of Progress over Labor Day Weekend 2009

**Stage 1- Close Bridge and Prepare for Roll-Out of Existing Truss**

**Stage 2 - Roll-Out of Existing Truss**

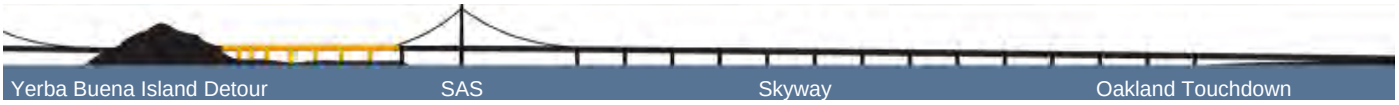


**Stage 3 - Prepare Bearings for Roll-In Truss**

**Stage 4 - Roll-In New Truss**

**Stage 5 - Prepare Bridge Joints, Barriers, and Striping**

**Stage 6 - Reopen to Traffic**



TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## San Francisco-Oakland Bay Bridge East Span Replacement Project
## Yerba Buena Island Transition Structures (YBITS)

The new Yerba Buena Island Transition Structures (YBITS) will connect the new SAS bridge span to the existing Yerba Buena Island Tunnel, transitioning the new side-by-side roadway decks to the upper and lower decks of the tunnel. The new structures will be cast-in-place reinforced concrete structures that will look very similar to the already constructed Skyway structures. While some YBITS foundations and columns have been advanced by the YBID contract, the remaining work will be completed under three separate YBITS contracts.

**Yerba Buena Island Transition Column W7L North Foundation Piles Installation**

### B YBITS #1 Contract

Contractor: TBD
Current Capital Outlay Forecast: $223.2 M
Status: Advertised

The YBITS #1 contract will construct the mainline roadway structures from the SAS bridge to the YBI tunnel. Work on the structures is scheduled to start once the existing structures have been demolished and removed from the site. An addendum to revise the bid opening date to December 15, 2009 was issued in May.

**Rendering of Future Yerba Buena Island Transition Structures (top) with Detour Viaduct (bottom)**

## YBITS #2 Contract

Contractor: TBD
Current Capital Outlay Forecast: $59.4 M
Status: In Design

The YBITS #2 contract will demolish the detour viaduct after all traffic is shifted to the new bridge and will construct a new eastbound on-ramp to the bridge in its place. The new ramp will also provide the final link for bicycle/pedestrian access off the SAS bridge onto Yerba Buena Island.

## YBITS Landscaping Contract

Contractor: TBD
Current Capital Outlay Forecast: $3.3 M
Status: In Design

Upon completion of the YBITS work, a follow-on landscaping contract will be executed to re-plant and landscape the area.

### *Yerba Buena Island Transition Structures Advanced Work*

Due to the re-advertisement of the SAS superstructure contract in 2005, it became necessary to temporarily suspend the detour contract and make design changes to the viaduct. To make more effective use of the extended contract duration and to reduce overall project schedule and construction risks, the TBPOC approved the advancement of foundation and column work from the Yerba Buena Island Transition Structures contract.

**Overview of YBITS Advanced Column Work in Progress**

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## San Francisco-Oakland Bay Bridge East Span Replacement Project Self-Anchored Suspension (SAS) Bridge

If one single element bestows the status of world class on the new Bay Bridge East Span, it is the Self-Anchored Suspension (SAS) bridge. This engineering marvel will be the world's largest SAS span at 2,047 feet in length, as well as the first bridge of its kind built with a single tower.

The SAS was separated into three separate contracts—construction of the land-based foundations and columns at Pier W2; construction of the marine-based foundations and columns at Piers T1 and E2; and construction of the SAS steel superstructure, including the tower, roadway, and cabling. Construction of the foundations at Pier W2 and at Piers T1 and E2 was completed in 2004 and 2007, respectively.

### SAS Land Foundation Contract

Contractor: West Bay Builders, Inc.
Approved Capital Outlay Budget: $26.4 M
Status: Completed

The twin W2 columns on Yerba Buena Island provide essential support for the western end of the SAS bridge, where the single main cable for the suspension span will extend down from the tower and wrap around and under the western end of the roadway deck. Each of these huge columns required massive amounts of concrete and steel and are anchored 80 feet into the island's solid bedrock.

SAS West Elevation of W2

SAS Tower Temporary Trestle Piling Installation in Progress

### C SAS Marine Foundations Contract

Contractor: Kiewit/FCI/Manson, Joint Venture
Approved Capital Outlay Budget: $280.9 M
Status: Completed

Construction of the piers at E2 and T1 required significant on-water resources to drive the foundation support piles down, not only to bedrock, but also through the bay water and mud (see rendering on facing page).

The T1 foundation piles extend 196 feet below the waterline and are anchored into bedrock with heavily reinforced concrete rock sockets that are drilled into the rock. Driven nearly 340 feet deep, the steel and concrete E2 foundation piles were driven 100 feet deeper than the deepest timber piles of the existing east span in order to get through the bay mud and reach solid bedrock.

## D SAS Superstructure Contract

Contractor: American Bridge/Fluor Enterprises, Joint Venture
Approved Capital Outlay Budget: $1,753.7 M
Status: 45% Complete as of September 2009

Rising 525 feet above mean sea level and embedded in rock, the single-tower SAS span is designed to withstand a massive earthquake. The SAS bridge is not just another suspension bridge. Traditional main cable suspension bridges have twin cables with smaller suspender cables connected to them. These cables hold up the roadbed and are anchored to the east end of the box girders. While there will appear to be two main cables on the SAS, there will actually only be one. This single cable will be anchored within the eastern end of the roadway, carried over the tower and then wrapped around the two side-by-side decks at the western end.

The single steel tower will be made up of four separate legs and the tower head connected by shear link beams, which function much like a fuse in an electrical circuit. These beams will absorb most of the impact from an earthquake, preventing damage to the tower legs.

The next several pages highlight the construction sequence of the SAS and are followed by detailed updates on specific construction activities.

**Architectural Rendering of New Self-Anchored Suspension Span**

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## *Self-Anchored Suspension (SAS) Construction Sequence*

### STEP 1 - CONSTRUCT TEMPORARY SUPPORT STRUCTURES

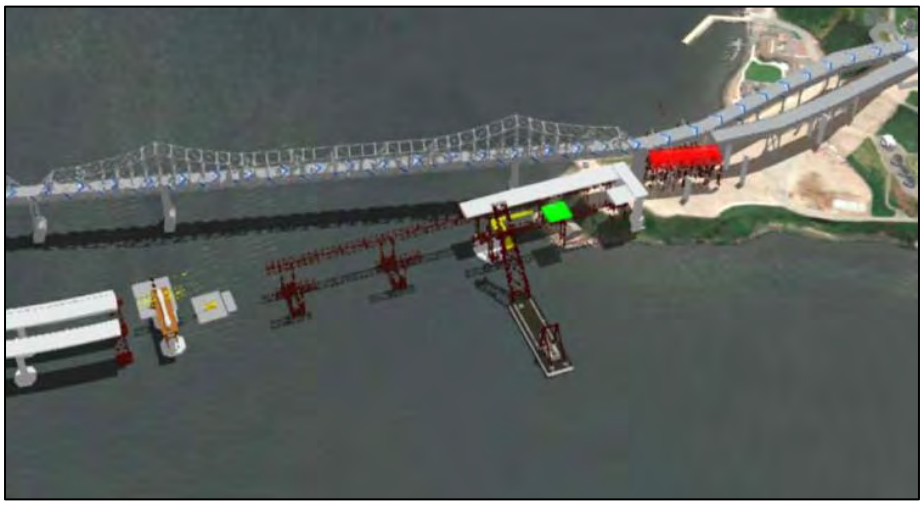
Temporary support structures will need to be erected from the Skyway to Yerba Buena Island to support the new SAS bridge during construction.

**Status:** Foundations for the temporary supports are complete. Support structures are now being installed from west to east.

### STEP 2 - INSTALL ROADWAYS

The roadway boxes will be lifted into place by using the shear-leg crane barge. The boxes will be bolted and welded together atop the temporary support trusses to form two continuous parallel steel roadway boxes.

**Status:** The Roadway Box segments are being fabricated (see page 26 for more information).



### STEP 3 - INSTALL TOWER

Each of the four legs of the tower will be erected in five separate lifts. The first lift will use the shear-leg crane barge while the remaining higher lifts will use a temporary support tower and lifting jacks.

**Status:** The first shipment of tower sections is being fabricated (see page 26 for more information).

### Step 4 - Main Cable and Suspender Installation

The main cable will be pulled from the east end of the SAS bridge, over the tower, and wrapped around the west end before returning back. Suspender cables will be added to lift the roadway decks off the temporary support structure.

**Status:** Cable installation is pending the erection of the tower and roadway spans.

### Step 5 - Westbound Opening

The new bridge will first open in the westbound direction pending completion of the Yerba Buena Island Transition Structures. Westbound access to the Skyway from Oakland will be completed by the Oakland Touchdown #1 contract in 2009.

**Status:** Westbound opening is scheduled for 2012.

### Step 6 - Eastbound Opening

Opening of the bridge in the eastbound direction is pending completion of Oakland Touchdown #2, which needs westbound traffic off the existing bridge before the eastbound approach structure can be completed.

**Status:** Eastbound opening is scheduled for 2013.

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## *Self-Anchored Suspension (SAS) Superstructure Fabrication Activities*

Nearly every component of the SAS above the waterline—from the temporary support structures to the roadway and tower box sections to the main cable and suspender ropes—will be fabricated off-site and erected into place upon arrival in the Bay Area. This project is truly global in nature, with fabrication of the bridge components occurring not only in the United States but around the world—in China, the United Kingdom, Japan, South Korea and other locations.

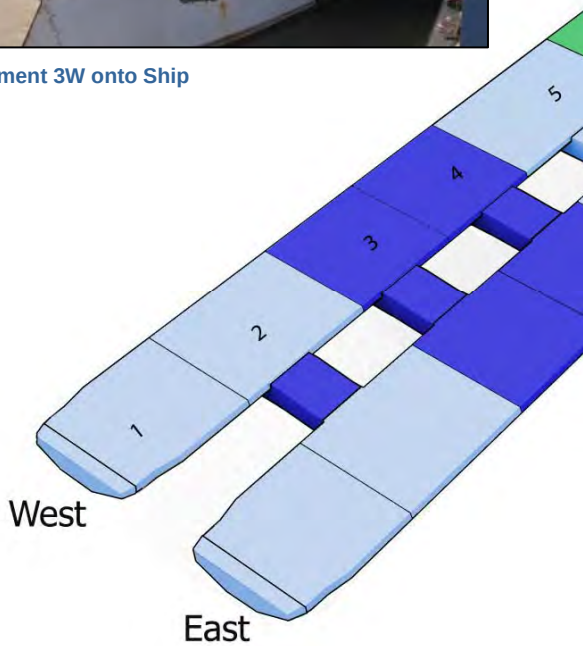
SAS Loading of Segment 3W onto Ship

### *Roadway and Tower Segments*

Like giant three-dimensional jigsaw puzzles, the roadway and tower segments of the SAS bridge are hollow steel shells that are internally strengthened and stiffened by a highly engineered network of welded steel ribs and diaphragms. The use of steel in this manner allows for a flexible yet relatively light and strong structure able to withstand the massive loads placed on the bridge during seismic events.

**Status:** The contractor has reported that fabrication of the steel tower and roadway boxes has fallen 15 months behind schedule due to the complexity of the design and fabrication.

As shown in the diagram to the right, roadway segments 1 to 11 are in segment assembly or further along in the process, while segment 12 is in subassembly fabrication. Tower segments 1 to 4 are in various stages of fabrication. The first shipment of roadway boxes (segments 1 through 4) are anticipated by the end of the year, while the first tower segments are expected next year.



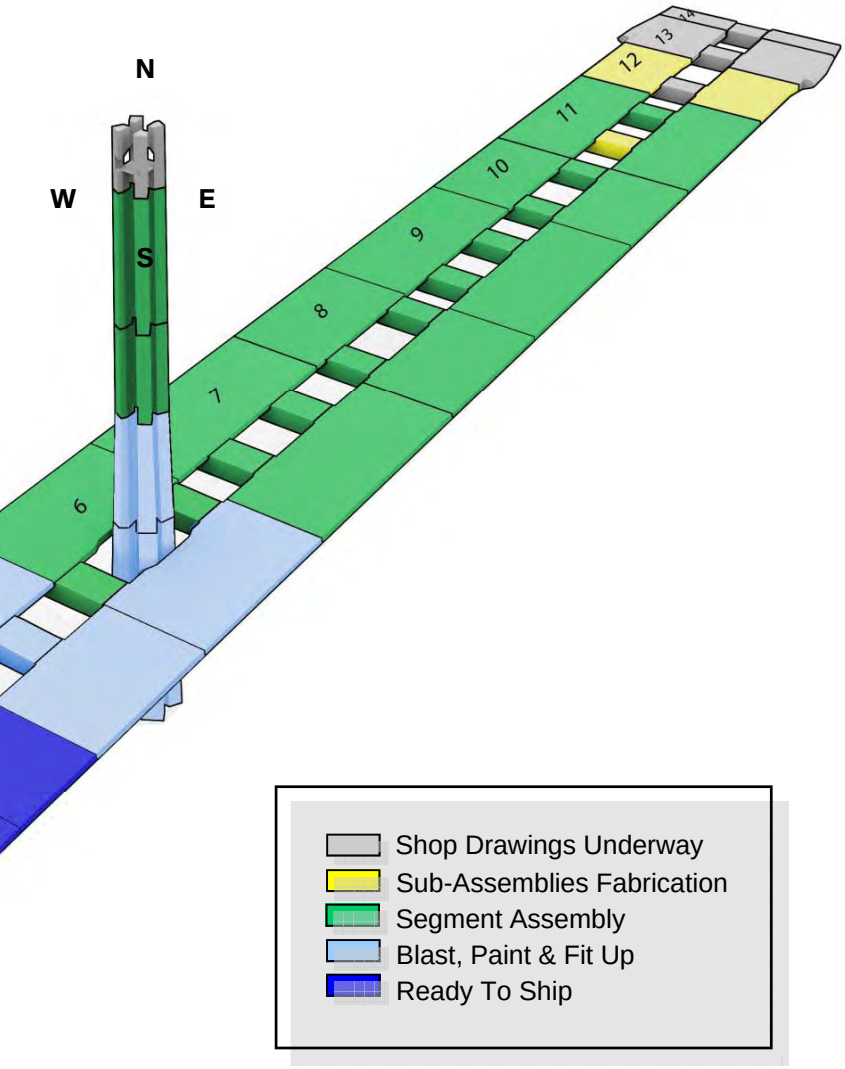

All components have undergone a rigorous quality review by ZPMC, ABF, and Caltrans to ensure that only bridge components that have been built in accordance to the specifications will be shipped.

On the critical path to completing the bridge are the fabrication of the last two roadway sections (segments 13 and 14). Start of fabrication of these segments has fallen behind schedule due to delays in the fabrication drawing preparation process. The TBPOC continues to execute and explore options to improve review times and communication, including locating additional design staff with shop drawing drafters in Vancouver, Canada.

These delays will likely prevent the westbound opening of the bridge in 2012, but we continue to estimate for full opening of the bridge in 2013 (see additional progress photos on pages 78 through 87).

# Fabrication Progress Diagram

**Though September 30, 2009**



**SAS Tower Lift 1 South and East Lift in Vertical Position**

**SAS Tower Shaft**

**SAS Segment Assembly in Trial Assembly Yard**

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## *Self-Anchored Suspension (SAS) Superstructure Fabrication Activities (cont.)*

### *Cables and Suspenders*

One continuous main cable will be used to support the roadway deck of the SAS bridge. Anchored into the eastern end of the bridge, the main cable will start on the east end of the box girder, go over the main tower at T1, loop around the western end of the roadway decks at Pier W2, and then go back over the main tower to the eastern end of the box girder. The main cable will be made up of bundles of individual wire strands. Supporting the roadway decks to the main cable will be a number of smaller suspender cables. The main cable will be fabricated in China and the suspender cables in Missouri, USA.

**Status:** Initial trial testing of the main cable strands was performed in September 2009.

SAS Cable Band Half, United Kingdom

SAS Service Platform Upper-Frame Galvanizing, California

### *Saddles, Bearings, Hinges, and Other Bridge Components*

The mounts on which the main cable and suspender ropes will sit are made from solid steel castings. Castings for the main cable saddles are being made by Japan Steel Works, while the cable bands and brackets are being made by Goodwin Steel in the United Kingdom.

The bridge bearings and hinges that support, connect, and transfer loads from the self-anchored suspension (SAS) span to the adjoining sections of the new east span are being fabricated in a number of locations. Work on the bearings is being performed in Pennsylvania, USA and South Korea, while hinge pipe beams are being fabricated in Oregon, USA.

**Status:** Under fabrication.

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# *Self-Anchored Suspension (SAS) Superstructure Field Activities*

**Shear-Leg Barge Crane Lifting a Section of Temporary Support Structure**

## *Shear-Leg Barge Crane*

The massive shear-leg barge crane that is helping to build the SAS superstructure arrived in the San Francisco Bay on March 12, 2009 after a trans-Pacific voyage.

The crane and barge are separate units operating as a single entity dubbed the "Left Coast Lifter." The 400-by-100-foot barge is a U.S.–f lagged vessel that was custom - built in Portland, Oregon by U.S. Barge, LLC and outfitted with the crane by Shanghai Zhenhua Heavy Industry Co. Ltd. (ZPMC) at a facility near Shanghai, China. The crane's boom weighs 992 tons and is 328 feet long. The crane can lift up to 1,873 tons, including the deck and tower sections for the SAS.

The crane has off-loaded all temporary structures shipped to date and has lifted 75 percent of the temporary structures into place. Work on the eastbound side of the SAS must occur first, as the crane cannot reach over permanent westbound decks to work on the eastbound roadway.

**Status:** At jobsite.

**SAS View from East of E2**

## *Cap Beams*

Construction of the massive steel-reinforced concrete cap beams that link the columns at piers W2 and E2 was left to the SAS superstructure contractor and represents the only concrete portions of work on that contract. The east and west ends of the SAS roadway will rest on the cap beams and the main cable will wrap around Pier W2, while anchoring into the east end of the SAS deck sections near E2.

**Status:** Completed.

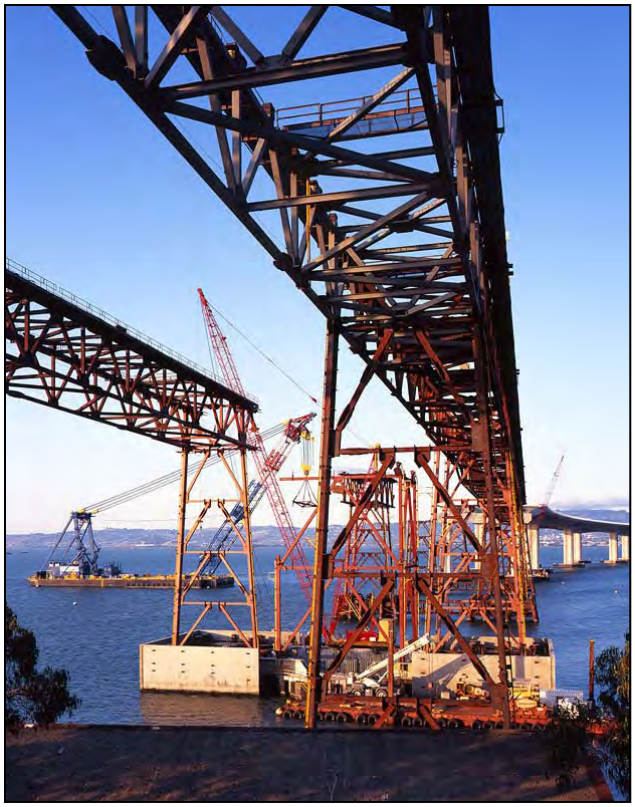
# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## *Self-Anchored Suspension (SAS) Superstructure Field Activities*

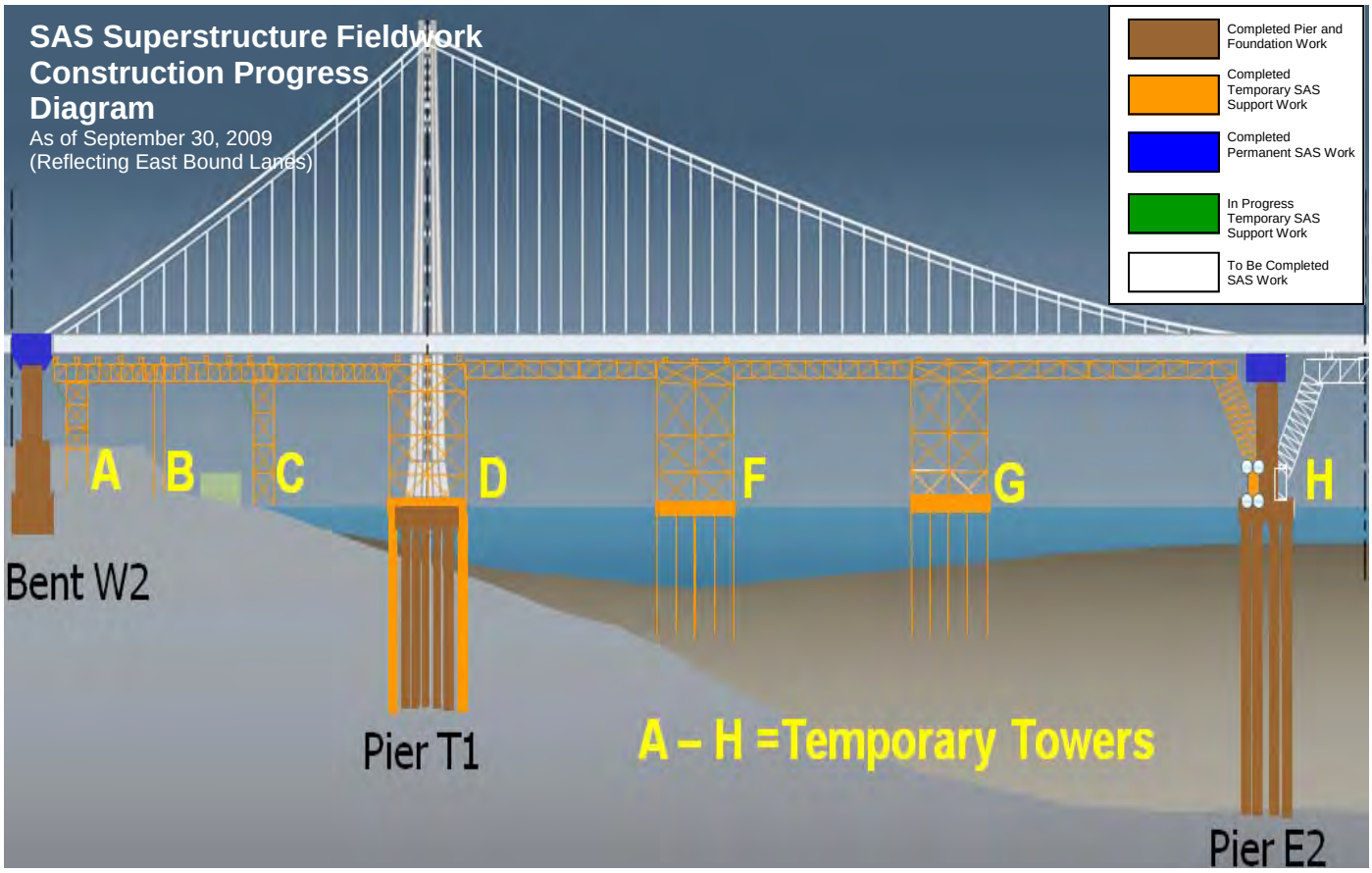
### *Temporary Support Structures*

To erect the roadway decks and tower of the bridge, temporary support structures will first be put in place. Almost a bridge in itself, the temporary support structures will stretch from the end of the completed Skyway back to Yerba Buena Island. For the tower, a strand jack system is being built into the tower's temporary frame to elevate the upper sections of the tower into place. These temporary supports are being fabricated in the Bay Area, as well as in Oregon and in China at ZPMC.

**Status:** The temporary support foundations and six temporary towers have been completed and 75 percent of the temporary structures are in place.



**SAS Eastbound and Westbound Temporary Support Structures**



**SAS East and Westbound Temporary Support Structures Looking East**

**SAS Temporary Support Structures and Tower Erection Temporary Framing and the End of the completed Skyway on the Left**

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# San Francisco-Oakland Bay Bridge East Span Replacement Project Skyway

The Skyway, which comprises much of the new East Span, will drastically change the appearance of the Bay Bridge. Replacing the gray steel that currently cages drivers, a graceful, elevated roadway supported by piers will provide sweeping views of the bay.

Completed Skyway Left of Existing East Span

## E Skyway Contract

Contractor: Kiewit/FCI/Manson, Joint Venture
Approved Capital Outlay Budget: $1,254.1 M
Status: Completed

Extending for more than a mile across Oakland mudflats, the Skyway is the longest section of the East Span. It sits between the new Self-Anchored Suspension (SAS) span and the Oakland Touchdown. In addition to incorporating the latest seismic-safety technology, the side-by-side roadway decks of the Skyway feature shoulders and lane widths built to modern standards.

The Skyway's decks are composed of 452 pre-cast concrete segments (standing three stories high), and contain approximately 200 million pounds of structural steel, 120 million pounds of reinforcing steel, 200 thousand linear feet of piling and about 450 thousand cubic yards of concrete. These are the largest segments of their kind ever cast and were lifted into place by winches that were custom-made for this project.

The Skyway marine foundation consists of 160 hollow steel pipe piles measuring eight feet in diameter and dispersed among 14 sets of piers. The 365-ton piles were driven more than 300 feet into the deep bay mud. The new East Span piles were battered or driven in at an angle, rather than vertically, to obtain maximum strength and resistance.

Designed specifically to move during a major earthquake, the Skyway features several state-of-the art seismic safety innovations, including 60-foot-long hinge pipe beams. These beams will allow deck segments on the Skyway to move, enabling the deck to withstand greater motion and to absorb more earthquake energy.

Western End of Completed Skyway

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# San Francisco-Oakland Bay Bridge East Span Replacement Project Oakland Touchdown

When completed, the Oakland Touchdown (OTD) structures will connect Interstate 80 in Oakland to the new side-by-side decks of the new East Span. For westbound drivers, the OTD will be their introduction to the graceful new East Span. For eastbound drivers from San Francisco, this section of the bridge will carry them from the Skyway to the East Bay, offering unobstructed views of the Oakland hills.

The OTD will be constructed through two contracts. The first contract will build the new westbound lanes, as well as part of the eastbound lanes. The second contract to complete the eastbound lanes cannot fully begin until westbound traffic is shifted onto the new bridge so that a portion of the upper deck of the existing bridge can be demolished to allow for a smooth transition for the new eastbound lanes in Oakland.

## F Oakland Touchdown #1 Contract

Contractor: MCM Construction, Inc.
Current Capital Outlay Forecast: $211.0 M
Status: 83% Complete as of September 2009

The OTD #1 contract constructs the entire 1,000-foot-long westbound approach from the toll plaza to the Skyway. When completed, the westbound approach structure will provide direct access to the westbound Skyway. In the eastbound direction, the contract will construct a portion of the eastbound structure and all of the eastbound foundations that are not in conflict with the existing bridge.

**Status:** On the westbound structure, the contractor has completed all foundation work and is now proceeding with eastbound superstructure work. The contractor MCM re-established temporary construction access to the Skyway structure over the new westbound Oakland Touchdown on August 4.

## G Oakland Touchdown #2 Contract

Contractor: TBD
Current Capital Outlay Forecast: $64.0 M
Status: In design

The OTD #2 contract will complete the eastbound approach structure from the end of the Skyway to Oakland. This work is critical to the eastbound opening of the new bridge, but cannot be completed until westbound traffic has been shifted off the existing upper deck to the new SAS bridge.

Oakland Touchdown Progress

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# San Francisco-Oakland Bay Bridge East Span Replacement Project Other Contracts

A number of contracts needed to relocate utilities, clear areas of archeological artifacts, and prepare areas for future work have already been completed. The last major contract will be the eventual demolition and removal of the existing bridge, which by that time will have served the Bay Area for nearly 80 years. Following is a status of some the other East Span contracts.

Archeological Investigations

## East Span Interim Seismic Retrofit

Contractors: 1) California Engineering Contractors
2) Balfour Beatty
Approved Capital Outlay Budget: $30.8 M
Status: Completed

After the 1989 Loma Prieta Earthquake, and before the final retrofit strategy was determined for the East Span, Caltrans completed an interim retrofit of the existing bridge to prevent a catastrophic collapse of the bridge should a similar earthquake occur before the East Span was completely replaced. The interim retrofit was performed under two separate contracts that lengthened pier seats, added some structural members, and strengthened areas of the bridge so they would be more resilient during an earthquake.

Existing East Span of Bay Bridge

## Stormwater Treatment Measures

Contractor: Diablo Construction, Inc.
Approved Capital Outlay Budget: $18.3 M
Status: Completed

The Stormwater Treatment Measures contract implemented a number of best practices for the management and treatment of stormwater runoff. Focused on the areas around and approaching the toll plaza, the contract added new drainage and built new bio-retention swales and other related constructs.

Stormwater Retention Basin

## Yerba Buena Island Substation

Contractor: West Bay Builders
Approved Capital Outlay Budget: $11.6 M
Status: Completed

This contract relocated an electrical substation just east of the Yerba Buena Island Tunnel in preparation for the new East Span.

## Pile Installation Demonstration

Contractor: Manson and Dutra, Joint Venture
Approved Capital Outlay Budget: $9.2 M
Status: Completed

While common in offshore drilling, the new East Span is one of the first bridges to use large-diameter battered piles in its foundations. To minimize project risks and build industry knowledge, a pile installation demonstration project was initiated to prove the efficacy of the proposed technology and methodology. The demonstration was highly successful and helped result in zero contract change orders or claims for pile driving on the project.

## H Existing Bridge Demolition

Contractor: TBD
Approved Capital Outlay Budget: $239.2 M
Status: In Design

Design work on the contract will start in earnest as the opening of the new bridge to traffic approaches.

New YBI Electrical Substation

## I Electrical Cable Relocation

Contractor: Manson Construction
Approved Capital Outlay Budget: $9.6 M
Status: Completed

A submerged cable from Oakland that is close to where the new bridge will touch down supplies electrical power to Treasure Island. To avoid any possible damage to the cable during construction, two new cables were run from Oakland to Treasure Island to replace the existing cable. The extra cable was funded by the Treasure Island Development Authority and its future development plans.

## Quarterly Environmental Compliance Highlights

**Juvenile Peregrine Falcon (photo courtesy of Bob Anders)**

Overall environmental compliance for the SFOBB East Span project has been a success. All weekly, monthly and annual compliance reports to resource agencies have been delivered on time. There are no comments from receiving agencies. The tasks for the current quarters are focused on mitigation monitoring. Key successes in this quarter are as follows:

- Bird monitoring was conducted weekly in the active construction area. Monitors did not observe any indication that birds were disturbed due to the East Span construction activities.

- Peregrine falcon monitoring was conducted typically a few times per week through mid-July 2009. Monitoring was concluded for the nesting season on July 20, 2009, because the juvenile peregrines that successfully fledged in June had survived for one month and were spending less time in the immediate vicinity of their nest site at Pier E2.

- Canadian goose monitoring occurred in July and August 2009 along the I-80 roadway adjacent to the Emeryville Crescent. The presence of geese was more prevalent in early July, with few observations after that.

- Environmental compliance and stormwater pollution prevention (SWPP) inspections were conducted weekly at all active project sites. Environmental permit compliance staff continue to work closely with Caltrans construction and contractors to ensure compliance with environmental permits and regulations and to improve SWPP and best management practices.

- On July 7, 2009, Caltrans submitted a request to reinitiate consultation with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) in accordance with Section 7 of the Endangered Species Act. This consultation was needed to modify the project description for the

**SFO Bay Bridge Air Bubble Curtain Sound Attenuation System (photo courtesy of Rob Aramayo)**

**Yerba Buena Island Transition Erosion Control Matting, Silt Fencing, Fiber Rolls and Check Dams**

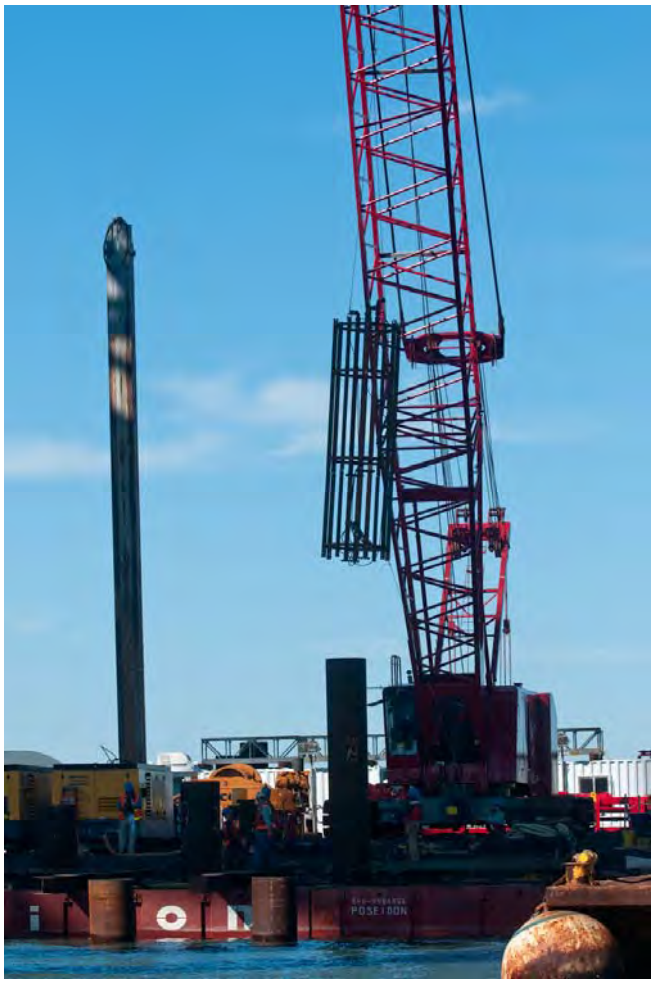
- On August 21, 2009, the NMFS issued a Supplemental Biological Opinion and Conference Opinion for the SFOBB Project. The Supplemental Biological and Conference Opinions analyze the effects of the project's activities on the Evolutionary Significant Units and critical habitat of Sacramento River winter-run and Central Valley spring-run Chinook salmon, the Distinct Population Segment and critical habitat of Central Valley and Central California Coast steelhead, and the southern Distinct Population Segment and proposed critical habitat of North American green sturgeon.

implementation of underwater sound attenuation during the installation of temporary piles to support a temporary access trestle as part of the Self-Anchored Suspension span portion of the SFOBB Project.

- On July 8, 2009, Caltrans submitted a request for Amendment No. 25 to San Francisco Bay Conservation and Development Commission (BCDC) Permit No. 8-01 for a proposed temporary access trestle as part of the Self-Anchored Suspension span portion of the SFOBB Project.

- On July 17, 2009, Caltrans submitted a request for a Minor Amendment to California Department of Fish and Game, Incidental Take Permit No. 2081-2001-021-03, in accordance with section 783.6 (c) of the California Code of Regulations. The Minor Amendment would extend the expiration date of the Incidental Take Permit and include the recently state-listed longfin smelt.

- On July 20, 2009, results of the pre-construction eelgrass and bathymetric survey for the Emeryville Flats were made available. The survey results were needed to help determine construction approaches and avoidance of potential impacts to the eelgrass bed during construction of the Shorebird Roosting Island, which is part of the SFOBB construction mitigation.



**SFO Bay Bridge Air Bubble Curtain Sound Attenuation System**

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## Other Completed Projects

The State Legislature in the 1990s identified seven of the nine state-owned toll bridges for seismic retrofit. In addition to the San Francisco-Oakland Bay Bridge, these included the Benicia-Martinez, Carquinez, Richmond-San Rafael and San Mateo-Hayward bridges in the Bay Area, and the Vincent Thomas and Coronado bridges in Southern California. Other than the East Span of the Bay Bridge, the retrofits of all of the bridges have been completed as planned.

High-Rise Section of San Mateo-Hayward Bridge

### San Mateo-Hayward Bridge Seismic Retrofit Project
### Project Status: Completed 2000

The San Mateo-Hayward Bridge seismic retrofit project focused on the strengthening of the high-rise portion of the span. The foundations of the bridge were significantly upgraded with additional piles.

### 1958 Carquinez Bridge Seismic Retrofit Project
### Project Status: Completed 2002

The eastbound 1958 Carquinez Bridge was retrofitted in 2002 with additional reinforcement of the cantilever thru-truss structure.

1958 Carquinez Bridge (foreground) with the 1927 Span (middle) under Demolition and the New Alfred Zampa Memorial Bridge (background)

### 1962 Benicia-Martinez Bridge Seismic Retrofit Project
### Project Status: Completed 2003

The southbound 1962 Benicia-Martinez Bridge was retrofitted to “Lifeline” status with the strengthening of the foundations and columns and the addition of seismic bearings that allow the bridge to move during a major seismic event. The Lifeline status means the bridge is designed to sustain minor to moderate damage after an event and to reopen quickly to emergency response traffic.

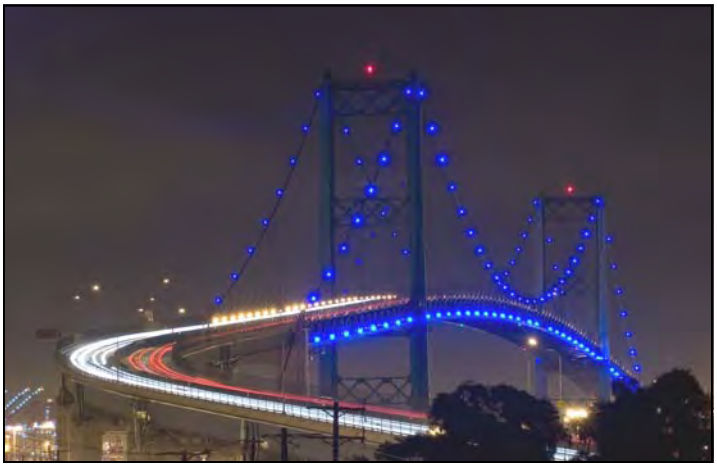
1962 Benicia-Martinez Bridge (right)

## Richmond-San Rafael Bridge Seismic Retrofit Project
## Project Status: Completed 2005

The Richmond-San Rafael Bridge was retrofitted to a “No Collapse” classification to avoid catastrophic failure during a major seismic event. The foundations, columns, and truss of the bridge were strengthened, and the entire low-rise approach viaduct from Marin County was replaced.

Richmond-San Rafael Bridge

## Los Angeles-Vincent Thomas Bridge Seismic Retrofit Project
## Project Status: Completed 2000



Los Angeles-Vincent Thomas Bridge

## San Diego-Coronado Bridge Seismic Retrofit Project
## Project Status: Completed 2002

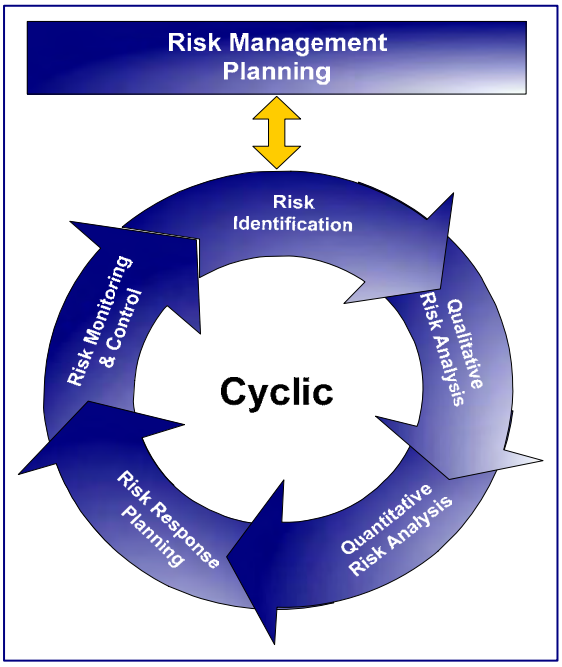
San Diego-Coronado Bridge

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM
## Risk Management Program Update

Assembly Bill (AB) 144 states that Caltrans must "regularly reassess its reserves for potential claims and unknown risks, incorporating information related to risks identified and quantified through its risk assessment processes." AB 144 set a $900 million Program Reserve (also referred to as the Program Contingency). The Program Contingency is currently at $689.7 million, according to the TBPOC Approved Budget.

### The Risk Management Process

Caltrans' approved risk management plan provides for a systemic and continuous process of identifying, analyzing, and responding to project and program risks. Risk management plan implementation provides




for maximizing the probability and consequences of positive events and minimizing the probability and consequences of adverse events to project objectives (e.g., cost, schedule and quality). Each element of the risk management process is illustrated in the diagram above and is explained in the following paragraphs. The risk management cyclic process is performed on a quarterly basis and encompasses all identified risks related to the contracts, program, corridor, capital outlay, capital outlay support, and schedule.

1. Risk Management Planning – deciding how to approach, plan and execute the risk management activities for the project.
2. Risk Identification – determining which risks might affect the project and documenting their characteristics.
3. Qualitative Risk Analysis – prioritizing risks for subsequent further analysis or action by assessing and combining their probability and impacts.
4. Quantitative Risk Analysis – analyzing numerically the effect of identified risks on overall project objectives.
5. Risk Response Planning – developing options and actions to enhance opportunities and to reduce impact to project objectives.
6. Risk Monitoring and Control – tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle.

Although the risk management processes above are presented as discreet elements with well-defined interfaces, in practice they often overlap and interact with each other.

### What Risk Management Does and Does Not Include

Risk management addresses risks that may affect its defined project objectives such as cost, schedule, scope and quality. Given a project plan, risk management generally looks at ways in which the project may not go according to plan. Risk management focuses on the defined project scope and objectives, and therefore does not include 1) risks or possible decisions that may effectively end the project, such as the loss of funding, a natural disaster that destroys all or part of the construction, or acts of governments; or 2) risks or possible decisions that may materially change the project. If the project objectives are changed substantially, risk management will start afresh on the "new" project. For example, the YBI Detour contract was significantly changed by the addition of several YBITS #1 project foundations by contract change order as well as certain design enhancements made to the east and west "tie-ins" of

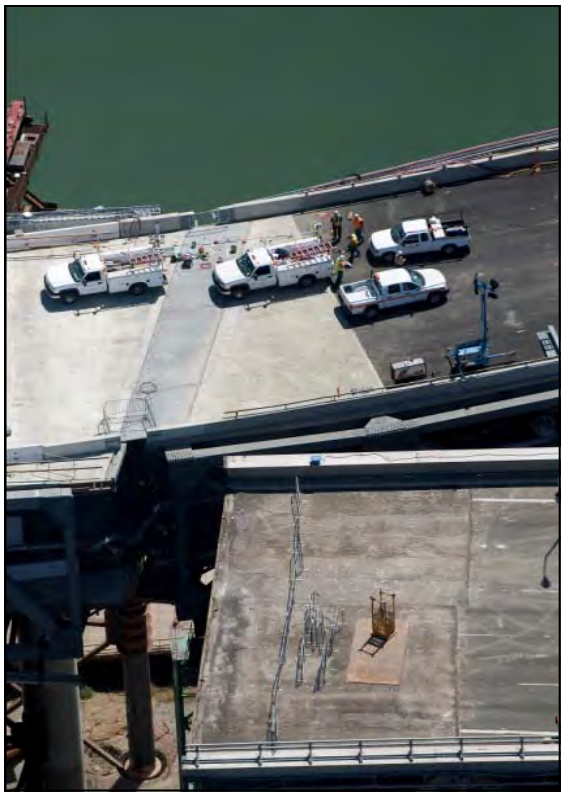
the YBI Detour structure. The risks of such decisions were not in the risk register of the original contract. In a nutshell, risk management is confined to quantifying risks that are intended to be covered by project and program contingency.

## About "Risk" and "Opportunity"

The concept of risk can include both upside and downside impacts. This means "risk" can describe uncertainties, which, if they occurred, would have a negative or harmful effect, and the same word can describe uncertainties, which, if they occurred, would be helpful. In short, there are two sides to risk — threats and opportunities. A risk that has no threat is a "pure opportunity." It is simply an unplanned good thing that might happen. For example, a new design method might be released, which we can apply to benefit our project. Opportunity is the inverse of threat if a risk has both threat and opportunity. Where a risk variable exists on a continuous scale and there is uncertainty over the eventual outcome, instead of just defining the risk as the downside, it might also be possible to consider upside potential. For example, if we have included escalation at 5 percent in our budget for future contracts and this rate could range from, say, 3-7 percent depending on economic conditions at the time of advertisement, we have an opportunity in the 3-5 percent range and a threat in the 5-7 percent range. Opportunity and threat exist in the one risk. If the budget was based on 7 percent escalation, we would have only opportunity. If based on 3 percent, we would have only threat. Threat and opportunity can also depend on how we define the risk. For example, if the risk is that an external agency may relax its requirements and this saves us money relative to what we have budgeted currently in our plan, this is an opportunity. If the risk is defined as the possibility of the agency tightening its requirements and this adds to our costs, this is a threat. We can only separate the opportunity and threat if we are certain the agency may act one way and not the other. If the risk is that the agency may change its requirements, we could have impacts that range from positive to negative. We would have both opportunity and threat in the same risk, and the degree of each would depend on what we have budgeted in our plan. Uncertainty in the cost of major contract change orders is another example of opportunity. If we enter an estimate into the change order log and the final outcome could range from less than the estimate to more than the estimate, we have both an opportunity and a threat. The degree of opportunity and threat depends on where the estimate lies within the range.

## Risk Management for Projects in Design and Construction

Projects in design have the greatest potential for opportunities because the projects are still open to changes. Risk reduction and avoidance are opportunities, as are value analysis, constructability reviews and innovations in design, construction methods and materials. Once a project enters construction, the project objectives (scope, schedule and cost) are fixed contractually. Any changes are made using a contract change order. The only opportunity to save money or time is from a negative change order such as resulting from a cost reduction incentive proposal by the contractor. Otherwise, change orders add cost and/or time to the project. So, the prime opportunity during construction is to



**Yerba Buena Island Detour: Aerial View of the Completed Detour**

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

# Risk Management Program Update (cont.)

## Potential Draw on Program Reserve (Program Contingency)

The approved TBSRP risk management plan provides for reporting quantitative cost risk results from the previous quarter's risk management assessment. The second-quarter quantitative risk management results are reported below.

Assembly Bill (AB) 144 states that Caltrans must "regularly reassess its reserves for potential claims and unknown risks, incorporating information related to risks identified and quantified through its risk assessment processes." AB 144 set a $900 million Program Reserve (also referred to as the Program Contingency). The Program Contingency is currently at $689.7 million, according to the TBPOC Approved Budget.

The risk management process calculates the potential draw on Program Contingency each quarter based on the total of all risks and the contingencies remaining from the contracts.

Each contract in design has an assigned contingency allowance. A contract in construction has a remaining contingency, which is the difference between its budget and the sum of bid items, state furnished materials, contract change orders and remaining supplemental work. Capital outlay support has no identified contingency allowance. The total of the contingencies is the amount that is available to cover the risks of all contracts, program risks, and capital outlay support risks. The amount by which the sum of all risks exceeds the total of all contingencies represents a potential draw on the Program Contingency (Reserve).

As of the end of the second quarter of 2009, the probable draw on Program Contingency ranges from $500 million to $780 million. The 50 percent probable draw is $650 million. The $689.7 million TBPOC third quarter of 2009 Approved Budget Program Contingency is sufficient to cover identified risks to an

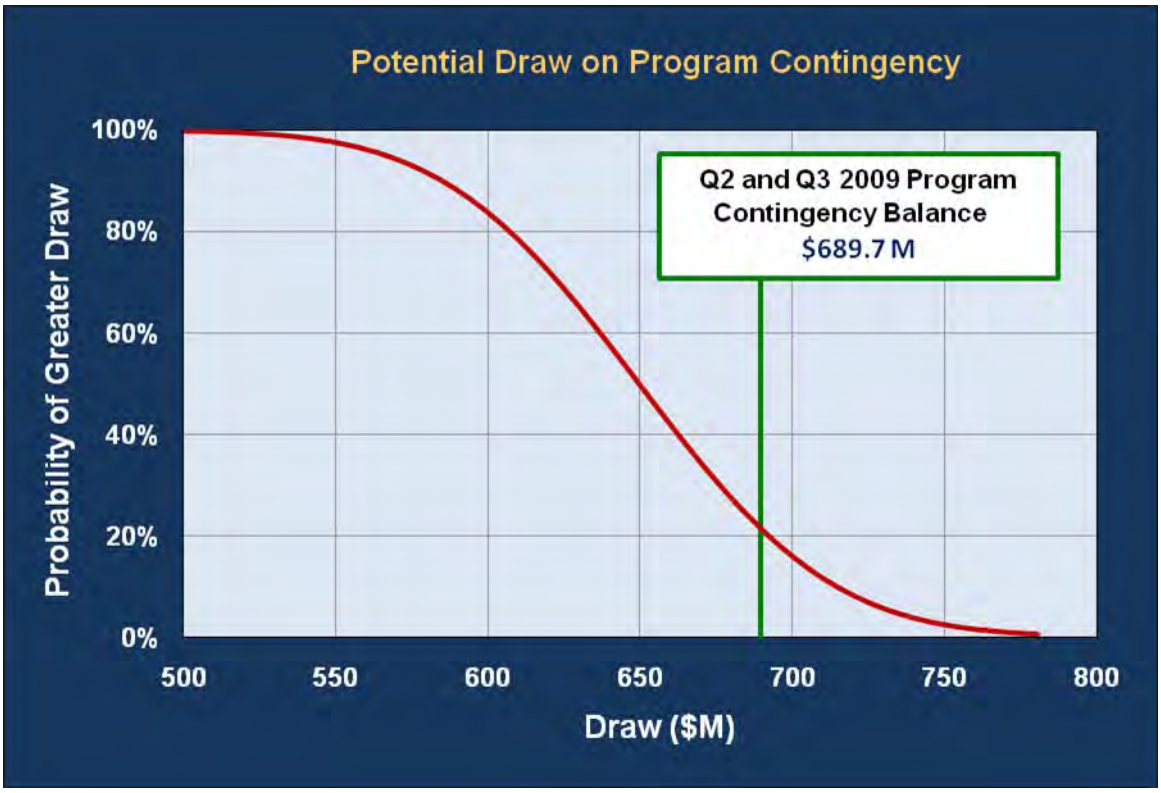



FIGURE 1 – POTENTIAL DRAW ON PROGRAM CONTINGENCY

80 percent confidence level. Ongoing risk mitigation actions will continue to be developed and implemented to reduce the potential draw on Program Contingency.

The curve in Figure 1 can be used to directly read off the probability of exceeding any value of cost. For example, there is about an 80 percent chance the potential draw on Program Contingency (Reserve) will exceed $610 million, while there is a 20 percent chance it will exceed $689.7 million.

## Risk Management Developments

### SAS Contract

The "east end" orthotropic box girder (i.e., Lifts 12 – 14) working drawing process is proving to be significantly more complicated than the other lifts due to super-elevation transitions, horizontal curves, cable anchorages, hinge diaphragms, and other technical issues. Three-dimensional modeling of the area was successful in identifying conflicts. The development of working drawings has been extremely complicated and continues to require a coordinated effort by Caltrans design and construction and the contractor's shop fabrication drawing team. Caltrans and the contractor's cross-functional working drawing campus team, as well as Caltrans management, continues to assess and implement ways to expedite working drawing reviews. Collocation of Caltrans, designer, and the contractor's personnel is facilitating the development and approval of east-end working drawings.

Caltrans and the contractor continue to work together to develop and implement a joint planning schedule. The schedule is continuously assessed to identify future opportunities and actions to mitigate schedule risk. Team China continues to work to mitigate deck and tower fabrication challenges reported in the SAS contractor's latest schedule update. Potential actions include the implementation of complex "mock-up" construction as well as the assessment of additional shop space, should the opportunity arise. Work could proceed in multiple shifts to expedite fabrication. The Corridor Schedule Team (CST) continues to assess the SAS and other contract schedules. The CST

**SAS Westbound and Eastbound Temporary Support Structures Looking East**

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## Risk Management Program Update (cont.)

developed an intermediate-level critical path method schedule for the corridor to evaluate schedule risks. This corridor schedule is a summarization of the contract schedules submitted by the various contractors and schedules developed by the Department for the contracts in design. During development and updating of the corridor schedule, the CST and risk team incorporated several opportunities and other assumptions into the SAS schedule. Most of the recovery opportunities are in the construction phase of the SAS contract and allow for re-sequencing certain work activities to better reflect concurrent work and redefining phase completion requirements. An important aspect of this schedule and of all schedules for large projects is that there may be multiple critical paths on a project. Focusing on the path that is the most critical, while important, may divert attention from other near-critical paths. The CST continues to assess risk mitigation strategies and opportunities accordingly.

### YBI Detour: Detailed Event Planning for YBI Detour Traffic Switch

Collaborative on-site meetings between Caltrans, the designer, and the contractor continued on-site and at various fabrication facilities. These meetings helped to resolve various constructability issues that may have caused significant impacts to the planned traffic switch schedule. Caltrans and the contractor performed a schedule risk analysis for the weekend traffic switch work and concluded that a four-day work window would likely be required to complete the work. The TBPOC subsequently approved the proposed four-day closure schedule. The traffic switch onto the YBI Detour contract occurred successfully in the third quarter of 2009. A significant portion of the YBI Detour contract risks were reduced or retired after the successful Labor Day weekend work was completed.

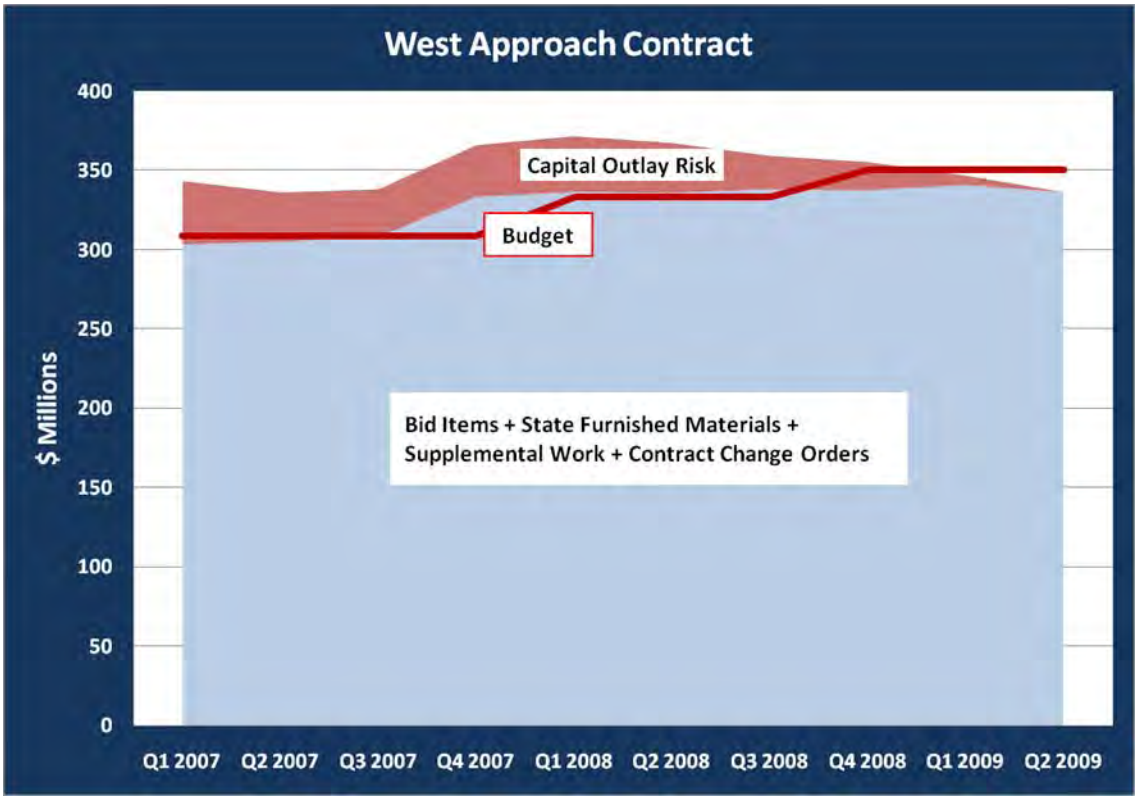



FIGURE 2 – WEST APPROACH TRENDS

## West Approach Contract Closeout

The West Approach contract was accepted on April 8, 2009. The project was completed under its current budget, there were no claims outstanding and the final estimate for the project was run in early July. Caltrans implemented a formal risk assessment process for the West Approach contract early in the contract. As the trend chart on the preceding page attests, the risk management team effectively forecast a range for the final project cost well in advance of project completion. This case study on the West Approach contract shows the value of using risk management to assist the project managers with program financial forecasting.

# Risk Management Look Ahead

## SAS Contract

### Resolution of Fabrication Issues

In the Second Quarter of 2009, Caltrans issued a contract change order to provide initial compensation for impacts to fabrication of the tower and the OBG Lifts 1 – 11. Caltrans is continuing negotiations in the third quarter of 2009 to resolve the remaining outstanding issues. A proposed resolution is to be presented to the TBPOC in the next quarter and will address contract time extensions for issues known prior to a definitive date. Other potential resolutions will include east-end shop drawing development and fabrication. A change order to address preliminary compensation and incentives to the shop drawing detailers will also be negotiated during the third quarter of 2009. This is considered to be the first of several steps that will be needed to resolve this issue.

### Schedule Partnership

Forecasting shipment dates continues to be a challenge. With the pace of repairs not matching the pace needed to meet the contract schedule, it is likely that the first shipment will not depart China until late this year. These delays were recognized in the contractor's August schedule update, and will likely result in a significant increase in schedule risk costs in the third quarter of 2009. Project management will engage the contractor to jointly develop a schedule for the remaining portion of the project. Such a schedule can be used as a planning tool to identify risks and their potential impacts to bridge opening. For example, Caltrans will work with the contractor to identify ways of rearranging the OBG and tower lifts among shipments to help mitigate project delays.

**Existing Bridge Viaduct YB4 Span Lowered and Ready for Demolition**

## YBID Contract

### Demolition

The project risk management team will hold several workshops to assess the costs and benefits of demolishing the YB4 span "up in the air" versus lowering it to the ground for demolition. A matrix of risks will be quantified and help the project team decide whether demolishing the YB4 span closer to the ground will reduce schedule risks to the SAS contract and therefore be a more cost-effective strategy overall. This work and demolition of the remainder of the old bridge from the east tie-in to the west tie-in will occur over the next several months.

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM
## Risk Management Program Update (cont.)

## YBITS Contract

### Hinge "K" Availability

Potential schedule risk may result if the YBITS #1 structure is ready for Hinge "K" closure, but the SAS contractor is not ready to vacate the area. Based on the status of the YBID and SAS contracts, the TBPOC approved moving the bid open date to December 15, 2009. However, a schedule gap may exist if additional delays are encountered on the SAS contract. An addition of contract working days to the YBITS #1 contract may be prudent to mitigate potential corridor schedule risk.

### Integrated Shop Drawings Conflict Resolution

The design team will continue working on completing the integrated shop drawings (ISDs) to avoid submittal schedule risk and potential added costs resulting from conflict resolution during construction.

## OTD #1 Contract

### Shore Bird Habitat Design Approval

A rip-rap shore bird habitat is to be constructed by the OTD #1 contract as part of the ongoing environmental conservation efforts of Caltrans. To better protect the birds, the San Francisco Bay Conservation and Development Commission (BCDC) requested a change to the location of the habitat from 60 feet to 200 feet from the shore. The change requires marine access that may impact the Bay. The updated design is awaiting BCDC determination whether additional mitigation measures such as eel-grass replanting and Bay floor restoration will be necessary. Project management will be working with the various agencies to deliver this work without delaying contract completion.

### Upcoming Construction Activities

On the bridge structure, installation of the electrical service platforms, the stressing of eastbound frame 1, and pulling in the pipe beams are scheduled to occur in the next few months. Once this work is complete, it is likely that additional risks can be retired. The OTD #1 contract is currently scheduled to complete in March 2010.

### Bridge Opening Planning

The OTD #2 contract will place traffic on the westbound lanes and later on the eastbound. Detailed plans for the traffic switches are to be prepared, including a current evaluation of whether a single full bridge closure will be better than two one-way closures when traffic is put on the new structure.

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

## Program Funding Status

AB 144 established a funding level of $8.685 billion for the TBSRP. The bill specifies program funding sources as shown in *Table 1-Program Budget.*

### Table 1—Program Budget as of September 30, 2009 ($ Millions)

| | | Budgeted | Funding Available & Contributions |
|---|---|---|---|
| **Financing** | | | |
| | Seismic Surcharge Revenue AB 1171 | 2,282.0 | 2,282.0 |
| | Seismic Surcharge Revenue AB 144 | 2,150.0 | 2,150.0 |
| | BATA Consolidation | 820.0 | 820.0 |
| | **Subtotal - Financing** | **5,252.0** | **5,252.0** |
| **Contributions** | | | |
| | Proposition 192 | 790.0 | 789.0 |
| | San Diego Coronado Toll Bridge Revenue Fund | 33.0 | 33.0 |
| | Vincent Thomas Bridge | 15.0 | 6.9 |
| | State Highway Account[(1)(2)] | 745.0 | 745.0 |
| | Public Transportation Account[(1)(3)] | 130.0 | 130.0 |
| | ITIP/SHOPP/Federal Contingency | 448.0 | 100.0 |
| | Federal Highway Bridge Replacement and Rehabilitation (HBRR) | 642.0 | 642.0 |
| | SHA - East Span Demolition | 300.0 | |
| | SHA - "Efficiency Savings"[(4)] | 130.0 | 10.0 |
| | Redirect Spillover | 125.0 | 125.0 |
| | Motor Vehicle Account | 75.0 | 75.0 |
| | **Subtotal - Contributions** | **3,433.0** | **2,655.9** |
| **Total Funding** | | **8,685.0** | **7,907.9** |
| **Encumbered to Date** | | | **7,185.4** |
| **Remaining Unallocated** | | | **722.5** |
| **Expenditures:** | | | |
| | Capital Outlay | | **4,763.2** |
| | State Operations | | **1,259.3** |
| | Total Expenditures | | **6,022.5** |
| **Encumbrances:** | | | |
| | Capital Outlay | | **1,151.0** |
| | State Operations | | **11.9** |
| | Total Encumbrances | | **1,162.9** |
| **Total Expenditures and Encumbrances** | | | **7,185.4** |

(1) The California Transportation Commission adopted a new schedule and changed the PTA/SHA split on December 15, 2005.

(2) To date, $645 million has been transferred from the SHA to the TBSRP, including the full $290 million transfer scheduled by the CTC to occur in 2005-06. An additional $100 million has been expended directly from the account.

(3) To date, $130 million has been transferred from the PTA to the TBSRP, including the full amount of all transfers scheduled by the CTC.

(4) To date, $10 million has been transferred from the SHA to the TBSRP, representing the commitment of "Efficiency Savings" identified under AB 144. Approximately $120 million remains to be distributed as scheduled by the CTC.

**Notes:**
Program budget includes $900 million program contingency.

## Summary of the Toll Bridge Oversight Committee (TBPOC) Expenses

Pursuant to Streets and Highways Code Section 30952.1 (d), expenses incurred by Caltrans, BATA, and the California Transportation Commission (CTC) for costs directly related to the duties associated with the TBPOC are to be reimbursed by toll revenues. *Table 3-Toll Bridge Program Oversight Committee Estimated Expenses: July 1, 2005 through September 30, 2009* shows expenses through June 30, 2009 for TBPOC functioning, support, and monthly and quarterly reporting.

### Table 2—CTC Toll Bridge Seismic Retrofit Program Contributions Adopted December 2005

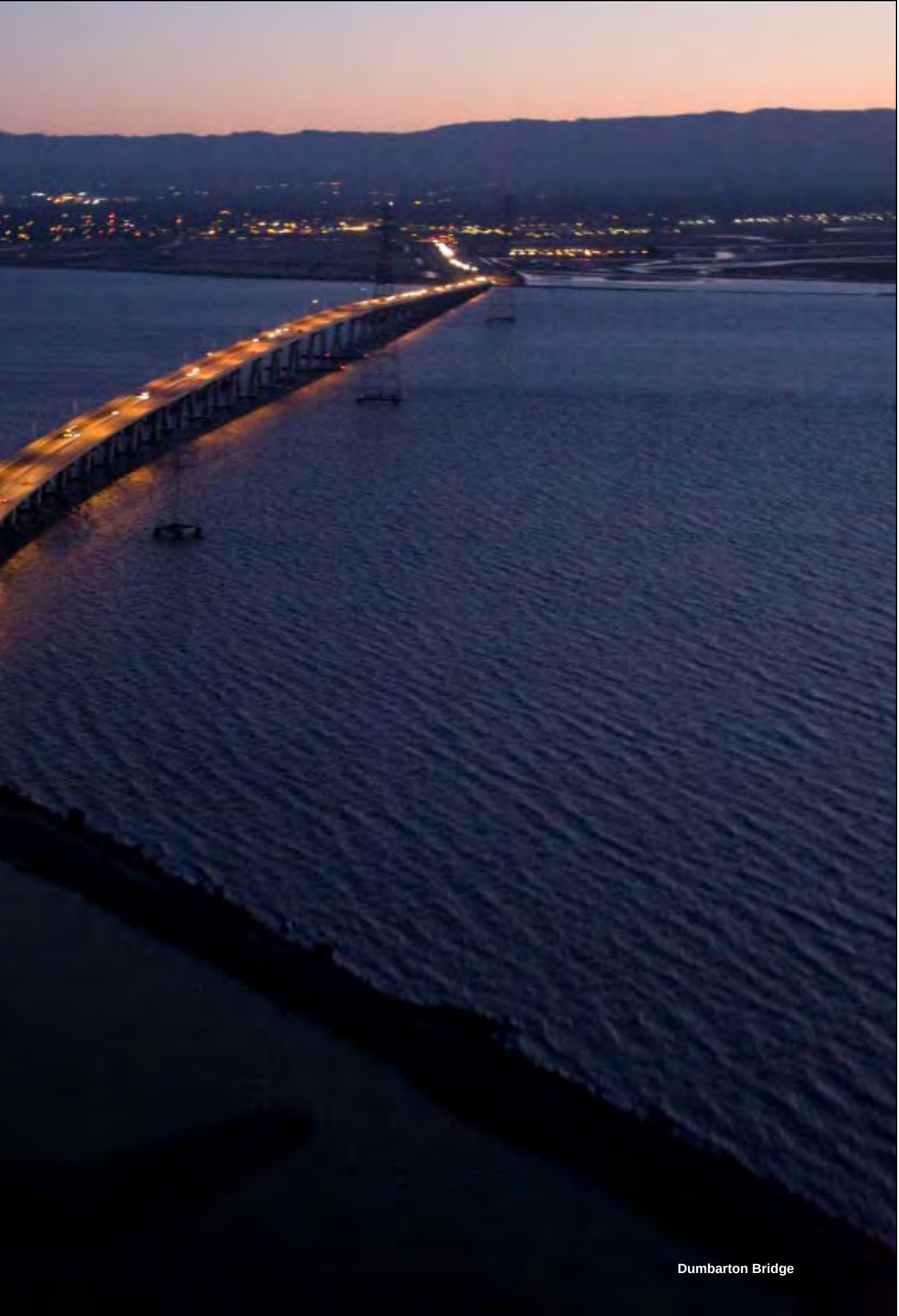
Schedule of Contributions to the Toll Bridge Seismic Retrofit Program ($ Millions)

| Source | Description | 2005-06 (Actual) | 2006-07 (Actual) | 2007-08 (Actual) | 2008-09 (Actual) | 2009-10 (Actual) | 2010-11 | 2011-12 | 2012-13 | 2013-14 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AB 1171 | SHA | 290 | | | | | | | | | 290 |
| | PTA | 80 | 40 | | | | | | | | 120 |
| | Highway Bridge Replacement and Rehabilitation (HBRR ) | 100 | 100 | 100 | 42 | | | | | | 342 |
| | Contingency | | | | 1 | 99 | 100 | 100 | 148 | | 448 |
| AB 144 | SHA* | 2 | 8 | | | | 53 | 50 | 17 | | 130 |
| | Motor Vehicle Account (MVA) | 75 | | | | | | | | | 75 |
| | Spillover | | 125 | | | | | | | | 125 |
| | SHA** | | | | | | | | | 300 | 300 |
| | Total | 547 | 273 | 100 | 43 | 99 | 153 | 150 | 165 | 300 | 1830 |

* *Caltrans Efficiency Savings*
** *SFOBB East Span Demolition Cost*

### Table 3—Toll Bridge Program Oversight Committee Estimated Expenses: July 1, 2005 through September 30, 2009 ($ Millions)

| Agency/Program Activity | Expenses |
|---|---|
| **BATA** | 0.8 |
| **Caltrans** | 1.7 |
| **CTC** | 1.2 |
| **Reporting** | 3.1 |
| **Total Program** | 6.8 |



Dumbarton Bridge

# Seismic Retrofit of the Dumbarton and Antioch Bridges

# SEISMIC RETROFIT OF DUMBARTON AND ANTIOCH BRIDGES

## Dumbarton Bridge Seismic Retrofit Project

## Project Status: In Design

The Dumbarton Bridge was opened to traffic in 1982, linking the cities of Newark in Alameda County and East Palo Alto in San Mateo County. The 1.6-mile-long bridge carries average daily traffic of nearly 60,000 vehicles over its six lanes and has an eight-foot bicycle/pedestrian lane to the south.

Though located between the San Andreas and Hayward faults, the Dumbarton Bridge was not included in the Toll Bridge Seismic Retrofit Program based on evaluations made in the 1990s that concluded the bridge did not warrant retrofitting. The bridge has since been re-evaluated for seismic vulnerability based on more recent seismic engineering, which has shown the bridge to be susceptible to damage from a major earthquake.

**Mock-Up of Dumbarton Pier Columns Undergoing Seismic Testing**

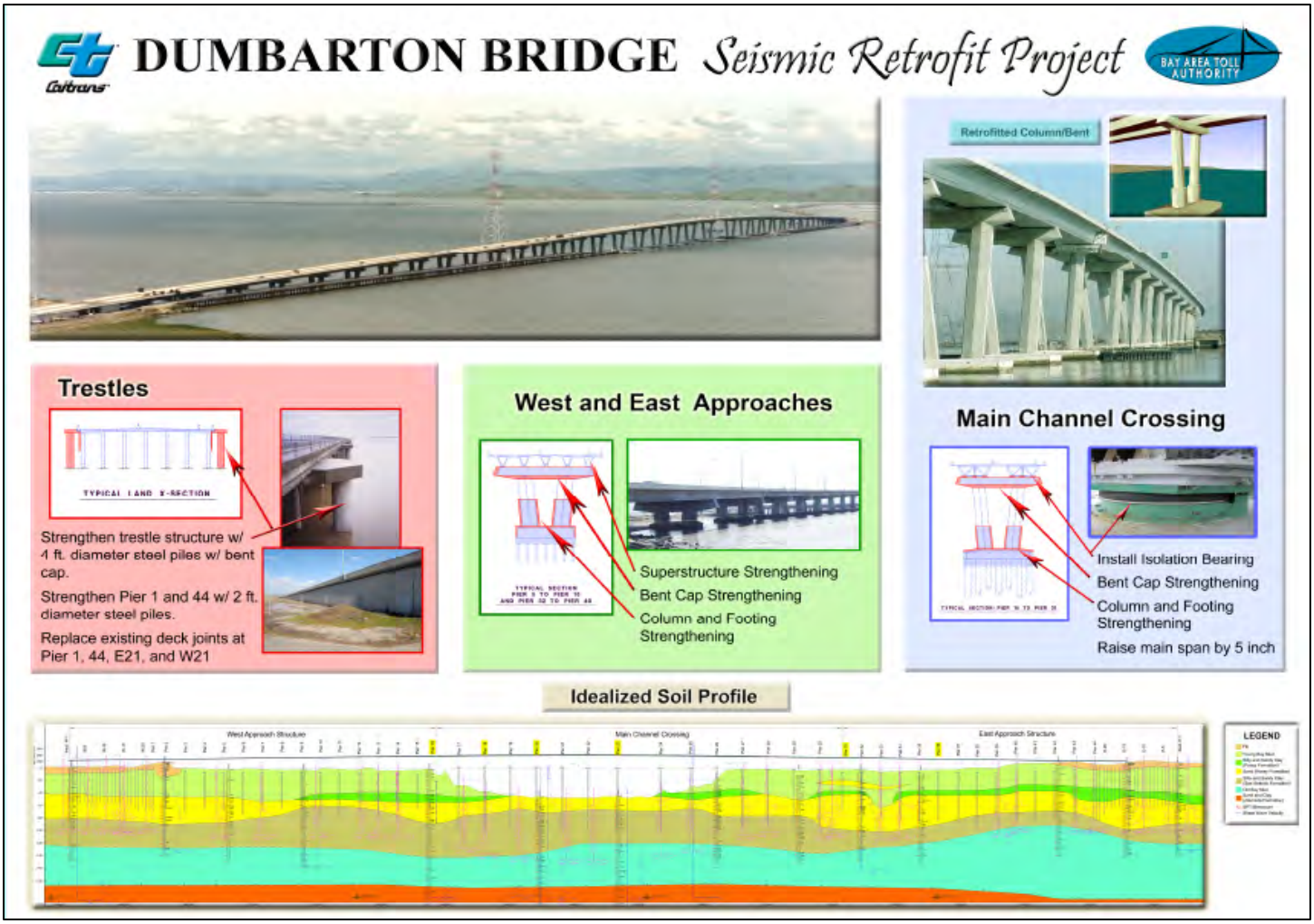
**Existing Dumbarton Bridge Looking East toward the Alameda County Foothills**

Based on the vulnerability studies and a follow-up sensitivity analysis of seismic risk, Caltrans and BATA decided to take steps towards retrofitting the Dumbarton Bridge, even though full funding for the project has not yet been identified. Using BATA toll bridge rehabilitation funding, a comprehensive seismic analysis of the bridge has commenced. This includes detailed geotechnical and geophysical investigations at the bridge and the development of a seismic retrofit strategy and design plans.

The current retrofit strategy for the Dumbarton Bridge includes superstructure and deck modifications, plus strengthening of the over land approach slab structures. Additional activities are identified in the attached diagram. The results of the seismic analysis and proposed retrofit strategy have been presented to the Toll Bridge Seismic Safety Peer Review Panel.

**Status:** On October 11, 2009, Governor Schwarzenegger approved Assembly Bill 1175 that added the Dumbarton and Antioch Bridges to the Toll Bridge Seismic Retrofit Program. BATA has now initiated efforts to raise tolls on the seven state-owned toll bridges in the Bay Area to, in part, fund the seismic retrofit of the Dumbarton and Antioch bridges.

BATA has already funded design plans for both bridge projects in anticipation of the projects being advertised in early 2010. The total estimated cost of these retrofits has been recently revised from $950 million to $750 million as project plans have been refined with reduced scope, which has minimized cost risks. In the future, the project progress report will be updated to better reflect the incorporation of these two projects into the Toll Bridge Seismic Retrofit Program.




**Seismic Retrofit Strategy Summary for Dumbarton Bridge**

# SEISMIC RETROFIT OF DUMBARTON AND ANTIOCH BRIDGES

## Antioch Bridge Seismic Retrofit Project

## Project Status: In Design

Serving the Delta region of the Bay Area, the Antioch Bridge takes State Route 160 traffic over the San Joaquin River, linking eastern Contra Costa County with Sacramento County. The current bridge was opened in 1978 with one lane in each direction and carries an average of more than 10,000 vehicles a day. Approximately 1.8 miles long, the bridge is a steel girder support roadway on reinforced concrete columns and foundations.

Like the Dumbarton Bridge, the Antioch bridge was not included in the Toll Bridge Seismic Retrofit Program based on evaluations made in the 1990s that concluded that the bridge did not warrant retrofitting. The Antioch Bridge has since been re-evaluated for seismic vulnerability based on more recent seismic engineering, which has shown the bridge to be susceptible to damage from a major earthquake.

Based on the vulnerability studies and a follow-up sensitivity analysis of seismic risk, Caltrans and BATA decided to take steps toward retrofitting the Antioch Bridge, even though full funding for the project has not yet been identified. Using BATA toll bridge rehabilitation funding, a comprehensive seismic analysis of the bridge has commenced. This analysis includes detailed geotechnical and geophysical investigation at the bridge and the development of a seismic retrofit strategy and design plans.

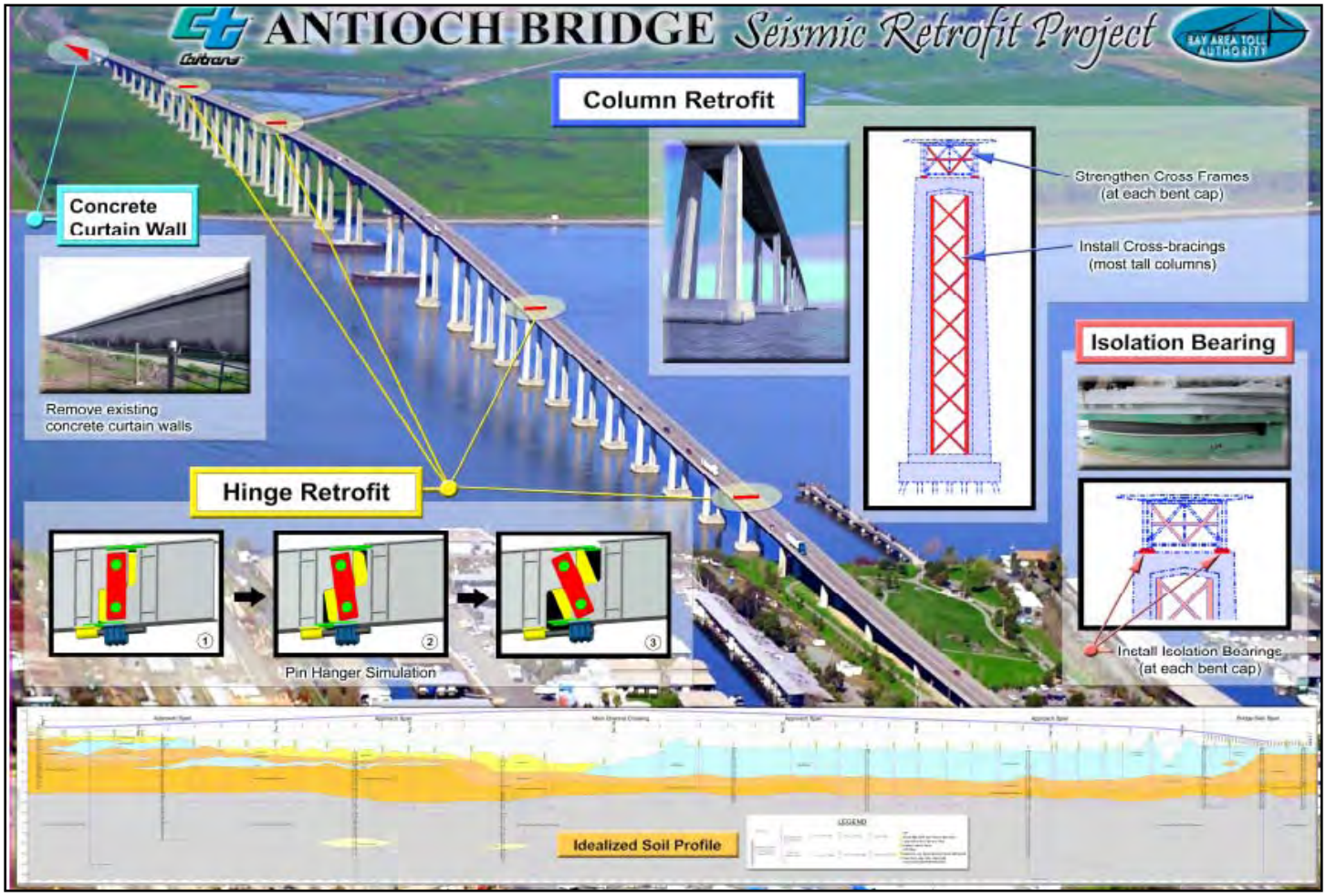
The current retrofit strategy for the Antioch Bridge includes relatively minor modifications to the approach structure on Sherman Island, the addition of isolation bearings, strengthening of the columns, and hinge retrofits. The results of the seismic analysis and proposed retrofit strategy have been presented to the Toll Bridge Seismic Safety Peer Review Panel.

Antioch Bridge

**Status:** On October 11, 2009, Governor Schwarzenegger approved Assembly Bill 1175 that added the Dumbarton and Antioch Bridges to the Toll Bridge Seismic Retrofit Program. BATA has now initiated efforts to raise tolls on the seven state-owned toll bridges in the Bay Area to, in part, fund the seismic retrofit of the Dumbarton and Antioch bridges.

BATA has already funded design plans for both bridge projects in anticipation of the projects being advertised in early 2010. The total estimated cost of these retrofits has been recently revised from $950 million to $750 million as project plans have been refined with reduced scope, which has minimized cost risks. In the future, the project progress report will be updated to better reflect the incorporation of these two projects into the Toll Bridge Seismic Retrofit Program.

**Prototype of Bearing for the Antioch Bridge Seismic Retrofit Project**



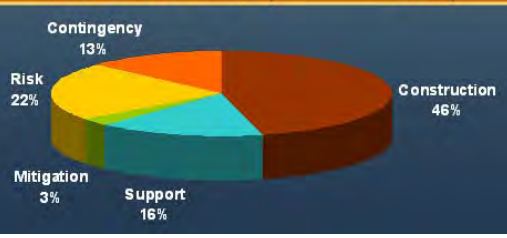

**Seismic Retrofit Strategy Summary for Antioch Bridge**

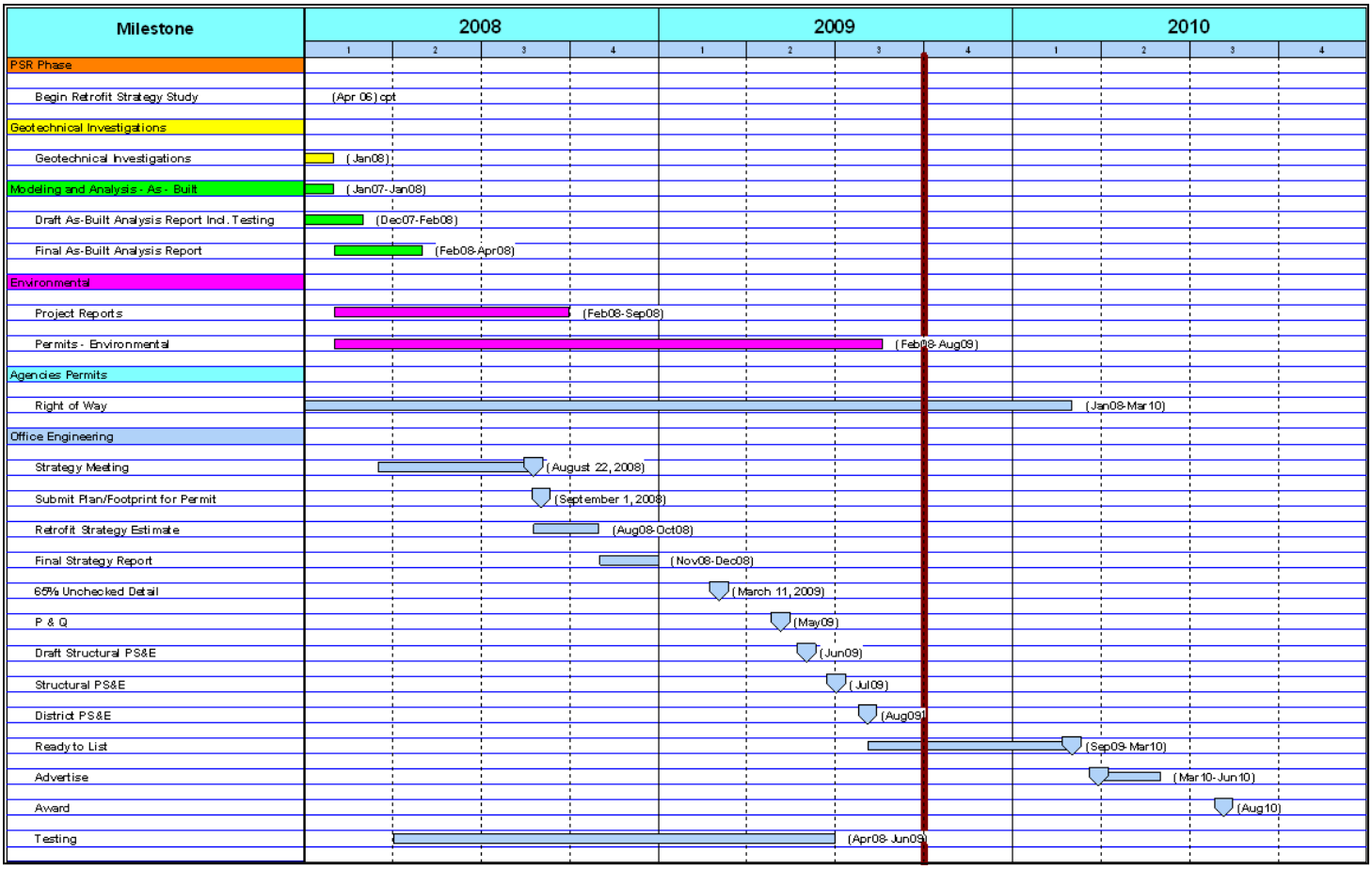
# Seismic Retrofits of Dumbarton and Antioch Bridges

## Project Cost and Schedule Summaries

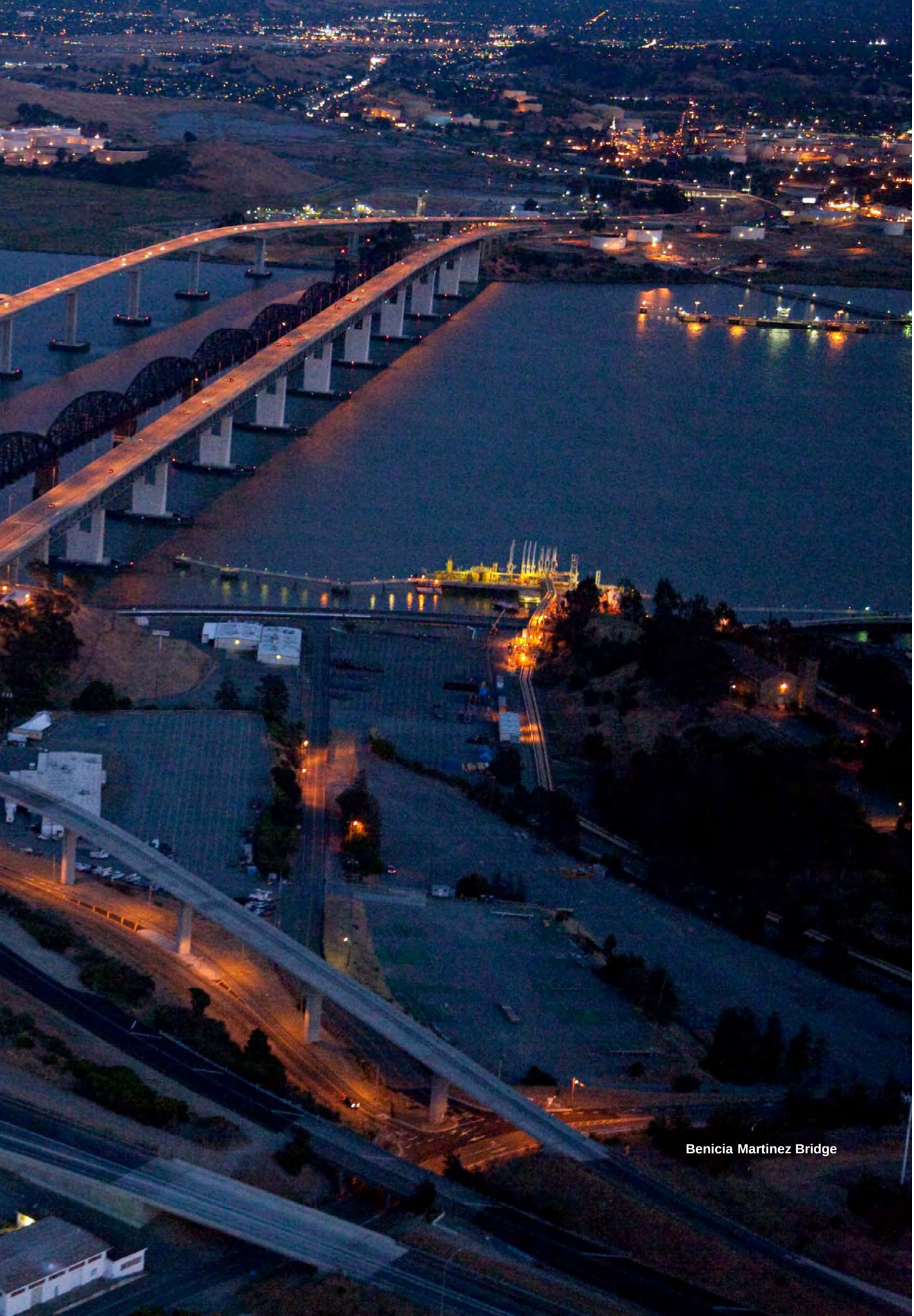
### Total Project Costs – $750 Million

| Description | Antioch ($ Millions) | Dumbarton ($ Millions) |
|---|---|---|
| CONSTRUCTION COST ESTIMATE (ESCALATION TO MID YEAR OF CONSTRUCTION) | $98 | $195 |
| CONTINGENCIES | 45 | 65 |
| SUBTOTAL CAPITAL COST ESTIMATE | 143 | 260 |
| SUPPORT COST ESTIMATE | 39 | 95 |
| MITIGATION COST ESTIMATE | 13 | 10 |
| RISK COST ESTIMATE | 72 | 118 |
| TOTAL COST ESTIMATE | $267 | $483 |



Dumbarton Bridge



Benicia Martinez Bridge

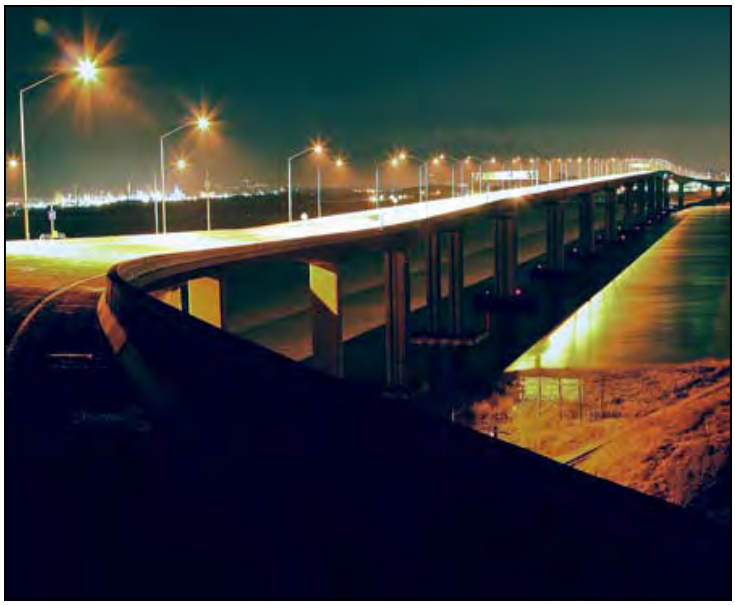
# REGIONAL MEASURE 1 TOLL BRIDGE PROGRAM

REGIONAL MEASURE 1 PROGRAM

## New Benicia-Martinez Bridge Project

## Project Status: New Bridge Completed 2007

The new Congressman George Miller Bridge opened to traffic in August 2007, taking its place alongside the existing 1962 Benicia-Martinez Bridge, which is named for Congressman Miller's father, the late George Miller, Jr. The new bridge carries five lanes of northbound Interstate 680 traffic, while the existing bridge is being upgraded to carry four lanes of southbound traffic and a new bicycle/pedestrian pathway.



New Benicia-Martinez Bridge Opened to Traffic in August 2007

Decades into the planning and construction, the new bridge is designed to a "Lifeline" seismic design standard, expected to be available for emergency response vehicles soon after a major seismic event. Constructed of lightweight concrete, the structure is one of the longest post-tensioned reinforced cast-in-place concrete bridges in the world. The new toll plaza, relocated from Benicia to Martinez, features the Bay Area's first FasTrak® express lanes, which vastly increase the throughput of vehicles using electronic toll collection.

## 1962 Benicia-Martinez Bridge Reconstruction Contract

Contractor: ACC/Top Grade, Joint Venture
Approved Capital Outlay Budget: $59.5 M
Status: Substantially Complete

A two-year project to rehabilitate and reconfigure the original Benicia-Martinez Bridge began shortly after the opening of the new Congressman George Miller Bridge. The existing 1.2-mile roadway surface on the steel deck truss bridge is being modified to carry four lanes of southbound traffic (one more than before)—with shoulders on both sides—plus a bicycle/pedestrian path on the west side of the span that will connect to Park Road in Benicia and to Marina Vista Boulevard in Martinez.

Mococo Road Bridge Jacking

### *Stage 1 – Reconstruction of East Side of Bridge and Approaches*

Completed in August 2008, this stage involved removal of the old toll plaza on the Benicia side of the bridge, deck repairs on the east side of the span, and repair of the roadway undulations on the southern approach just south of the Marina Vista interchange.

### *Stage 2 – Reconstruction of West Side of Bridge and Approaches and Construction of Bicycle/Pedestrian Pathway*

This stage began after southbound traffic was shifted from the west side of the bridge to the newly refurbished east side. It involves repairing the west-side bridge deck, repairing undulations on the west side of the roadway in Martinez, demolishing obsolete I-680/I-780 interchange structures, realigning southbound Interstate 680 for four lanes, and construction of the barrier separating traffic lanes from the bicycle/pedestrian path.

**Status:** A new southbound I-680 was opened to traffic in early August. The new bicycle/pedestrian path opened on August 29. The contract is now substantially complete.

**Benicia-Martinez Bridge Newly Opened Pedestrian/Bicycle Pathway**

**Benicia-Martinez Bridge Pedestrian/Bicycle Pathway Opened to The Public**

REGIONAL MEASURE 1 PROGRAM

## Interstate 880/State Route 92 Interchange Reconstruction Project
## Project Status: Under Construction

The Interstate 880/State Route 92 Interchange Reconstruction Project is the final project under the Regional Measure 1 Toll Bridge Program. Project completion fulfills a promise made to Bay Area voters in 1988 to deliver a slate of projects that help expand bridge capacity and improve safety on the bridges.

This corridor is consistently one of the Bay Area's most congested during the evening commute. This is due in part to the lane merging and weaving that is required by the existing cloverleaf interchange. The new interchange will feature direct freeway-to-freeway connector ramps that will increase traffic capacity and improve overall safety and traffic operations in the area. With the new direct-connector ramps, drivers coming off the San Mateo-Hayward Bridge can access Interstate 880 without having to compete with traffic headed onto east Route 92 from south Interstate 880 (see progress photos on pages 86 and 87).

Future Interstate 880/State Route 92 Interchange (as simulated) ,Looking West toward San Mateo.

## Interstate 880/State Route 92 Interchange Reconstruction Contract

Contractor: Flatiron/Granite
Approved Capital Outlay Budget: $155.0 M
Status: 52% Complete

Overview of Progress to Date

Bents 2, 3 and 4 of the I-880/SR92 Interchange New Separation Bridge

### *Stage 1 – Construct East Route 92 to North Interstate 880 Connector*

The new east Route 92 to north Interstate 880 connector (ENCONN) is the most critical flyover structure for relieving congestion in the corridor. The ENCONN will be first used as a detour to allow for future stages of work, while keeping traffic flowing.

**Status:** ENCONN was completed and opened to detour traffic on May 16, 2009.

### *Stage 2 – Replace South Side of Route 92 Separation Structure*

By detouring eastbound Route 92 traffic onto ENCONN, the existing separation structure that carries SR92 over I-880 can be replaced. The existing structure will be cut lengthwise, and then demolished and replaced separately. In this stage, the south side of the structure will be replaced, while west Route 92 and south-Interstate-880-to-east-Route-92 traffic will stay on the remaining structure.

**Status:** Work on the south side of the separation structure has begun. Foundations and columns have been installed.

### *Stage 3 – Replace North Side of Route 92 Separation Structure*

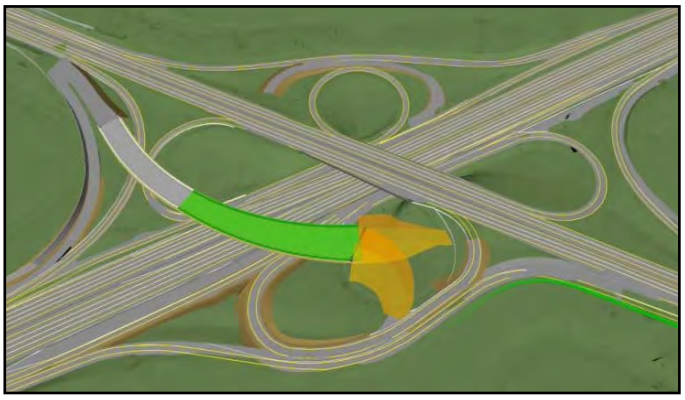
Upon completion of Stage 2, the existing north side of the separation structure will be demolished and replaced. Its traffic will then be shifted onto the newly reconstructed south side.

**Status:** Pending Stage 2.

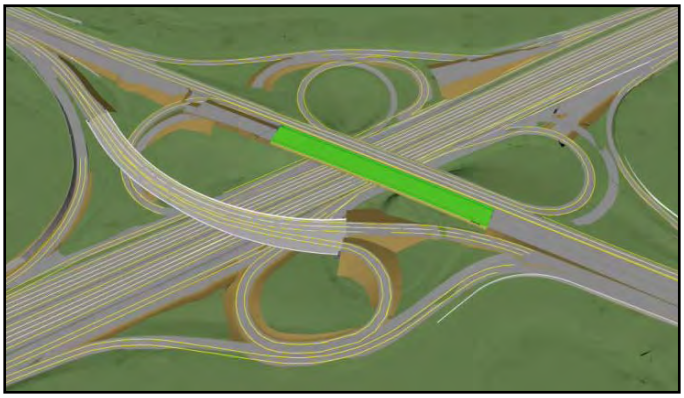
### *Stage 4 – Final Realignment and Other Work*

Upon completion of the Route 92 separation structure, east Route 92 traffic can be shifted onto its permanent alignment from the new ENCONN and directly under the new separation structure. Along with the ENCONN and Route 92 separation structures, several soundwalls, a pedestrian overcrossing on I-880 at Eldridge Avenue and other ramps and structures will also be reconstructed as part of this project.

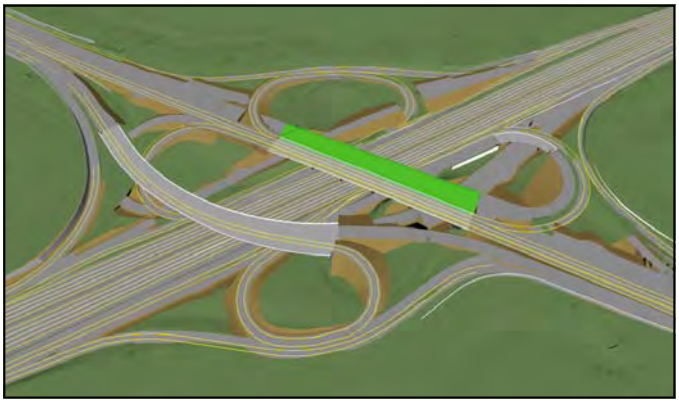
**Status:** Work continues on walls in the northwest (Stage 2), southeast and northeast quadrants, as well as on the Eldridge Ave. pedestrian overcrossing. The new pump station is ongoing and scheduled to be completed in February 2010. The Calaroga Bridge is 50 percent complete.



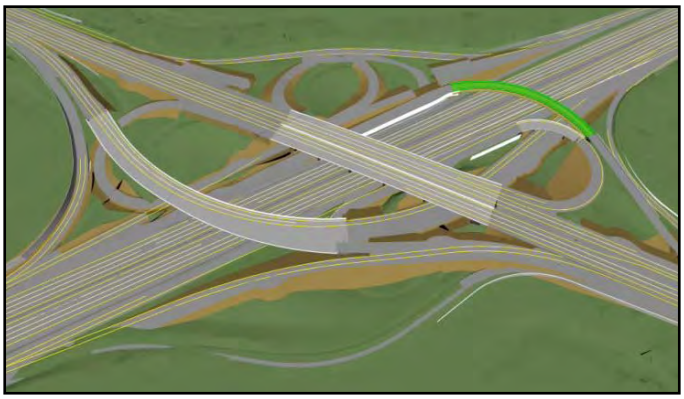
**Stage 1 - Construct East Route 92 to North Interstate 880 Direct Connector**



**Stage 2 - Demolish and Replace South Side of Route 92 Separation Structure**



**Stage 3 - Demolish and Replace North Side of Route 92 Separation Structure**



**Stage 4 - Final Realignment and Other Work**

REGIONAL MEASURE 1 PROGRAM

# Other Completed Projects

## San Mateo-Hayward Bridge-Widening Project
## Project Status: Completed 2003

Widening of the San Mateo-Hayward Bridge Trestle on Left

This project expanded the low-rise concrete trestle section of the San Mateo-Hayward Bridge to allow for three lanes in each direction to match the existing configuration of the high-rise steel section of the bridge.

## Richmond-San Rafael Bridge Rehabilitation Projects
## Project Status: Completed 2006

Two major rehabilitation projects for the Richmond-San Rafael Bridge were funded and completed:
(1) replacement of the western concrete approach trestle and ship-collision protection fender system; and
(2) rehabilitation of deck joints and resurfacing of the bridge deck.

In 2005, along with the seismic retrofit of the bridge, the trestle and fender replacement work was completed as part of the same project. Under a separate contract in 2006, the bridge was resurfaced with a polyester concrete overlay along with the repair of numerous deck joints.

New Richmond-San Rafael Bridge West Approach Trestle under Construction

## Richmond Parkway Construction Project
## Project Status: Completed 2001

The final connections to the Richmond Parkway from Interstate 580 near the Richmond-San Rafael Bridge were completed in May 2001.

New Alfred Zampa Memorial (Carquinez) Bridge Soon after Opening to Traffic, with Crockett Interchange Still under Construction

## New Alfred Zampa Memorial (Carquinez) Bridge Project
## Project Status: Completed 2003

The new western span of the Carquinez Bridge, which replaced the original 1927 span, is a twin-towered suspension bridge with three mixed-flow lanes, a new carpool lane, shoulders and a bicycle and pedestrian pathway.

## Bayfront Expressway (State Route 84) Widening Project
## Project Status: Completed 2004

This project expanded and improved the roadway from the Dumbarton Bridge touchdown to the US 101/Marsh Road interchange by adding additional lanes and turn pockets and improving bicycle and pedestrian access in the area.

Aerial View of  the Existing Bridge and Completed Roll Out/Roll In

# APPENDICES


A. TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2009 (A-1 and A-2)…… **68**

B. TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2009 ……..……..**70**

C. Regional Measure 1 Program Cost Detail……..……..…..**72**

D. Yerba Buena Island Transition Structures (YBITS) Advanced Work Project Progress Diagram……...……**75**

E. Oakland Touchdown (OTD) #1 Program Diagram……..……**76**

F. Project Photos……..……...**77**

G. Glossary of Terms……..……...**88**

## Appendix A-1: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2009 ($ Millions)

| Contract | AB 144 / SB 66 Budget (07/2005) | Approved Changes | Current Approved Budget (09/2009) | Cost To Date (09/2009) | Cost Forecast (09/2009) | At-Completion Variance |
|---|---|---|---|---|---|---|
| a | c | d | e = c + d | f | g | h = g - e |
| | | | | | | |
| SFOBB East Span Replacement Project | | | | | | |
| Capital Outlay Support | 959.3 | - | 959.3 | 771.9 | 1,203.1 | 243.8 |
| Capital Outlay Construction | 4,492.2 | 269.4 | 4,761.6 | 3,067.9 | 5,041.1 | 279.5 |
| Other Budgeted Capital | 35.1 | (3.3) | 31.8 | 0.7 | 7.7 | (24.1) |
| Total | 5,486.6 | 266.1 | 5,752.7 | 3,840.5 | 6,251.9 | 499.2 |
| SFOBB West Approach Replacement | | | | | | |
| Capital Outlay Support | 120.0 | - | 120.0 | 116.6 | 117.0 | (3.0) |
| Capital Outlay Construction | 309.0 | 41.7 | 350.7 | 328.1 | 338.1 | (12.6) |
| Total | 429.0 | 41.7 | 470.7 | 444.7 | 455.1 | (15.6) |
| SFOBB West Span Retrofit | | | | | | - |
| Capital Outlay Support | 75.0 | - | 75.0 | 74.8 | 75.0 | - |
| Capital Outlay Construction | 232.9 | - | 232.9 | 227.2 | 232.9 | - |
| Total | 307.9 | - | 307.9 | 302.0 | 307.9 | - |
| Richmond-San Rafael Bridge Retrofit | | | | | | |
| Capital Outlay Support | 134.0 | (7.0) | 127.0 | 126.7 | 127.0 | - |
| Capital Outlay Construction | 780.0 | (90.5) | 689.5 | 667.5 | 689.5 | - |
| Total | 914.0 | (97.5) | 816.5 | 794.2 | 816.5 | - |
| Benicia-Martinez Bridge Retrofit | | | | | | - |
| Capital Outlay Support | 38.1 | - | 38.1 | 38.1 | 38.1 | - |
| Capital Outlay Construction | 139.7 | - | 139.7 | 139.7 | 139.7 | - |
| Total | 177.8 | - | 177.8 | 177.8 | 177.8 | - |
| Carquinez Bridge Retrofit | | | | | | |
| Capital Outlay Support | 28.7 | - | 28.7 | 28.8 | 28.7 | - |
| Capital Outlay Construction | 85.5 | - | 85.5 | 85.4 | 85.5 | - |
| Total | 114.2 | - | 114.2 | 114.2 | 114.2 | - |
| San Mateo-Hayward Bridge Retrofit | | | | | | - |
| Capital Outlay Support | 28.1 | - | 28.1 | 28.1 | 28.1 | - |
| Capital Outlay Construction | 135.4 | - | 135.4 | 135.3 | 135.4 | - |
| Total | 163.5 | - | 163.5 | 163.4 | 163.5 | - |
| Vincent Thomas Bridge Retrofit (Los Angeles) | | | | | | |
| Capital Outlay Support | 16.4 | - | 16.4 | 16.4 | 16.4 | - |
| Capital Outlay Construction | 42.1 | - | 42.1 | 42.0 | 42.1 | - |
| Total | 58.5 | - | 58.5 | 58.4 | 58.5 | - |
| San Diego-Coronado Bridge Retrofit | | | | | | |
| Capital Outlay Support | 33.5 | - | 33.5 | 33.2 | 33.5 | - |
| Capital Outlay Construction | 70.0 | - | 70.0 | 69.4 | 70.0 | - |
| Total | 103.5 | - | 103.5 | 102.6 | 103.5 | - |
| | | | | | | |
| Subtotal Capital Outlay Support | 1,433.1 | (7.0) | 1,426.1 | 1,234.6 | 1,666.9 | 240.8 |
| Subtotal Capital Outlay | 6,286.8 | 220.6 | 6,507.4 | 4,762.5 | 6,774.3 | 266.9 |
| Subtotal Other Budgeted Capital | 35.1 | (3.3) | 31.8 | 0.7 | 7.7 | (24.1) |
| Miscellaneous Program Costs | 30.0 | - | 30.0 | 24.7 | 30.0 | - |
| Subtotal Toll Bridge Seismic Retrofit Program | 7,785.0 | 210.3 | 7,995.3 | 6,022.5 | 8,478.9 | 483.6 |
| Programatic Risk | - | - | - | - | 165.4 | 165.4 |
| Program Contingency | 900.0 | (210.3) | 689.7 | - | 40.7 | (649.0) |
| | | | | | | |
| Total Toll Bridge Seismic Retrofit Program | 8,685.0 | - | 8,685.0 | 6,022.5 | 8,685.0 | - |

*Note: Details may not sum to totals due to rounding effects.*

# Appendix A-2: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2009 ($ Millions)

| Bridge | AB 144 Baseline Budget | TBPOC Current Approved Budget | Expenditures to date and Encumbrances as of Sep 2009 See Note (1) | Estimated Costs not yet Spent or Encumbered as of Sep 2009 | Total Forecast as of Sep 2009 |
|---|---|---|---|---|---|
| a | b | c | d | e | f = d + e |
| Other Completed Projects | | | | | |
| Capital Outlay Support | 144.9 | 144.9 | 144.6 | 0.3 | 144.9 |
| Capital Outlay | 472.6 | 472.6 | 472.6 | 0.1 | 472.7 |
| Total | 617.5 | 617.5 | 617.2 | 0.4 | 617.6 |
| Richmond-San Rafael | | | | | |
| Capital Outlay Support | 134.0 | 127.0 | 126.7 | 0.3 | 127.0 |
| Capital Outlay | 698.0 | 689.5 | 674.2 | 15.3 | 689.5 |
| Project Reserves | 82.0 | - | - | - | - |
| Total | 914.0 | 816.5 | 800.9 | 15.6 | 816.5 |
| West Span Retrofit | | | | | |
| Capital Outlay Support | 75.0 | 75.0 | 74.8 | 0.2 | 75.0 |
| Capital Outlay | 232.9 | 232.9 | 232.7 | 0.2 | 232.9 |
| Total | 307.9 | 307.9 | 307.5 | 0.4 | 307.9 |
| West Approach | | | | | |
| Capital Outlay Support | 120.0 | 120.0 | 117.3 | (0.3) | 117.0 |
| Capital Outlay | 309.0 | 350.7 | 342.5 | (4.4) | 338.1 |
| Total | 429.0 | 470.7 | 459.8 | (4.7) | 455.1 |
| SFOBB East Span -Skyway | | | | | |
| Capital Outlay Support | 197.0 | 181.0 | 181.2 | (0.1) | 181.1 |
| Capital Outlay | 1,293.0 | 1,254.1 | 1,412.1 | (158.0) | 1,254.1 |
| Total | 1,490.0 | 1,435.1 | 1,593.3 | (158.1) | 1,435.2 |
| SFOBB East Span -SAS- Superstructure | | | | | |
| Capital Outlay Support | 214.6 | 214.6 | 186.3 | 226.6 | 412.9 |
| Capital Outlay | 1,753.7 | 1,753.7 | 1,649.7 | 364.4 | 2,014.1 |
| Total | 1,968.3 | 1,968.3 | 1,836.0 | 591.0 | 2,427.0 |
| SFOBB East Span -SAS- Foundations | | | | | |
| Capital Outlay Support | 62.5 | 41.0 | 37.6 | 1.0 | 38.6 |
| Capital Outlay | 339.9 | 307.3 | 308.7 | (1.4) | 307.3 |
| Total | 402.4 | 348.3 | 346.3 | (0.4) | 345.9 |
| Small YBI Projects | | | | | |
| Capital Outlay Support | 10.6 | 10.6 | 10.1 | 0.5 | 10.6 |
| Capital Outlay | 15.6 | 15.6 | 16.6 | (0.9) | 15.7 |
| Total | 26.2 | 26.2 | 26.7 | (0.4) | 26.3 |
| YBI Detour | | | | | |
| Capital Outlay Support | 29.5 | 66.0 | 75.0 | 10.5 | 85.5 |
| Capital Outlay | 131.9 | 492.8 | 493.0 | 11.0 | 504.0 |
| Total | 161.4 | 558.8 | 568.0 | 21.5 | 589.5 |
| YBI - Transition Structures | | | | | |
| Capital Outlay Support | 78.7 | 78.7 | 16.4 | 89.1 | 105.5 |
| Capital Outlay | 299.4 | 276.1 | 0.1 | 285.8 | 285.9 |
| Total | 378.1 | 354.8 | 16.5 | 374.9 | 391.4 |
| Oakland Touchdown | | | | | |
| Capital Outlay Support | 74.4 | 74.4 | 67.1 | 28.2 | 95.3 |
| Capital Outlay | 283.8 | 283.8 | 218.0 | 71.0 | 289.0 |
| Total | 358.2 | 358.2 | 285.1 | 99.2 | 384.3 |
| East Span Other Small Project | | | | | |
| Capital Outlay Support | 212.3 | 213.3 | 208.3 | 5.2 | 213.5 |
| Capital Outlay | 170.8 | 170.8 | 94.0 | 52.6 | 146.6 |
| Total | 383.1 | 384.1 | 302.3 | 57.8 | 360.1 |
| Existing Bridge Demolition | | | | | |
| Capital Outlay Support | 79.7 | 79.7 | 0.4 | 59.6 | 60.0 |
| Capital Outlay | 239.2 | 239.2 | - | 232.1 | 232.1 |
| Total | 318.9 | 318.9 | 0.4 | 291.7 | 292.1 |
| Miscellaneous Program Costs | 30.0 | 30.0 | 25.4 | 4.6 | 30.0 |
| Total Capital Outlay Support (2) | 1,463.2 | 1,456.2 | 1,271.2 | 425.7 | 1,696.9 |
| Total Capital Outlay | 6,321.8 | 6,539.1 | 5,914.2 | 867.8 | 6,782.0 |
| Program Total | 7,785.0 | 7,995.3 | 7,185.4 | 1,293.5 | 8,478.9 |

(1). Funds allocated to project or contract for Capital Outlay and Support needs includes Capital Outlay Support total allocation for FY 06/07.
(2). BSA provided a distribution of program contingency in December 2004 based on Bechtel Infrastructure Corporation input.
This column is subject to revision upon completion of Department's risk assessment update.
(3). Total Capital Outlay Support includes program indirect costs.

Notes: * Budget for Richmond-San Rafael Bridge includes $16.9 million of deck joint rehabilitation work that is considered to be eligible for seismic retrofit program funding.

*Note: Details may not sum to totals due to rounding effects.*

# Appendix B: TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2009 ($ Millions)

| Contract | EA Number | AB 144 / SB 66 Budget (07/2005) | Approved Changes | Current Approved Budget (09/2009) | Cost To Date (09/2009) | Cost Forecast (09/2009) | At-Completion Variance |
|---|---|---|---|---|---|---|---|
| a | b | c | d | e = c + d | f | g | h = g - e |
| San Francisco-Oakland Bay Bridge East Span Replacement Project | | | | | | | |
| East Span - Skyway | 01202X | | | | | | |
| Capital Outlay Support | | 197.0 | (16.0) | 181.0 | 181.1 | 181.1 | 0.1 |
| Capital Outlay Construction | | 1,293.0 | (38.9) | 1,254.1 | 1,236.9 | 1,254.1 | - |
| Total | | 1,490.0 | (54.9) | 1,435.1 | 1,418.0 | 1,435.2 | 0.1 |
| East Span - SAS E2/T1 Foundations | 0120EX | | | | | | - |
| Capital Outlay Support | | 52.5 | (21.5) | 31.0 | 28.4 | 28.6 | (2.4) |
| Capital Outlay Construction | | 313.5 | (32.6) | 280.9 | 275.0 | 280.9 | - |
| Total | | 366.0 | (54.1) | 311.9 | 303.4 | 309.5 | (2.4) |
| East Span - SAS Superstructure | 0120FX | | | | | | |
| Capital Outlay Support | | 214.6 | - | 214.6 | 180.5 | 412.9 | 198.3 |
| Capital Outlay Construction | | 1,753.7 | - | 1,753.7 | 821.5 | 2,014.1 | 260.4 |
| Total | | 1,968.3 | - | 1,968.3 | 1,002.0 | 2,427.0 | 458.7 |
| SAS W2 Foundations | 0120CX | | | | | | |
| Capital Outlay Support | | 10.0 | - | 10.0 | 9.2 | 10.0 | - |
| Capital Outlay Construction | | 26.4 | - | 26.4 | 25.8 | 26.4 | - |
| Total | | 36.4 | - | 36.4 | 35.0 | 36.4 | - |
| YBI South/South Detour | 0120RX | | | | | | |
| Capital Outlay Support | | 29.4 | 36.6 | 66.0 | 72.5 | 85.5 | 19.5 |
| Capital Outlay Construction | | 132.0 | 360.8 | 492.8 | 384.2 | 504.0 | 11.2 |
| Total | | 161.4 | 397.4 | 558.8 | 456.7 | 589.5 | 30.7 |
| YBI Transition Structures (see notes below) | 0120PX | | | | | | |
| Capital Outlay Support | | 78.7 | - | 78.7 | 26.9 | 105.5 | 26.8 |
| Capital Outlay Construction | | 299.3 | (23.2) | 276.1 | - | 285.9 | 9.8 |
| Total | | 378.0 | (23.2) | 354.8 | 26.9 | 391.4 | 36.6 |
| * YBI- Transition Structures Contract No. 1 | | | | | | | |
| Capital Outlay Support | | | | | 7.2 | 65.1 | |
| Capital Outlay Construction | | | | | - | 223.2 | |
| Total | | | | | 7.2 | 288.3 | |
| * YBI- Transition Structures Contract No. 2 | | | | | | | |
| Capital Outlay Support | | | | | 3.2 | 23.4 | |
| Capital Outlay Construction | | | | | - | 59.4 | |
| Total | | | | | 3.2 | 82.8 | |
| * YBI- Transition Structures Contract No. 3 Landscape | | | | | | | |
| Capital Outlay Support | | | | | - | 1.0 | |
| Capital Outlay Construction | | | | | - | 3.3 | |
| Total | | | | | - | 4.3 | |
| below) | 01204X | | | | | | |
| Capital Outlay Support | | 74.4 | - | 74.4 | 65.0 | 95.3 | 20.9 |
| Capital Outlay Construction | | 283.8 | - | 283.8 | 193.2 | 289.0 | 5.2 |
| Total | | 358.2 | - | 358.2 | 258.2 | 384.3 | 26.1 |
| * OTD Submarine Cable | 0120K4 | | | | | | |
| Capital Outlay Support | | | | | 0.9 | 0.9 | |
| Capital Outlay Construction | | | | | 7.9 | 9.6 | |
| Total | | | | | 8.8 | 10.5 | |
| * OTD No. 1 (Westbound) | 0120L4 | | | | | | |
| Capital Outlay Support | | | | | 39.1 | 50.4 | |
| Capital Outlay Construction | | | | | 185.3 | 211.0 | |
| Total | | | | | 224.4 | 261.4 | |
| * OTD No. 2 (Eastbound) | 0120M4 | | | | | | |
| Capital Outlay Support | | | | | 4.3 | 20.5 | |
| Capital Outlay Construction | | | | | - | 64.0 | |
| Total | | | | | 4.3 | 84.5 | |
| * OTD Electrical Systems | 0120N4 | | | | | | |
| Capital Outlay Support | | | | | 0.8 | 1.5 | |
| Capital Outlay Construction | | | | | - | 4.4 | |
| Total | | | | | 0.8 | 5.9 | |

Notes: YBI Transition Structures and Oakland Touchdown Cost-to-Date and Cost Forecast includes prior-to-split Capital Outlay

*Note: Details may not sum to totals due to rounding effects.*

## Appendix B: TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2009 ($ Millions) (continued)

| Contract | EA Number | AB 144 / SB 66 Budget (07/2005) | Approved Changes | Current Approved Budget (09/2009) | Cost To Date (09/2009) | Cost Forecast (09/2009) | At-Completion Variance |
|---|---|---|---|---|---|---|---|
| a | b | c | d | e = c + d | f | g | h = g - e |
| Existing Bridge Demolition | 01209X | | | | | | |
| Capital Outlay Support | | 79.7 | - | 79.7 | 0.4 | 60.0 | (19.7) |
| Capital Outlay Construction | | 239.2 | - | 239.2 | - | 232.1 | (7.1) |
| Total | | 318.9 | - | 318.9 | 0.4 | 292.1 | (26.8) |
| YBI/SAS Archeology | 01207X | | | | | | |
| Capital Outlay Support | | 1.1 | - | 1.1 | 1.1 | 1.1 | - |
| Capital Outlay Construction | | 1.1 | - | 1.1 | 1.1 | 1.1 | - |
| Total | | 2.2 | - | 2.2 | 2.2 | 2.2 | - |
| | | | | | | | |
| YBI - USCG Road Relocation | 0120QX | | | | | | |
| Capital Outlay Support | | 3.0 | - | 3.0 | 2.7 | 3.0 | - |
| Capital Outlay Construction | | 3.0 | - | 3.0 | 2.8 | 3.0 | - |
| Total | | 6.0 | - | 6.0 | 5.5 | 6.0 | - |
| YBI - Substation and Viaduct | 0120GX | | | | | | |
| Capital Outlay Support | | 6.5 | - | 6.5 | 6.4 | 6.5 | - |
| Capital Outlay Construction | | 11.6 | - | 11.6 | 11.3 | 11.6 | - |
| Total | | 18.1 | - | 18.1 | 17.7 | 18.1 | - |
| Oakland Geofill | 01205X | | | | | | - |
| Capital Outlay Support | | 2.5 | - | 2.5 | 2.5 | 2.5 | - |
| Capital Outlay Construction | | 8.2 | - | 8.2 | 8.2 | 8.2 | - |
| Total | | 10.7 | - | 10.7 | 10.7 | 10.7 | - |
| | | | | | | | |
| Pile Installation Demonstration Project | 01208X | | | | | | |
| Capital Outlay Support | | 1.8 | - | 1.8 | 1.8 | 1.8 | - |
| Capital Outlay Construction | | 9.2 | - | 9.2 | 9.2 | 9.2 | - |
| Total | | 11.0 | - | 11.0 | 11.0 | 11.0 | - |
| Stormwater Treatment Measures | 0120JX | | | | | | |
| Capital Outlay Support | | 6.0 | 2.0 | 8.0 | 8.1 | 8.2 | 0.2 |
| Capital Outlay Construction | | 15.0 | 3.3 | 18.3 | 16.7 | 18.3 | - |
| Total | | 21.0 | 5.3 | 26.3 | 24.8 | 26.5 | 0.2 |
| Right-of-Way and Environmental Mitigation | 0120X9 | | | | | | |
| Capital Outlay Support | | - | - | - | - | - | - |
| Capital Outlay & Right-of-Way | | 72.4 | - | 72.4 | 51.2 | 72.4 | - |
| Total | | 72.4 | - | 72.4 | 51.2 | 72.4 | - |
| | 04343X & 04300X | | | | | | |
| Sunk Cost - Existing East Span Retrofit | | | | | | | |
| Capital Outlay Support | | 39.5 | - | 39.5 | 39.5 | 39.5 | - |
| Capital Outlay Construction | | 30.8 | - | 30.8 | 30.8 | 30.8 | - |
| Total | | 70.3 | - | 70.3 | 70.3 | 70.3 | - |
| Other Capital Outlay Support | | | | | | | |
| Environmental Phase | | 97.7 | - | 97.7 | 97.7 | 97.7 | - |
| Pre-Split Project Expenditures | | 44.9 | - | 44.9 | 44.9 | 44.9 | - |
| Non-project Specific Costs | | 20.0 | (1.0) | 19.0 | 3.2 | 19.0 | - |
| Total | | 162.6 | (1.0) | 161.6 | 145.8 | 161.6 | - |
| | | | | | | | |
| Subtotal Capital Outlay Support | | 959.3 | - | 959.3 | 771.9 | 1,203.1 | 243.8 |

*Note: Details may not sum to totals due to rounding effects.*

# Appendix C: Regional Measure 1 Program Cost Detail ($ Millions)

| Project | EA Number | BATA Budget (07/2005) | Approved Changes | Current Approved Budget (09/2009) | Cost To Date (09/2009) | Cost Forecast (09/2009) | At-Completion Variance |
|---|---|---|---|---|---|---|---|
| a | b | c | d | e = c + d | f | g | h = g - e |
| **New Benicia-Martinez Bridge Project** | | | | | | | |
| **New Bridge** | **00603_** | | | | | | |
| Capital Outlay Support | | | | | | | |
| BATA Funding | | 84.9 | 6.9 | 91.8 | 91.7 | 91.8 | - |
| Non-BATA Funding | | - | 0.1 | 0.1 | 0.1 | 0.1 | - |
| Subtotal | | 84.9 | 7.0 | 91.9 | 91.8 | 91.9 | - |
| Capital Outlay Construction | | | | - | | | - |
| BATA Funding | | 661.9 | 94.6 | 756.5 | 753.8 | 756.5 | - |
| Non-BATA Funding | | 10.1 | - | 10.1 | 10.1 | 10.1 | - |
| Subtotal | | 672.0 | 94.6 | 766.6 | 763.9 | 766.6 | - |
| **Total** | | 756.9 | 101.6 | 858.5 | 855.7 | 858.5 | - |
| **I-680/I-780 Interchange Reconstruction** | **00606_** | | | | | | |
| Capital Outlay Support | | | | | | | |
| BATA Funding | | 24.9 | 5.2 | 30.1 | 30.1 | 30.1 | - |
| Non-BATA Funding | | 1.4 | 5.2 | 6.6 | 6.3 | 6.6 | - |
| Subtotal | | 26.3 | 10.4 | 36.7 | 36.4 | 36.7 | - |
| Capital Outlay Construction | | | | | | | |
| BATA Funding | | 54.7 | 26.9 | 81.6 | 77.1 | 81.6 | - |
| Non-BATA Funding | | 21.6 | - | 21.6 | 21.7 | 21.6 | - |
| Subtotal | | 76.3 | 26.9 | 103.2 | 98.8 | 103.2 | - |
| **Total** | | 102.6 | 37.3 | 139.9 | 135.2 | 139.9 | - |
| **I-680/Marina Vista Interchange Reconstruction** | **00605_** | | | | | | |
| Capital Outlay Support | | 18.3 | 1.8 | 20.1 | 20.1 | 20.1 | - |
| Capital Outlay Construction | | 51.5 | 4.9 | 56.4 | 56.1 | 56.4 | - |
| **Total** | | 69.8 | 6.7 | 76.5 | 76.2 | 76.5 | - |
| **New Toll Plaza and Administration Building** | **00604_** | | | | | | |
| Capital Outlay Support | | 11.9 | 3.8 | 15.7 | 15.7 | 15.7 | - |
| Capital Outlay Construction | | 24.3 | 2.0 | 26.3 | 25.1 | 26.3 | - |
| **Total** | | 36.2 | 5.8 | 42.0 | 40.8 | 42.0 | - |
| **Existing Bridge & Interchange Modifications** | **0060A_** | | | | | | |
| Capital Outlay Support | | | | | | | |
| BATA Funding | | 4.3 | 13.5 | 17.8 | 17.3 | 17.8 | - |
| Non-BATA Funding | | - | 0.9 | 0.9 | 0.8 | 0.9 | - |
| Subtotal | | 4.3 | 14.4 | 18.7 | 18.1 | 18.7 | - |
| Capital Outlay Construction | | | | | | | |
| BATA Funding | | 17.2 | 32.8 | 50.0 | 34.0 | 50.0 | - |
| Non-BATA Funding | | - | 9.5 | 9.5 | - | 9.5 | - |
| Subtotal | | 17.2 | 42.3 | 59.5 | 34.0 | 59.5 | - |
| **Total** | | 21.5 | 56.7 | 78.2 | 52.1 | 78.2 | - |
| **Other Contracts** | **See note below** | | | | | | |
| Capital Outlay Support | | 11.4 | (2.3) | 9.1 | 8.6 | 9.1 | - |
| Capital Outlay Construction | | 20.3 | 3.3 | 23.6 | 17.3 | 23.6 | - |
| Capital Outlay Right-of-Way | | 20.4 | (0.1) | 20.3 | 17.0 | 20.3 | - |
| **Total** | | 52.1 | 0.9 | 53.0 | 42.9 | 53.0 | - |
| Subtotal BATA Capital Outlay Support | | 155.7 | 28.9 | 184.6 | 183.5 | 184.6 | - |
| Subtotal BATA Capital Outlay Construction | | 829.9 | 164.5 | 994.4 | 963.4 | 994.4 | - |
| Subtotal Capital Outlay Right-of-Way | | 20.4 | (0.1) | 20.3 | 17.0 | 20.3 | - |
| Subtotal Non-BATA Capital Outlay Support | | 1.4 | 6.2 | 7.6 | 7.2 | 7.6 | - |
| Subtotal Non-BATA Capital Outlay Construction | | 31.7 | 9.5 | 41.2 | 31.8 | 41.2 | - |
| Project Reserves | | 20.8 | 3.6 | 24.4 | - | 24.4 | - |
| Total New Benicia-Martinez Bridge Project | | 1,059.9 | 212.6 | 1,272.5 | 1,202.9 | 1,272.5 | - |

**Notes:** **Includes EA's 00601_,00603_,00605_,00606_, 00608_, 00609_, 0060A_, 0060C_, 0060E_, 0060F_, 0060G_, and 0060H_ and all Project Right-of-Way**

*Note: Details may not sum to totals due to rounding effects.*

## Appendix C: Regional Measure 1 Program Cost Detail ($ Millions) (Continued)

| Project | EA Number | BATA Budget (07/2005) | Approved Changes | Current Approved Budget (09/2009) | Cost To Date (09/2009) | Cost Forecast (09/2009) | At-Completion Variance |
|---|---|---|---|---|---|---|---|
| a | b | c | d | e = c + d | f | g | h = g - e |
| **Carquinez Bridge Replacement Project** | | | | | | | |
| **New Bridge** | **01301_** | | | | | | |
| Capital Outlay Support | | 60.5 | (0.3) | 60.2 | 60.2 | 60.2 | - |
| Capital Outlay Construction | | 253.3 | 2.7 | 256.0 | 255.9 | 256.0 | - |
| **Total** | | 313.8 | 2.4 | 316.2 | 316.1 | 316.2 | - |
| **Crockett Interchange Reconstruction** | **01305_** | | | | | | |
| Capital Outlay Support | | 32.0 | (0.1) | 31.9 | 31.9 | 31.9 | - |
| Capital Outlay Construction | | 73.9 | (1.9) | 72.0 | 71.9 | 72.0 | - |
| **Total** | | 105.9 | (2.0) | 103.9 | 103.8 | 103.9 | - |
| **Existing 1927 Bridge Demolition** | **01309_** | | | | | | |
| Capital Outlay Support | | 16.1 | (0.5) | 15.6 | 15.6 | 15.6 | - |
| Capital Outlay Construction | | 35.2 | - | 35.2 | 34.8 | 35.2 | - |
| **Total** | | 51.3 | (0.5) | 50.8 | 50.4 | 50.8 | - |
| **Other Contracts** | **See note below** | | | | | | |
| Capital Outlay Support | | 15.8 | 1.2 | 17.0 | 16.3 | 17.0 | - |
| Capital Outlay Construction | | 18.8 | (1.2) | 17.6 | 16.2 | 17.6 | - |
| Capital Outlay Right-of-Way | | 10.5 | (0.1) | 10.4 | 9.9 | 10.4 | - |
| **Total** | | 45.1 | (0.1) | 45.0 | 42.4 | 45.0 | - |
| Subtotal BATA Capital Outlay Support | | 124.4 | 0.3 | 124.7 | 124.0 | 124.7 | - |
| Subtotal BATA Capital Outlay Construction | | 381.2 | (0.4) | 380.8 | 378.8 | 380.8 | - |
| Subtotal Capital Outlay Right-of-Way | | 10.5 | (0.1) | 10.4 | 9.9 | 10.4 | - |
| Project Reserves | | 12.1 | (9.8) | 2.3 | - | 2.3 | - |
| Total Carquinez Bridge Replacement Project | | 528.2 | (10.0) | 518.2 | 512.7 | 518.2 | - |

**Notes:** **Other Contracts includes EA's 01301_,01302_, 01303_, 01304_,01305_, 01306_, 01307_, 01308_, 01309_,0130A_, 0130C_, 0130D_ , 0130F_, 0130G_, 0130H_, 0130J_, 00453_, 00493_, 04700_, 00607_, 2A270_, and 29920_ and all Project Right-of-Way**

*Note: Details may not sum to totals due to rounding effects.*

# Appendix C: Regional Measure 1 Program Cost Detail ($ Millions) (Continued)

| Project | EA Number | BATA Budget (07/2005) | Approved Changes | Current Approved Budget (09/2009) | Cost To Date (09/2009) | Cost Forecast (09/2009) | At-Completion Variance |
|---|---|---|---|---|---|---|---|
| a | b | c | d | e = c + d | f | g | h = g - e |
| Richmond-San Rafael Bridge Trestle, Fender, and Deck Joint Rehabilitation | | | See note [1] below | | | | |
| Capital Outlay Support | | | | | | | |
| BATA Funding | | 2.2 | (0.8) | 1.4 | 1.4 | 1.4 | - |
| Non-BATA Funding | | 8.6 | 1.8 | 10.4 | 10.4 | 10.4 | - |
| Subtotal | | 10.8 | 1.0 | 11.8 | 11.8 | 11.8 | - |
| Capital Outlay Construction | | | | | | | |
| BATA Funding | | 40.2 | (6.8) | 33.4 | 33.3 | 33.4 | - |
| Non-BATA Funding | | 51.1 | - | 51.1 | 51.1 | 51.1 | - |
| Subtotal | | 91.3 | (6.8) | 84.5 | 84.4 | 84.5 | - |
| Project Reserves | | - | 0.8 | 0.8 | - | 0.8 | - |
| Total | | 102.1 | (5.0) | 97.1 | 96.2 | 97.1 | - |
| Rehabilitation | 04152_ | | | | | | |
| Capital Outlay Support | | | | | | | |
| BATA Funding | | 4.0 | (0.7) | 3.3 | 3.3 | 3.3 | - |
| Non-BATA Funding | | 4.0 | (4.0) | - | - | - | - |
| Subtotal | | 8.0 | (4.7) | 3.3 | 3.3 | 3.3 | - |
| Capital Outlay Construction | | 16.9 | (0.6) | 16.3 | 16.3 | 16.3 | - |
| Project Reserves | | 0.1 | 0.3 | 0.4 | - | 0.4 | - |
| Total | | 25.0 | (5.0) | 20.0 | 19.6 | 20.0 | - |
| Richmond Parkway Project (RM 1 Share Only) | Non-Caltrans | | | | | | |
| Capital Outlay Support | | - | - | - | - | - | - |
| Capital Outlay Construction | | 5.9 | - | 5.9 | 4.3 | 5.9 | - |
| Total | | 5.9 | - | 5.9 | 4.3 | 5.9 | - |
| San Mateo-Hayward Bridge Widening | See note [2] below | | | | | | |
| Capital Outlay Support | | 34.6 | (0.5) | 34.1 | 34.1 | 34.1 | - |
| Capital Outlay Construction | | 180.2 | (6.1) | 174.1 | 174.1 | 174.1 | - |
| Capital Outlay Right-of-Way | | 1.5 | (0.9) | 0.6 | 0.5 | 0.6 | - |
| Project Reserves | | 1.5 | (0.5) | 1.0 | - | 1.0 | - |
| Total | | 217.8 | (8.0) | 209.8 | 208.7 | 209.8 | - |
| I-880/SR-92 Interchange Reconstruction | EA's 23317_, 01601_, and 01602_ | | | | | | |
| Capital Outlay Support | | 28.8 | 34.6 | 63.4 | 49.6 | 63.4 | - |
| Capital Outlay Construction | | | | | | | |
| BATA Funding | | 85.2 | 60.2 | 145.4 | 77.3 | 145.4 | - |
| Non-BATA Funding | | 9.6 | - | 9.6 | - | 9.6 | - |
| Subtotal | | 94.8 | 60.2 | 155.0 | 77.3 | 155.0 | - |
| Capital Outlay Right-of-Way | | 9.9 | 7.0 | 16.9 | 11.7 | 16.9 | - |
| Project Reserves | | 0.3 | 9.4 | 9.7 | - | 9.7 | - |
| Total | | 133.8 | 111.2 | 245.0 | 138.6 | 245.0 | - |
| Bayfront Expressway Widening | EA's 00487_, 01511_, and 01512_ | | | | | | |
| Capital Outlay Support | | 8.6 | (0.2) | 8.4 | 8.3 | 8.4 | - |
| Capital Outlay Construction | | 26.5 | (1.5) | 25.0 | 24.9 | 25.0 | - |
| Capital Outlay Right-of-Way | | 0.2 | - | 0.2 | 0.2 | 0.2 | - |
| Project Reserves | | 0.8 | (0.3) | 0.5 | - | 0.5 | - |
| Total | | 36.1 | (2.0) | 34.1 | 33.4 | 34.1 | - |
| US 101/University Avenue Interchange Modification | Non-Caltrans | | | | | | |
| Capital Outlay Support | | - | - | - | - | - | - |
| Capital Outlay Construction | | 3.8 | - | 3.8 | 3.7 | 3.8 | - |
| Total | | 3.8 | - | 3.8 | 3.7 | 3.8 | - |
| Subtotal BATA Capital Outlay Support | | 358.3 | 61.6 | 419.9 | 404.2 | 419.9 | - |
| Subtotal BATA Capital Outlay Construction | | 1,569.8 | 209.3 | 1,779.1 | 1,676.1 | 1,779.1 | - |
| Subtotal Capital Outlay Right-of-Way | | 42.5 | 5.9 | 48.4 | 39.3 | 48.4 | - |
| Subtotal Non-BATA Capital Outlay Support | | 14.0 | 4.0 | 18.0 | 17.6 | 18.0 | - |
| Subtotal Non-BATA Capital Outlay Construction | | 92.4 | 9.5 | 101.9 | 82.9 | 101.9 | - |
| Project Reserves | | 35.6 | 3.5 | 39.1 | - | 39.1 | - |
| Total RM1 Program | | 2,112.6 | 293.8 | 2,406.4 | 2,220.1 | 2,406.4 | - |

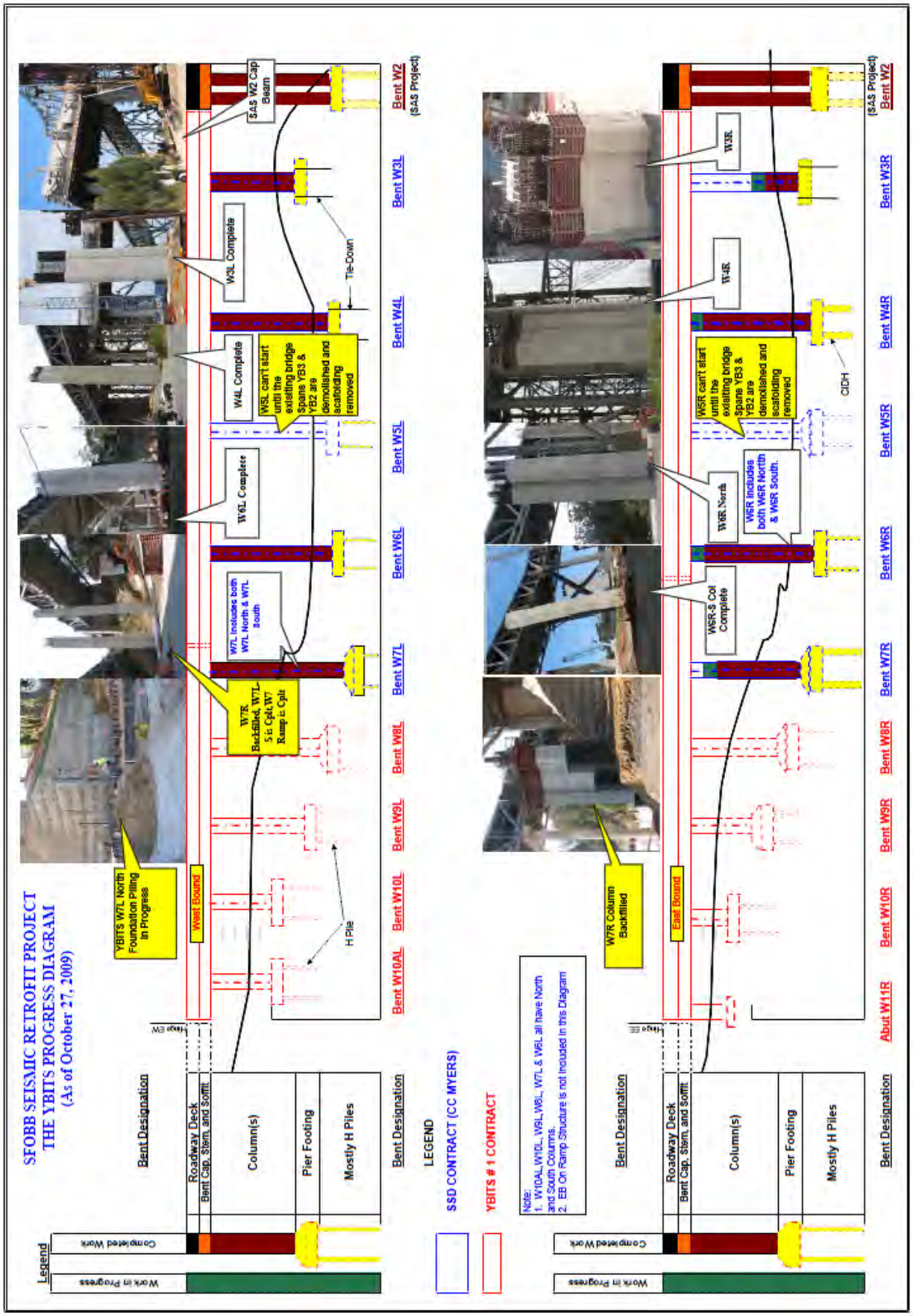
Notes:

1 Richmond-San Rafael Bridge Trestle, Fender, and Deck Joint Rehabilitation Includes Non-TBSRA Expenses for EA 0438U_ and 04157_

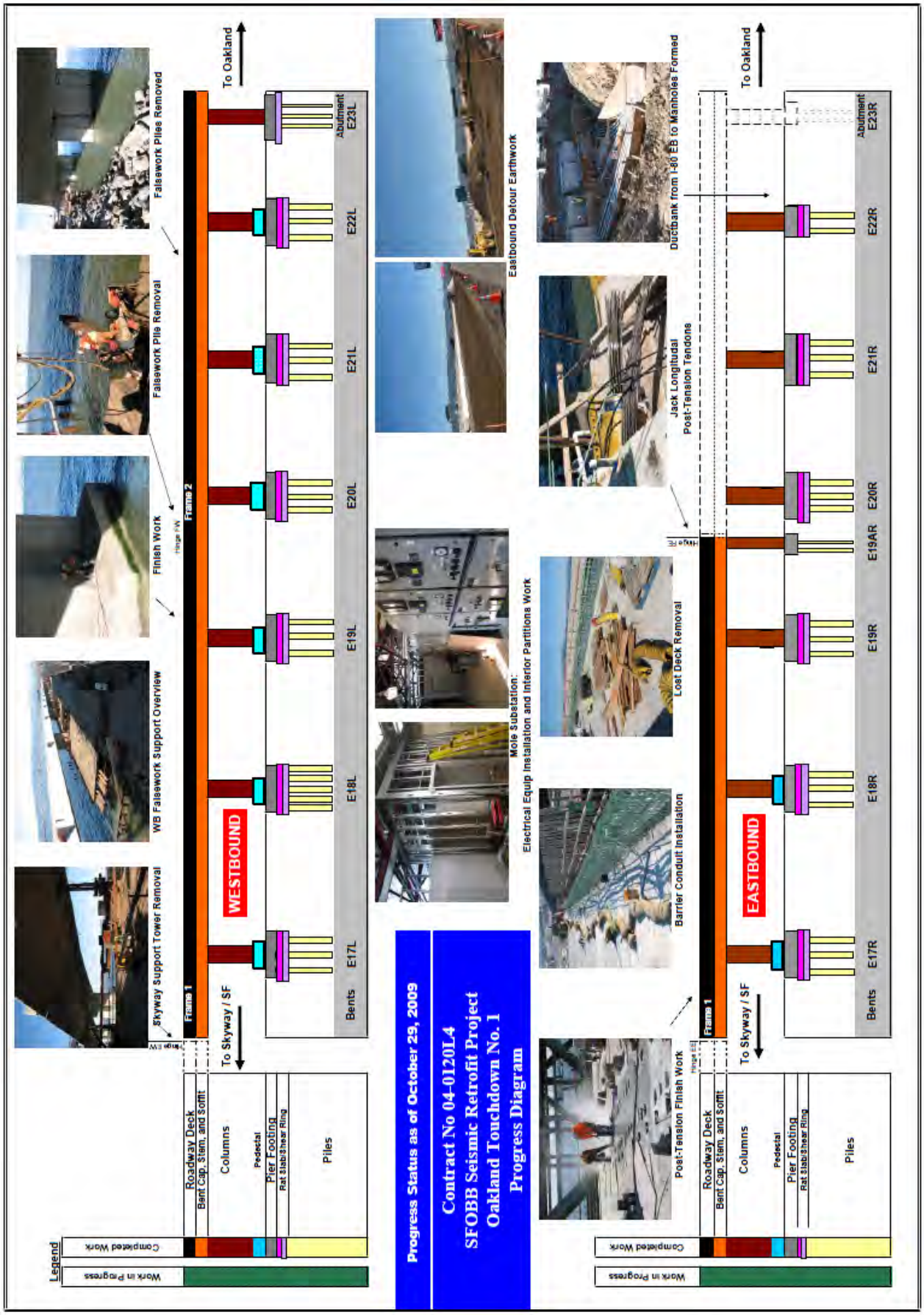
2 San Mateo-Hayward Bridge Widening Includes EA's 00305_, 04501_, 04502_, 04503_, 04504_, 04505_, 04506_, 04507_, 04508_, 04509_, 27740_, 27790_, 04860_

*Note: Details may not sum to totals due to rounding effects.*

# Appendix D: YBITS Advanced Work Project Progress Diagram



# Appendix E: OTD #1 Program Diagram



# Appendix F: Project Progress Photographs

**Aerial View of the West Span of the San Francisco-Oakland Bay Bridge**

# Appendix F: Project Progress Photographs

## Yerba Buena Island Detour

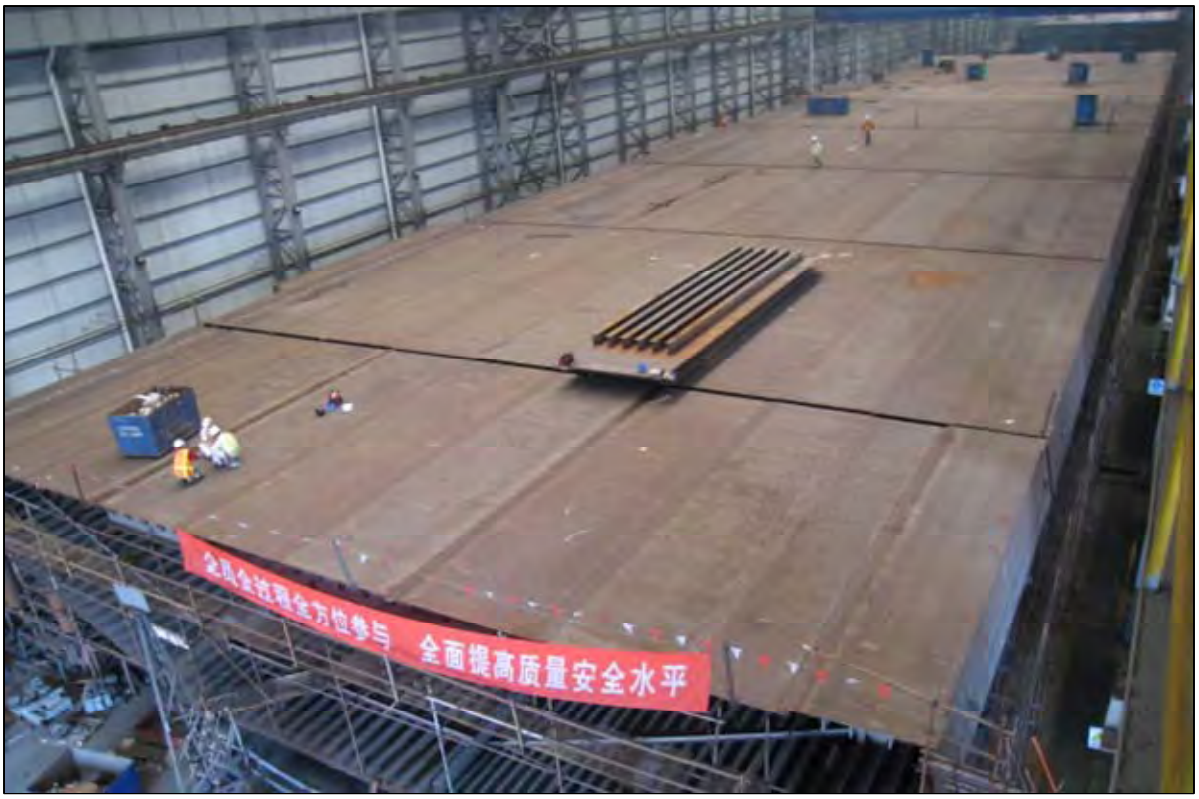
**YBID Skid Bent A1 and B1 Moved Out and being Disassembled**

**Existing Viaduct Bridge Spans YB3 and YB2 Demolition in Progress**

**Existing Viaduct Bridge Spans YB3 & YB2 to the Left and the Detour Structure**

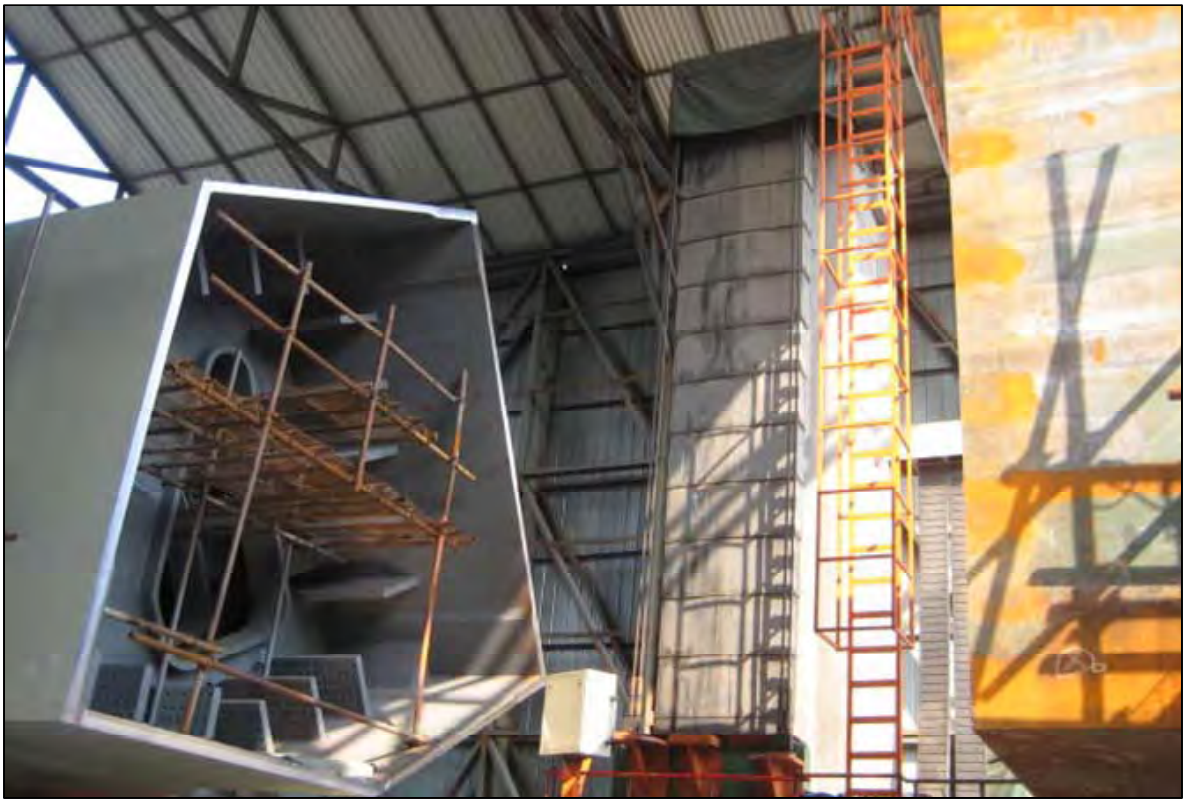
# Appendix F: Project Progress Photographs

## Self-Anchored Suspension Bridge Fabrication




**SAS OBG Lift 9 and 10 East-Line Assembly**

**SAS Segment Assembly in the Assembly Yard**



**SAS Tower Shaft Lift 1 North-Perimeter Milling in Milling Yard**

**SAS Trial Assembling of T-1 Erection Tower in the Open Yard**

# Appendix F: Project Progress Photographs

## Self-Anchored Suspension Bridge Field Work

**SAS - Pier 7 - Temporary Support Structures "W" D to E (Gap for Tower Erection)**

**SAS - Temporary Support Structures "E' Line H (E2) toward Skyway**

**SAS - Temporary Support Structures- "E' Line H (E2) toward Skyway Close-Up**

**SAS - View from Temporary Support Structures East of H (E2) underneath Skyway**

# Appendix F: Project Progress Photographs

## Oakland Touchdown

**Oakland Touchdown Scaffolding Support Piles Removed**

**Oakland Touchdown Eastbound Road**

**Oakland Touchdown Mole Substation Electrical Equipment**

**Oakland Touchdown Westbound Overview**

# Appendix F: Project Progress Photographs

## 92/880 Interchange

**92/880 Widening at Mount Eden Overhead Crossing**

**92/880 Pump Station Construction in Progress**

**92/880 Site Preparation of New Route 92 and Interstate 880 Separator**

# Appendix G: Glossary of Terms

**AB144/SB 66 BUDGET:** The planned allocation of resources for the Toll Bridge Seismic Retrofit Program, or subordinate projects or contracts, as provided in Assembly Bill 144 and Senate Bill 66, signed into law by Governor Schwarzenegger on July 18, 2005 and September 29, 2005, respectively.

**BATA BUDGET:** The planned allocation of resources for the Regional Measure 1 Program, or subordinate projects or contracts as authorized by the Bay Area Toll Authority as of June 2005.

**APPROVED CHANGES:** For cost, changes to the AB144/SB 66 Budget or BATA Budget as approved by the Bay Area Toll Authority Commission. For schedule, changes to the AB 144/SB 66 Project Complete Baseline approved by the Toll Bridge Program Oversight Committee, or changes to the BATA Project Complete Baseline approved by the Bay Area Toll Authority Commission.

**CURRENT APPROVED BUDGET:** The sum of the AB144/SB66 Budget or BATA Budget and Approved Changes.

**COST TO DATE:** The actual expenditures incurred by the program, project or contract as of the month and year shown.

**COST FORECAST:** The current forecast of all of the costs that are projected to be expended so as to complete the given scope of the program, project, or contract.

**AT COMPLETION VARIANCE or VARIANCE (cost):** The mathematical difference between the Cost Forecast and the Current Approved Budget.

**AB 144/SB 66 PROJECT COMPLETE BASELINE:** The planned completion date for the Toll Bridge Seismic Retrofit Program or subordinate projects or contracts.

**BATA PROJECT COMPLETE BASELINE:** The planned completion date for the Regional Measure 1 Program or subordinate projects or contracts.

**PROJECT COMPLETE CURRENT APPROVED SCHEDULE:** The sum of the AB144/SB66 Project Complete Baseline or BATA Project Complete Baseline and Approved Changes.

**PROJECT COMPLETE SCHEDULE FORECAST:** The current projected date for the completion of the program, project, or contract.

**SCHEDULE VARIANCE or VARIANCE (schedule):** The mathematical difference expressed in months between the Project Complete Schedule Forecast and the Project Complete Current Approved Schedule.

**% COMPLETE:** % Complete is based on an evaluation of progress on the project, expenditures to date, and schedule.

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*The information in this report is provided in accordance with California Government code Section 755. This document is one of a series of reports prepared for the Bay Area Toll Authority (BATA)/Metropolitan Transportation Commission (MTC) for the Toll Bridge Seismic Retrofit and Regional Measure 1 Programs. The contract value for the monitoring efforts, technical analysis, and field site works that contribute to these reports, as well as the report preparation and production is $1,574,873.73.*

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