

# San Francisco Bay Area Toll Bridge Seismic Retrofit and Regional Measure 1 Programs

Project Progress  
and Financial Update  
**May 2012**



TOLL BRIDGE PROGRAM  
OVERSIGHT COMMITTEE

CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

Released: June 2012





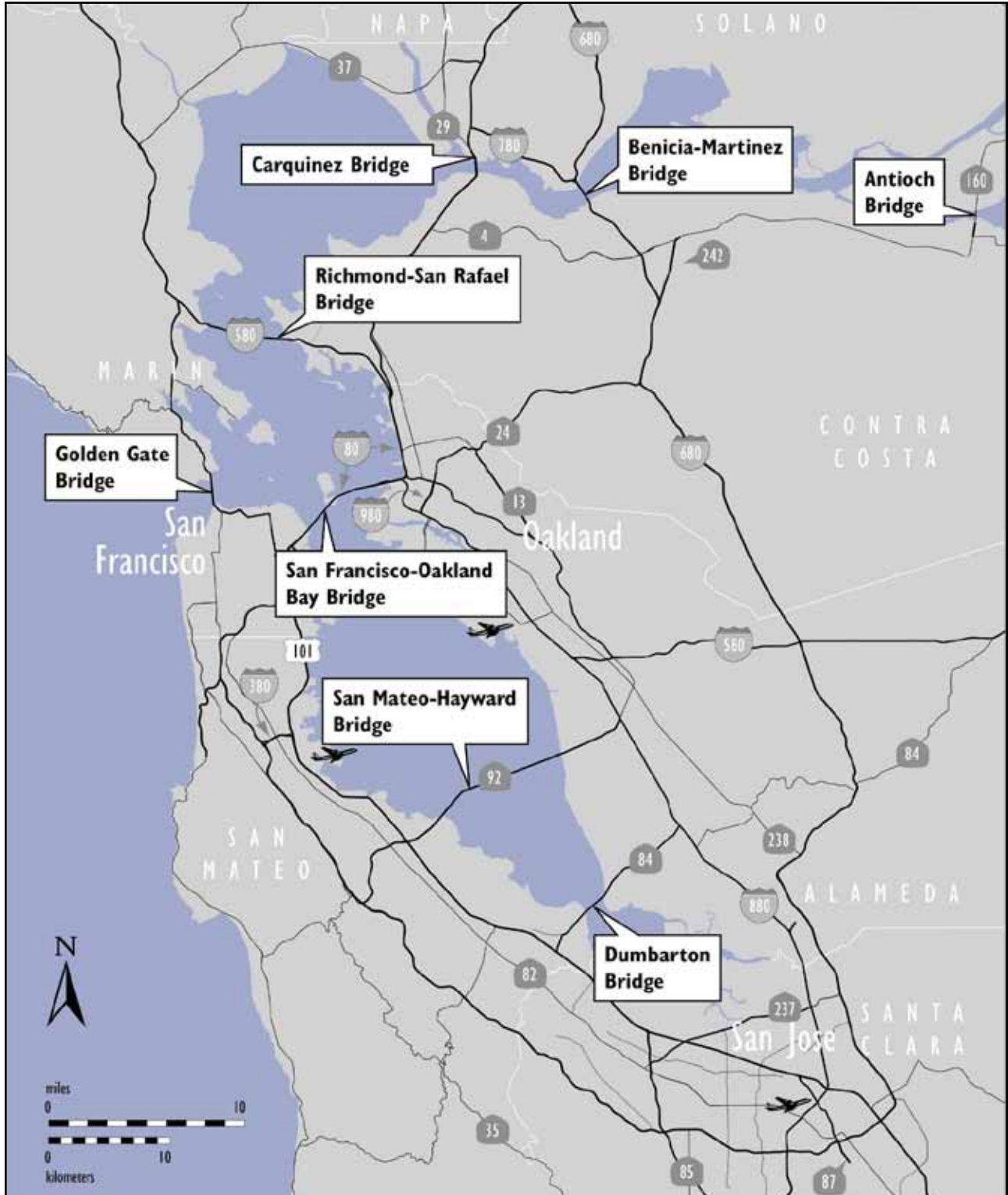
Cable Compaction Activities on the Self-Anchored Suspension Bridge



## Table of Contents

|   |           |
|---|-----------|
| <b>Introduction</b> .....   | <b>1</b>  |
| 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         |
| <b>Toll Bridge Seismic Retrofit Program (TBSRP)</b> .....                   | <b>11</b> |
| San Francisco-Oakland Bay Bridge Seismic Retrofit Strategy.....             | 12        |
| San Francisco-Oakland Bay Bridge East Span Replacement Project Summary..... | 14        |
| Yerba Buena Island Detour (YBID).....                                       | 15        |
| Yerba Buena Island Transitions Structures.....                              | 16        |
| Self-Anchored Suspension (SAS) Bridge.....                                  | 18        |
| SAS Construction Sequence.....  | 20        |
| SAS Superstructure Fabrication Activities.....                              | 22        |
| Skyway.....   | 24        |
| Existing East Span Demolition.....  | 27        |
| Other Contracts.....  | 28        |
| Antioch Bridge Seismic Retrofit Project.....                                | 30        |
| Dumbarton Bridge Seismic Retrofit Project.....                              | 32        |
| Other Completed TBSRP Projects.....   | 34        |
| <b>Regional Measure 1 Toll Bridge Program</b> .....                         | <b>37</b> |
| Other Completed RM1 Projects.....   | 38        |
| <b>Appendices</b> .....   | <b>41</b> |

## 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 new Benicia-Martinez Bridge and State Toll Bridge Seismic Retrofit Program projects. The TBPOC consists of the Director of the California Department of Transportation (Caltrans), the Executive Director of the Bay Area Toll Authority (BATA) 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, reviewing and approving significant change orders and claims in excess of \$1 million (as defined by the Committee), and keeping the Legislature and others apprised of current project progress and status. In January 2010, Assembly Bill (AB) 1175 (Torlakson) amended the TBSRP to include the Antioch and Dumbarton Bridges seismic retrofit projects. The current Toll Bridge Seismic Retrofit Program is as follows:

| Toll Bridge Seismic Retrofit Projects                       | Seismic Safety Status |
|---|-----------------------|
| Dumbarton Bridge Seismic Retrofit                           | Construction          |
| Antioch Bridge Seismic Retrofit                             | Complete              |
| 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              |

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               | Open                   |
| 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                   |

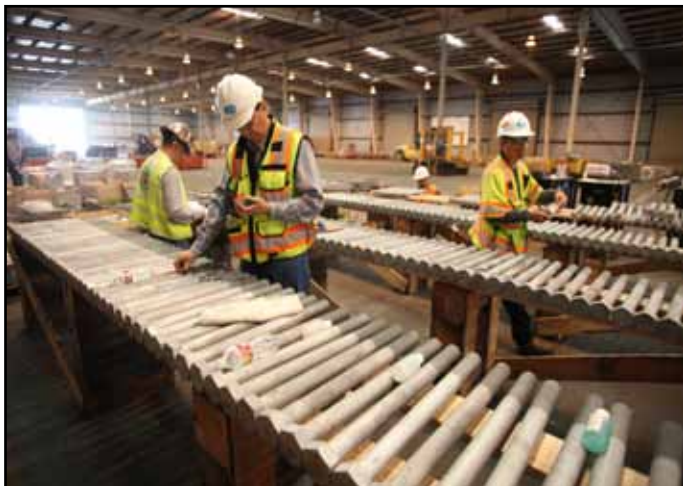
## SUMMARY OF MAJOR PROJECT HIGHLIGHTS, ISSUES, AND ACTIONS



Verifying the initial Length of the Cable Band Bolts on the West Loop of the Self-Anchored Suspension Bridge



Parallel Wire Strands after Compaction



Measuring Initial Length of Cable Band Bolts

### Toll Bridge Seismic Retrofit Program Risk Management

A major element of the 2005 AB 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.

A comprehensive risk assessment is performed for each project in the program on a quarterly basis. 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, assurances have been made that the public is informed of the risks that have been identified and the possible expense they could necessitate.

The program contingency is currently \$284 million in accordance with the TBPOC Approved Budget. As of the end of the first quarter of 2012, the 50 percent probable draw on program contingency is \$154 million. The potential draw ranges from about \$75 million to \$225 million.

The \$154 million program contingency balance can be used to cover the costs of identified risks. In accordance with the approved TBSRP Risk Management Plan, risk mitigation actions are continuously developed and implemented to reduce the potential draw on the program contingency.

### San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Replacement Project SAS Super Structures Contract

The prime contractor constructing the Self-Anchored Suspension (SAS) bridge from the completed Skyway to Yerba Buena Island is a joint venture of American Bridge/Fluor (ABF). The structures that comprise the SAS were produced both in the Bay Area and around the world.

With installation of all structural elements of the tower and roadway nearing completion, focus is now turning to the placement of the bridge's more than 2.5 - foot in diameter and nearly mile-long main cable. The single cable is made up of 137 separate bundled strands containing 127 individual pencil thin wires (see diagram on page 22). Each of the 137 bundled strands are individually pulled by a tramway system

similar to a ski lift, to haul the strands up and around the bridge. Cable strand installation started in December 2011 and was completed in April 2012. The cable hauling is complete and has been compacted to minimize voids between the individual wires and strands. Installation of suspender brackets and suspenders is now underway. The TBPOC's goal is to open the bridge to traffic in both directions by September 2013.

### Yerba Buena Island Transition Structure #1 Contract

The YBITS #1 contract was awarded to MCM Construction, Inc., the same contractor that completed the Oakland Touchdown (OTD) #1 contract. The MCM contract includes completing the remaining foundations and the bridge deck structure from the Yerba Buena Island Tunnel to the Self-Anchored Suspension (SAS) bridge's Hinge "K" closure gap (Hinge "K" closure is now part of the SAS contract).

Work on the westbound structure was completed in February 2012. Work is now focusing on the eastbound structure from the lower tunnel deck to the SAS bridge.

### Oakland Detour

The detour realigns the existing bridge approach to the south to allow for construction of the remaining portion of OTD #2 that was in conflict with the existing bridge. The eastbound detour was completed and opened to traffic on May 30, 2011. The westbound detour lanes were constructed and opened to traffic on February 19, 2012.

### Oakland Touchdown #2 Contract

The OTD #2 contract for construction was advertised in November 2011. The bid was protested by several bidders and was not awarded by Caltrans. In early March, the contract was rebid on an expedited procurement schedule. Bid opening was held on March 21, 2012, and the contract was awarded to Flatiron West, Inc. on March 29, 2012. The first working day will be on June 25, 2012.



Hinge K Pipe Beams on right and YBITS#1 Structure on left



Yerba Buena Island Transition Structure #1 Westbound Deck Complete and Eastbound in Progress with Existing Bridge on Left

## SUMMARY OF MAJOR PROJECT HIGHLIGHTS, ISSUES, AND ACTIONS



Oakland Detour - Westbound Opened to Traffic



Existing San Francisco-Oakland Bay Bridge Cantilever Section to be Dismantled



Antioch Bridge Seismic Retrofit

### Existing SFOBB Dismantling

To expedite the opening of a new eastbound on-ramp and the pedestrian/bicycle pathway from Yerba Buena Island, the TBPOC has decided to split the bridge dismantling project into at least two contracts. The dismantling of the superstructure of the main cantilever section of the existing bridge will be incorporated into the YBITS #2 contract, while the remaining portions of the existing bridge will be removed by separate contract(s) still in design. The YBITS #2 contract was advertised on April 9, 2012 and bid opening is forecast for September 25, 2012.

### Antioch Bridge Seismic Retrofit

The major retrofit strategy for the bridge includes installing seismic isolation bearings at each of the 41 piers, strengthening piers 12 through 31 with steel cross-bracing between column bents, and installing steel casings at all columns located at the Sherman Island approach slab bridge. Seismic safety opening was achieved on April 12, 2012 and contract completion is forecast for July 2012.

### Dumbarton Bridge Seismic Retrofit

The Dumbarton bridge Bridge is a combination of three bridge types; reinforced concrete slab approaches supported on multiple pile extension columns, precast - prestressed concrete girders and steel box girders supported on reinforced concrete piers. The retrofit strategy for the bridge includes superstructure and deck modifications and installation of isolation bearings. The Dumbarton Bridge is was closed for construction over the 2012 Memorial Day weekend to install a seismic joint in the westbound direction. Project progress is reported on page 34.



Aerial View Self-Anchored Suspension Bridge and Hinge K Pipe Beams

## Toll Bridge Seismic Retrofit Program Cost Summary (Millions)

|   | Contract Status | AB 144/SB 66 Budget (August 2005) | TBPOC Approved Changes | Current TBPOC Approved Budget (April 2012) | Cost to Date (April 2012) | Current Cost Forecast (April 2012) | Cost Variance | Cost Status |
|---|-----------------|-----------------------------------|------------------------|--|---------------------------|------------------------------------|---------------|-------------|
|   |                 | a                                 | b                      | c = a + b                                  | d                         | e                                  | f = e - c     |             |
| <b>SFOBB East Span Seismic Replacement</b>                    |                 |                                   |                        |  |                           |                                    |               |             |
| Capital Outlay Construction                                   |                 |                                   |                        |  |                           |                                    |               |             |
| Skyway  | Completed       | 1,293.0                           | (47.8)                 | 1,245.2                                    | 1,237.1                   | 1,245.2                            | -             | ●           |
| SAS Marine Foundations  | Completed       | 313.5                             | (34.9)                 | 278.6                                      | 274.8                     | 278.6                              | -             | ●           |
| SAS Superstructure  | Construction    | 1,753.7                           | 293.1                  | 2,046.8                                    | 1,665.7                   | 2,058.0                            | 11.2          | ●           |
| YBI Detour  | Completed       | 131.9                             | 360.9                  | 492.8                                      | 466.1                     | 482.8                              | (10.0)        | ●           |
| YBI Transition Structures (YBITS)                             |                 | 299.3                             | (37.3)                 | 262.0                                      | 118.5                     | 326.7                              | 64.7          | ●           |
| YBITS 1   | Construction    |                                   |                        | 199.7                                      | 118.5                     | 243.6                              | 43.9          | ●           |
| YBITS 2   | Advertised      |                                   |                        | 59.0                                       | -                         | 79.8                               | 20.8          | ●           |
| YBITS Landscaping   | Design          |                                   |                        | 3.3  | -                         | 3.3                                | -             | ●           |
| Oakland Touchdown (OTD)                                       |                 | 283.8                             | 50.8                   | 334.6                                      | 208.7                     | 327.3                              | (7.3)         | ●           |
| OTD 1   | Completed       |                                   |                        | 212.0                                      | 203.0                     | 203.3                              | (8.7)         | ●           |
| OTD 2   | Awarded         |                                   |                        | 62.0                                       | -                         | 56.3                               | (5.7)         | ●           |
| Detour  | Completed       |                                   |                        | 51.0                                       | -                         | 53.7                               | 2.7           | ●           |
| OTD Electrical Systems  | Design          |                                   |                        | -  | -                         | 4.4                                | 4.4           | ●           |
| Submerged Electric Cable                                      | Completed       |                                   |                        | 9.6  | 5.7                       | 9.6                                | -             | ●           |
| Existing Bridge Demolition                                    | Design          | 239.2                             | (0.1)                  | 239.1                                      | -                         | 237.3                              | (1.8)         | ●           |
| *Cantilever Section   | Design          |                                   |                        | -  | -                         | 60.4                               |               |             |
| *504/288 Sections   | Design          |                                   |                        | -  | -                         | 176.9                              |               |             |
| Stormwater Treatment Measures                                 | Completed       | 15.0                              | 3.3                    | 18.3                                       | 16.8                      | 18.3                               | -             | ●           |
| Other Completed Contracts                                     | Completed       | 90.4                              | -                      | 90.4                                       | 89.9                      | 90.4                               | -             | ●           |
| Capital Outlay Support  |                 | 959.3                             | 261.5                  | 1,220.8                                    | 1,051.4                   | 1,264.1                            | 43.3          | ●           |
| Right-of-Way and Environmental Mitigation                     |                 | 72.4                              | -                      | 72.4                                       | 51.7                      | 80.4                               | 8.0           | ●           |
| Other Budgeted Capital  |                 | 35.1                              | (3.3)                  | 31.8                                       | 0.7                       | 7.7                                | (24.1)        | ●           |
| <b>Total SFOBB East Span Replacement</b>                      |                 | <b>5,486.6</b>                    | <b>846.2</b>           | <b>6,332.8</b>                             | <b>5,181.4</b>            | <b>6,416.8</b>                     | <b>84.0</b>   |             |
| <b>Antioch Bridge Seismic Retrofit</b>                        |                 |                                   |                        |  |                           |                                    |               |             |
| Capital Outlay Construction and Mitigation                    | Construction    |                                   | 51.0                   | 51.0                                       | 44.0                      | 50.8                               | (0.2)         | ●           |
| Capital Outlay Support  |                 |                                   | 31.0                   | 31.0                                       | 22.4                      | 31.0                               | -             | ●           |
| <b>Total Antioch Bridge Seismic Retrofit</b>                  |                 | <b>-</b>                          | <b>82.0</b>            | <b>82.0</b>                                | <b>66.4</b>               | <b>81.8</b>                        | <b>(0.2)</b>  |             |
| <b>Dumbarton Bridge Seismic Retrofit</b>                      |                 |                                   |                        |  |                           |                                    |               |             |
| Capital Outlay Construction and Mitigation                    | Construction    |                                   | 92.7                   | 92.7                                       | 42.5                      | 83.5                               | (9.2)         | ●           |
| Capital Outlay Support  |                 |                                   | 56.0                   | 56.0                                       | 33.6                      | 56.0                               | -             | ●           |
| <b>Total Dumbarton Bridge Seismic Retrofit</b>                |                 | <b>-</b>                          | <b>148.7</b>           | <b>148.7</b>                               | <b>76.1</b>               | <b>139.5</b>                       | <b>(9.2)</b>  |             |
| Other Program Projects  |                 | 2,268.4                           | (63.6)                 | 2,204.8                                    | 2,162.9                   | 2,192.2                            | (12.6)        | ●           |
| Miscellaneous Program Costs                                   |                 | 30.0                              | -                      | 30.0                                       | 25.5                      | 30.0                               | -             | ●           |
| Net Programmatic Risks  |                 | -                                 | -                      | -  | -                         | 92.0                               | 92.0          | ●           |
| Program Contingency   |                 | 900.0                             | (616.3)                | 283.7                                      | -                         | 129.7                              | (154.0)       | ●           |
| <b>Total Toll Bridge Seismic Retrofit Program<sup>2</sup></b> |                 | <b>8,685.0</b>                    | <b>397.0</b>           | <b>9,082.0</b>                             | <b>7,512.3</b>            | <b>9,082.0</b>                     | <b>-</b>      |             |

## Toll Bridge Seismic Retrofit Program Schedule Summary (Millions)

|  | AB 144/SB<br>66 Project<br>Completion<br>Schedule<br>Baseline<br>(July 2005) | TBPOC<br>Approved<br>Changes<br>(Months) | Current TBPOC<br>Approved<br>Completion<br>Schedule<br>(April 2012) | Current<br>Completion<br>Forecast<br>(April 2012) | Schedule<br>Variance<br>(Months) | Schedule<br>Status | Remarks/Notes |
|--|--|--|---|---|----------------------------------|--------------------|---------------|
|  | g  | h  | i=g+h   | j   | k=j-i                            | l                  |               |
| <b>SFOBB East Span Seismic Replacement</b>                 |  |  |   |   |                                  |                    |               |
| Contract Completion  |  |  |   |   |                                  |                    |               |
| Skyway   | Apr 2007   | 8  | Dec 2007  | Dec 2007  | -                                | ●                  | See Page 26   |
| SAS Marine Foundations                                     | Jun 2008   | (5)                                      | Jan 2008  | Jan 2008  | -                                | ●                  | See Page 18   |
| SAS Superstructure   | Mar 2012   | 29                                       | Aug 2014  | Aug 2014  | -                                | ●                  | See Page 19   |
| YBI Detour   | Jul 2007   | 39                                       | Oct 2010  | Oct 2010  | -                                | ●                  | See Page 15   |
| YBI Transition Structures (YBITS)                          | Nov 2013   | 27                                       | Feb 2016  | Feb 2016  | -                                | ●                  | See Page 16   |
| YBITS 1  |  |  | Dec 2013  | Dec 2013  | -                                | ●                  |               |
| YBITS 2  |  |  | Feb 2016  | Feb 2016  | -                                | ●                  |               |
| Oakland Touchdown  | Nov 2013   | 10                                       | Sep 2014  | Sep 2014  | -                                | ●                  | See Page 28   |
| OTD 1  |  |  | Jun 2010  | Jun 2010  | -                                | ●                  |               |
| OTD 2  |  |  | Sep 2014  | Sep 2014  | -                                | ●                  |               |
| Submerged Electric Cable                                   |  |  | Jan 2008  | Jan 2008  | -                                | ●                  |               |
| Existing Bridge Demolition                                 | Sep 2014   | 18                                       | Dec 2015  | June 2017   | 18                               | ●                  |               |
| Stormwater Treatment Measures                              | Mar 2008   |  | Mar 2008  | Mar 2008  | -                                | ●                  |               |
| <b>SFOBB East Span Bridge Opening and Other Milestones</b> |  |  |   |   |                                  |                    |               |
| Westbound Seismic Safety Open                              | Sep 2011   | 27                                       | Dec 2013  | Sep 2013  | (3)                              | ●                  |               |
| Eastbound Seismic Safety Open                              | Sep 2012   | 15                                       | Dec 2013  | Sep 2013  | (3)                              | ●                  |               |
| Bike/Ped Pathway Open to YBI                               |  |  | Sep 2015  | Sep 2015  | -                                | ●                  |               |
| Permanent Eastbound On Ramp Open                           |  |  | Sep 2015  | Sep 2015  | -                                | ●                  |               |
| Oakland Detour Eastbound Open                              |  |  | May 2011  | May 2011  | -                                | ●                  |               |
| Oakland Detour Westbound Open                              |  |  | Feb 2012  | Feb 2012  | -                                | ●                  |               |
| OTD Westbound Access                                       |  |  | Aug 2009  | Aug 2009  | -                                | ●                  |               |
| YBI Detour Open  |  |  | Sep 2009  | Sep 2009  | -                                | ●                  | See Page 15   |
| <b>Antioch Bridge Seismic Retrofit</b>                     |  |  |   |   |                                  |                    |               |
| Contract Completion  |  |  | Jul 2012  | Jul 2012  | -                                | ●                  | See Page 30   |
| Seismic Safety Completion                                  |  |  | Apr 2012  | Apr 2012  | -                                | ●                  |               |
| <b>Dumbarton Bridge Seismic Retrofit</b>                   |  |  |   |   |                                  |                    |               |
| Contract Completion  |  |  | Sep 2013  | Sep 2013  | -                                | ●                  | See Page 32   |
| Seismic Safety Completion                                  |  |  | Sep 2013  | Sep 2013  | -                                | ●                  |               |

- 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

<sup>(1)</sup> Figures may not sum up to totals due to rounding effects.  
<sup>(2)</sup> Construction administration of the OTD Detour is under the YBITS#1 contract.  
<sup>(3)</sup> Construction administration of the Cantilever segment will be under the YBITS#2 contract.

## Regional Measure 1 Program Cost Summary (Millions)

|   | Contract Status | BATA Baseline Budget (July 2005) | BATA Approved Changes | Current BATA Approved Budget (April 2012) | Cost to Date (April 2012) | Current Cost Forecast (April 2012) | Cost Variance | Cost Status |
|---|-----------------|----------------------------------|-----------------------|---|---------------------------|------------------------------------|---------------|-------------|
|   |                 | a                                | b                     | c = a + b                                 | d                         | e                                  | f = e - c     |             |
| <b>Interstate 880/Route 92 Interchange Reconstruction</b>       |                 |                                  |                       |   |                           |                                    |               |             |
| Capital Outlay Construction                                     | Complete        | 94.8                             | 68.4                  | 163.2                                     | 150.2                     | 163.2                              | -             | ●           |
| Capital Outlay Support  |                 | 28.8                             | 35.8                  | 64.6                                      | 62.2                      | 64.6                               | -             | ●           |
| Capital Outlay Right-of-Way                                     |                 | 9.9                              | 7.3                   | 17.2                                      | 14.7                      | 17.2                               | -             | ●           |
| Project Reserve   |                 | 0.3                              | (0.3)                 | -   | -                         | -                                  | -             |             |
| <b>Total I-880/SR-92 Interchange Reconstruction</b>             |                 | <b>133.8</b>                     | <b>111.2</b>          | <b>245.0</b>                              | <b>227.1</b>              | <b>245.0</b>                       | -             |             |
| Other Completed Program Projects                                |                 | 1,978.8                          | 182.6                 | 2,161.4                                   | 2,089.0                   | 2,161.4                            | -             |             |
| <b>Total Regional Measure 1 Toll Bridge Program<sup>1</sup></b> |                 | <b>2,112.6</b>                   | <b>293.8</b>          | <b>2,406.4</b>                            | <b>2,316.1</b>            | <b>2,406.4</b>                     | -             |             |

● Within approved schedule and budget

● Identified potential project risks that could significantly impact approved schedules and budgets if not mitigated

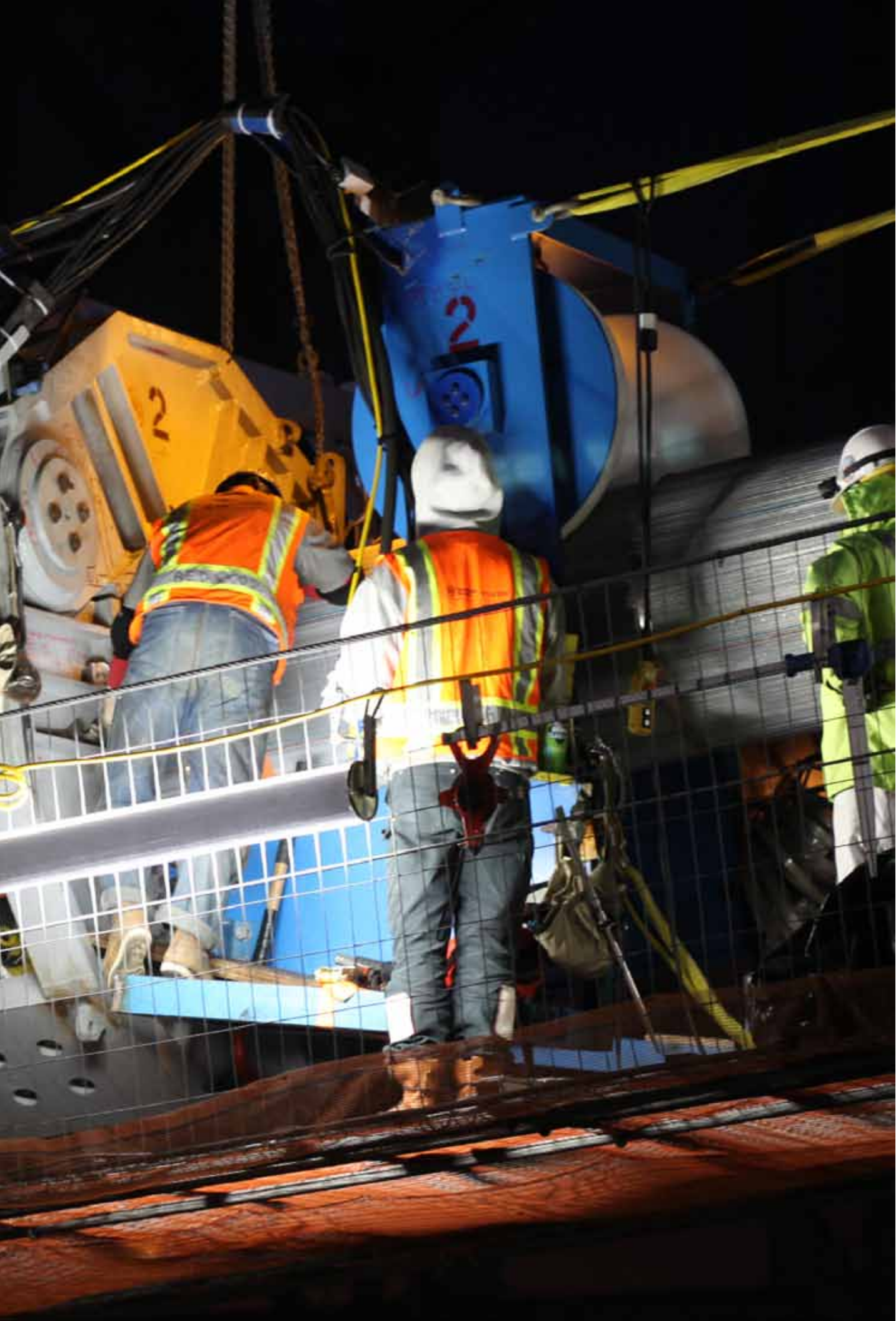
● Known project impacts with forthcoming changes to approved schedules and budgets

<sup>1</sup> Figures may not sum up to totals due to rounding effects.

## Regional Measure 1 Program Schedule Summary (Millions)

|  | BATA Baseline<br>Completion<br>Schedule<br>(September<br>2005) | BATA Approved<br>Changes<br>(Months) | Current BATA<br>Approved<br>Completion<br>Schedule<br>(April 2012) | Current<br>Completion<br>Forecast<br>(April 2012) | Schedule<br>Variance<br>(Months) | Schedule<br>Status | Remarks/Notes |
|--|--|--------------------------------------|--|---|----------------------------------|--------------------|---------------|
|  | g  | h                                    | i = g + h  | j   | k = j - i                        | l                  |               |
| <a href="#">Interstate 880/Route 92 Interchange Reconstruction</a> |  |                                      |  |   |                                  |                    |               |
| Contract Completion  |  |                                      |  |   |                                  |                    |               |
| Interchange Reconstruction   | Dec 2010   | 9                                    | Sep 2011   | Sep 2011  | -                                | ●                  | See Page 39   |





**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, a critical question 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.



West Approach Overview

#### West Approach Seismic Replacement Project

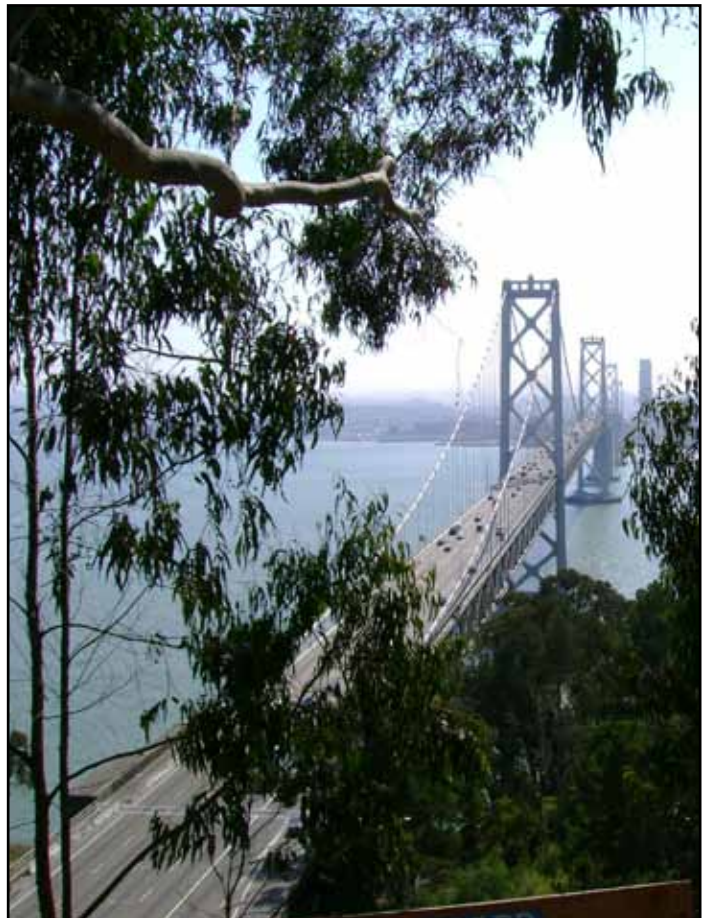
**Project Status: Completed 2009**

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.



San Francisco-Oakland Bay Bridge West Span

## East Span Seismic Replacement Project Project Status: **In Construction**

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 side-by-side, providing motorists with expansive views of the bay. These views will also be enjoyed by bicyclists and pedestrians, thanks to a new bike 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 has been completed and vehicles have been safely rerouted to it, the original East Span will be demolished.



The East end of the Cable Compaction Shows the Remaining Area to be Compacted

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

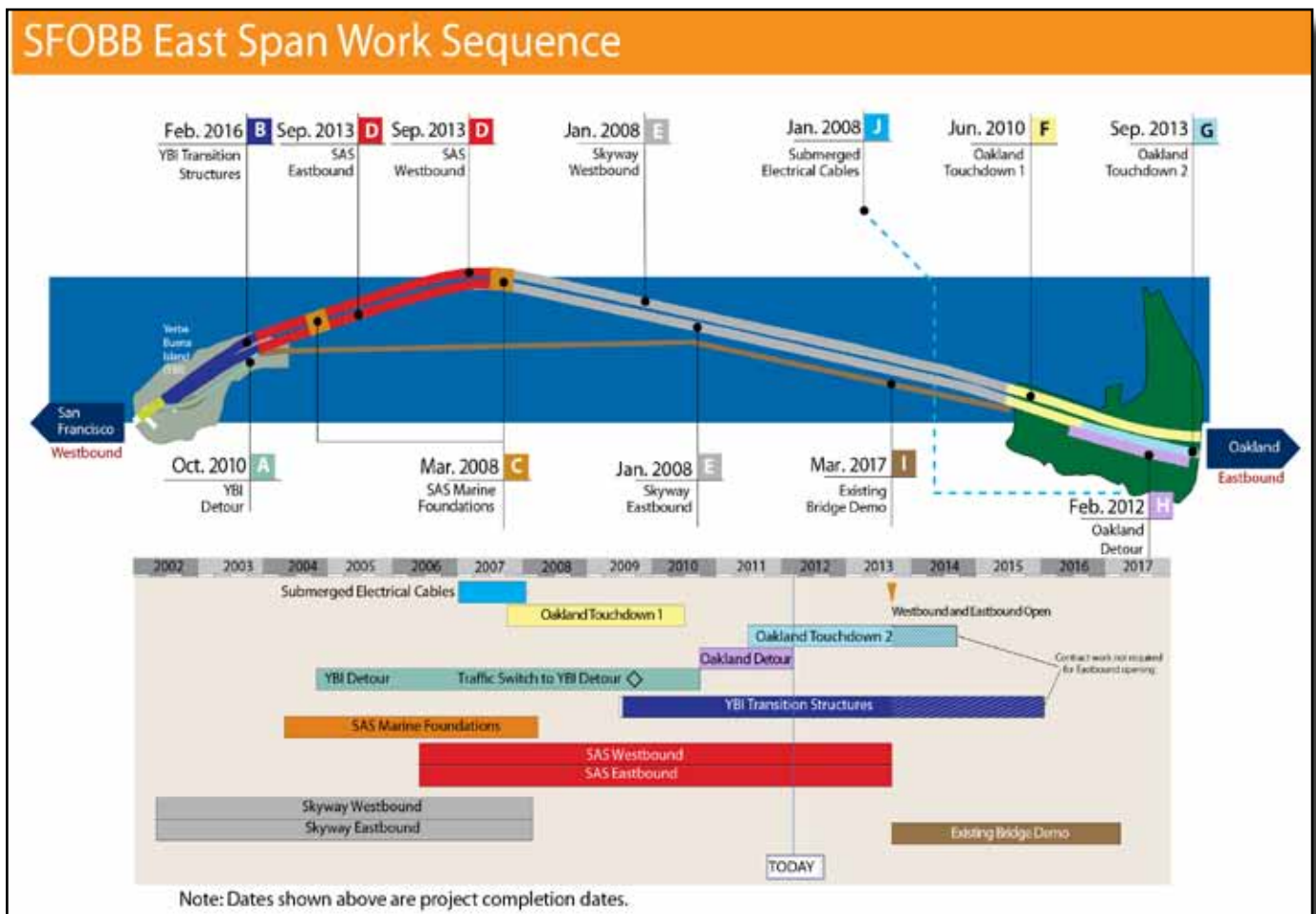
## San Francisco-Oakland Bay Bridge East Span Replacement Project Summary

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

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



Overview of the San Francisco-Oakland Bay Bridge East Span Construction Progress



## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

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

As with all of the Toll Bridge Seismic Retrofit Program’s projects, crews built the Yerba Buena Island Detour structure (YBID) without disrupting traffic. To accomplish this task, YBID eastbound and westbound traffic was shifted off the existing roadway and onto a temporary detour over 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: Completed October 2010

This contract was originally awarded in early 2004 to construct the detour structure for the planned 2006 opening of the new East Span. Because of a lack of funding, the SAS Superstructure contract was re-advertised in 2005 and the 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 approved a number of changes to the contract, including adding the deck replacement work near the tunnel that was rolled into place over the 2007 Labor Day weekend advancing future transition structure foundation work and making design enhancements to the temporary detour structure. These changes increased the budget and forecast for the contract to cover the revised project scope and reduce project risks.



YBID East Tie-In Rolled in on Labor Day 2009 Weekend



West Tie-In Phase #1 Rolled in on Labor Day Weekend 2007

## 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 contract (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 were advanced by the YBID contract, the remaining work is being completed under three separate YBITS contracts.

#### **B** YBITS #1 Contract

Contractor: MCM Construction, Inc.

Approved Capital Outlay Budget: \$199.7 M

Status: 56% Complete as of April 2012

The YBITS #1 contract will construct the mainline roadway structure from the SAS bridge to the YBI tunnel. On February 4, 2010, Caltrans awarded the YBITS #1 contract to MCM Construction, Inc.

**Status:** The construction of the westbound roadway deck was completed in February 2012. Westbound falsework was removed and modified for use for the eastbound roadway deck in April 2012. The eastbound roadway construction began in late December 2011 and will be completed to Hinge K and turned over to American Bridge Fluor (ABF) by the end of 2012.

#### YBITS #2 Contract

Contractor: TBD

Approved Capital Outlay Budget: \$59.0 M

Status: Advertised on April 9, 2012

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. To expedite opening of a new eastbound on-ramp and the pedestrian/bicycle pathway from Yerba Buena Island, the TBPOC has decided to split the bridge dismantling project into at least two contracts. The dismantling of the superstructure of the main cantilever section of the existing bridge will be incorporated into the YBITS #2 contract, while the remaining portions of the existing bridge will be removed by separate contract or contracts yet to be determined. The YBITS #2 contract, including the cantilever truss demolition, was advertised on April 9, 2012, and bid opening is forecast for September 25, 2012.

#### YBITS Landscaping Contract

Contractor: TBD

Approved Capital Outlay Budget \$3.3 M

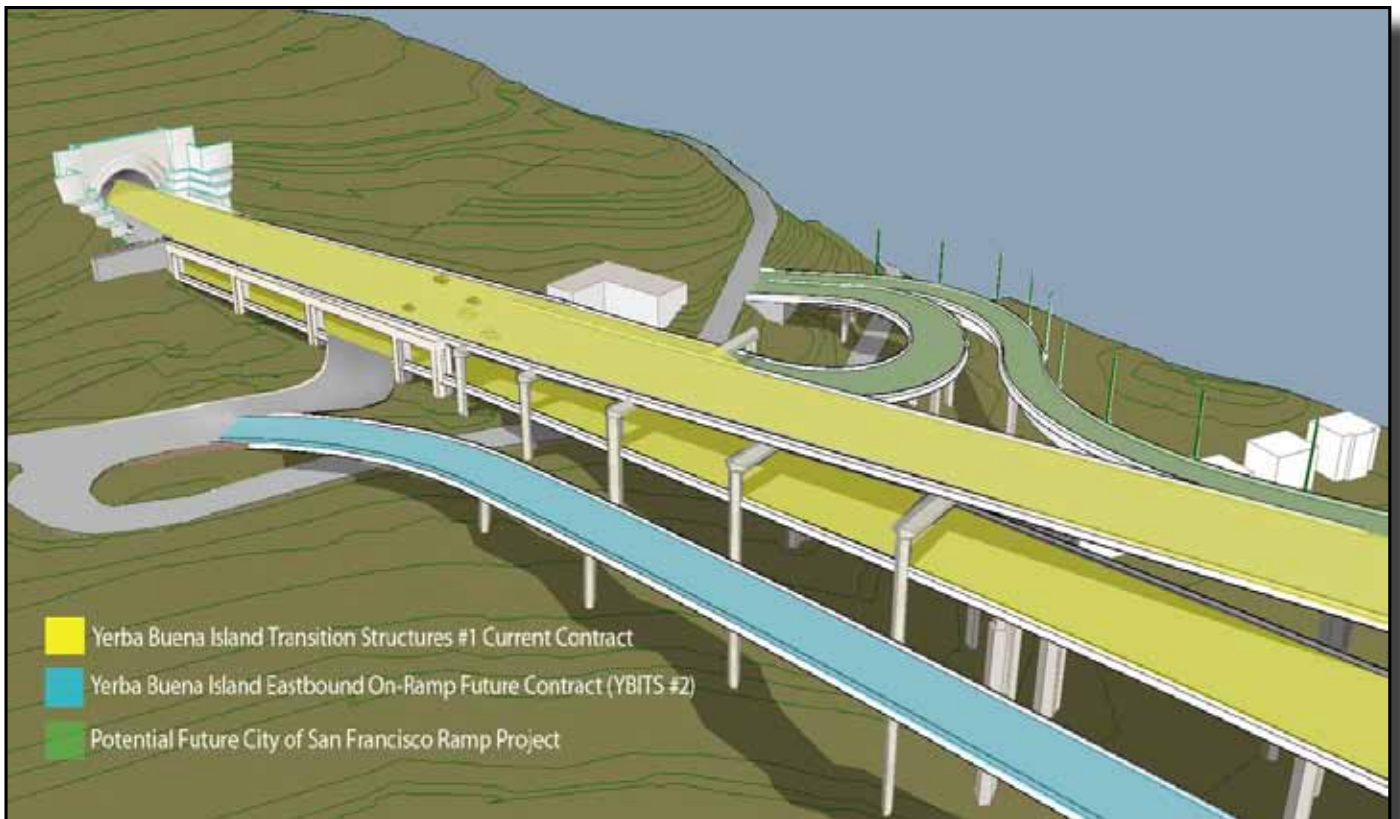
Status: In Design

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





YBITS #1 Roadway Deck Construction 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 world class status 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 Marine Foundation - E2 Foundation with Completed Westbound Column

### SAS Land Foundation Contract

Contractor: West Bay Builders, Inc.  
Approved Capital Outlay Budget: \$26.5 M  
Status: Completed October 2004

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.

### C SAS Marine Foundations Contract

Contractor: Kiewit/FCI/Manson, Joint Venture  
Approved Capital Outlay Budget: \$278.6 M  
Status: Completed January 2008

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

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: \$2.05 B

Status: 84% Complete as of April 2012

The SAS bridge is not just another suspension bridge. Rising 525 feet above mean sea level and embedded in bedrock, the single-tower SAS span is designed to withstand a massive earthquake. Traditional main cable suspension bridges have twin cables with smaller suspender cables connected to them. While there will appear to be two main cables on the SAS, it is actually a single continuous cable. 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 is made up of four separate legs 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 and Skyway

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

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

#### STEP 1 - CONSTRUCT TEMPORARY SUPPORT STRUCTURES

All temporary support foundations and structures were completed in September 2010 between the Skyway and Yerba Buena Island to support the westbound and eastbound roadway box erections.



Step 1

#### STEP 2 - INSTALL ROADWAYS

All of the 28 steel roadway boxes and 17 crossbeams have been erected as of the end of October 2011.

**Status:** Roadway deck interior field painting continues. Bike path railing and steel barrier installation continues on the roadway deck along with mechanical, electrical and piping installation.



Step 2

#### STEP 3 - INSTALL TOWER

All tower legs, tower grillage and tower saddle were erected using the self-rising crane as of mid-May 2011. The tower head will be installed after cable erection and suspenders have been completed in mid-2012.

**Status:** Mechanical, electrical and piping installation continues in the tower. Non-Destructive Testing (NDT) and repair of the tower base shear plate welding is ongoing. Welding of the 13-meter diaphragm to the shear plate continues.



Step 3



**STEP 4 - MAIN CABLE AND SUSPENDER INSTALLATION**

The main cable haul started in late December 2011 from the east end of the westbound roadway deck moving over the tower saddle, wrapping around pier W2 west deviation saddles and returning to the tower saddle to the east end of eastbound roadway deck where it will then be anchored. Suspender cables (114) will be added after all 137 cable bundles have been hauled, compacted and cable bands installed to lift the roadway deck off the temporary support structure.



**Status:** The parallel wire strand (PWS) cable installation was completed on April 9, 2012. Compaction started on April 16, 2012, and will be completed in May 2012, with the exception of the swing-out cable portions.

**STEP 5 - WESTBOUND AND EASTBOUND SEISMIC SAFETY OPENING**

The new bridge will now open simultaneously in both the westbound and eastbound directions on Labor Day September 2, 2013.



**Status:** The Yerba Buena Island Transition Structures (YBITS) #1 contract is currently in progress. Oakland Touchdown (OTD) #2 will begin construction in mid-2012. The Self-Anchored Suspension (SAS) segment is in progress and construction is scheduled to be complete and ready for seismic safety opening in both eastbound and westbound directions by September 2013.

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

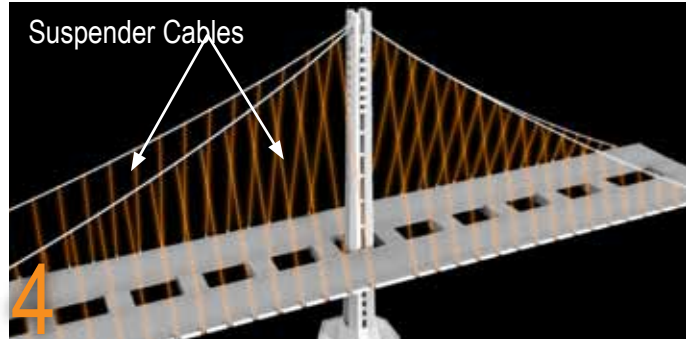
## Self-Anchored Suspension (SAS) Superstructure Main Cable Completion Activities



1

### CABLE STRAND HAULING

Crews haul the 137 individual steel wire strands that comprise the nearly 1-mile long single main cable. The strands are adjusted and then anchored into the east end of the SAS. **Completed**

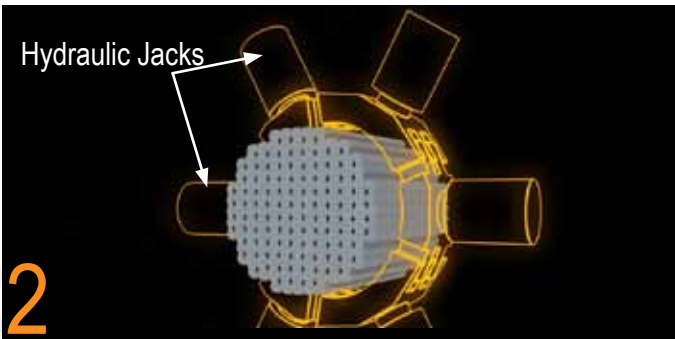


4

Suspender Cables

### SUSPENDER CABLES INSTALLED

Workers begin placing the suspender cables that connect the main cable to the road-decks. Not all of the suspender cables need to be attached before load transfer begins. **In Progress**

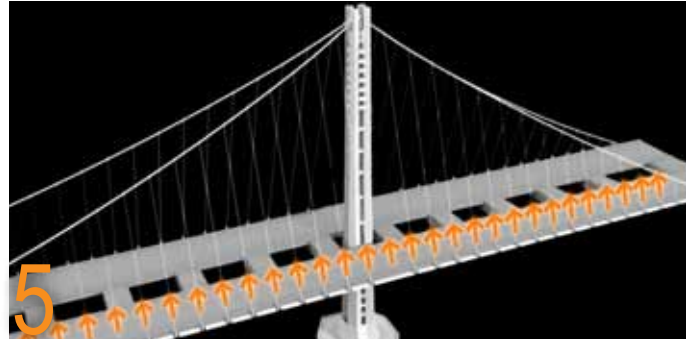


Hydraulic Jacks

2

### CABLE STRAND COMPACTING

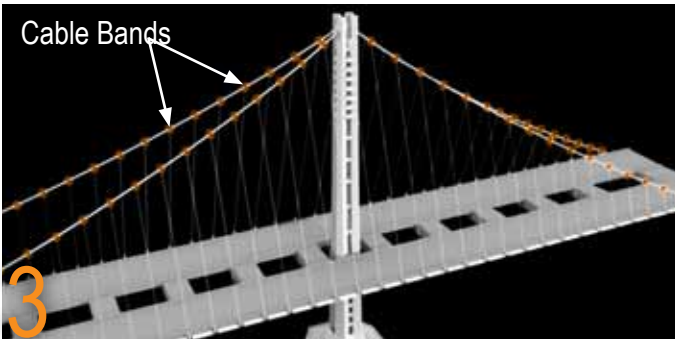
Four compacting machines containing hydraulic jacks are used to compress the 137 steel wire strands into the shape of the main cable. Temporary bands are placed to maintain the shape **In Progress**



5

### LOAD TRANSFER

Using the attached suspender cables, crews begin the process of transferring the weight of the span from the temporary supports under the bridge to the main cable. **Late August 2012**

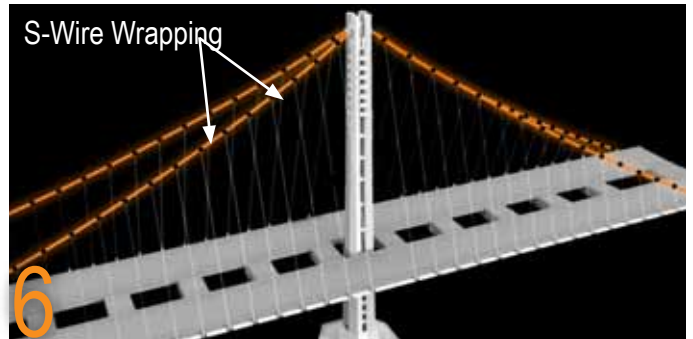


Cable Bands

3

### CABLE BANDS INSTALLED

Crews install 114 permanent steel cable bands along the main cable. These bands maintain the shape of the cable, and serve as anchor points for the suspender cables. **In Progress**



S-Wire Wrapping

6

### S-WIRE WRAP

After load transfer, the main cable is wrapped in S-wire to protect the cable against corrosion. After the cable is wrapped, it is painted. **September 2012**



## 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.

#### **E** Skyway Contract

Contractor: Kiewit/FCI/Manson, Joint Venture

Approved Capital Outlay Budget: \$1.25 B

Status: Completed April 2008

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), containing 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 custom-made winches.

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.



Skyway on the left and Existing Bridge on the Right Looking East toward Oakland



## 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 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 approach structures to the Skyway will be constructed in three phases. The first phase, constructed under the OTD #1 contract, built the new westbound approach structure. Due to physical constraints with the existing bridge, the OTD #1 contract was only able to construct a portion of the eastbound approach. To facilitate opening the bridge in both directions at the same time, the current phase of work, performed by the Oakland Detour contractor, is widening the upper deck of the Oakland end of the existing bridge to allow for a traffic shift to the north that removes the physical constraint to completing the eastbound structure. The third phase, to be constructed by a future OTD #2 contract, will complete the eastbound lanes and provide the traffic switch to the new structure in both directions. This will allow the bridge to open simultaneously in both directions.

#### **F** Oakland Touchdown #1 Contract

Contractor: MCM Construction, Inc.  
Approved Capital Outlay Budget: \$212.0 M  
Status: Completed June 2010

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

**Status:** MCM Construction, Inc. completed OTD #1 westbound and eastbound phase 1 on June 8, 2010.

#### **G** Oakland Touchdown #2 Contract

Contractor: Flatiron West, Inc.  
Approved Capital Outlay Budget: \$62.0 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 by September 2013.

**Status:** The TBPOC approved an acceleration plan to construct a detour at the Oakland end of the bridge to allow for expedited construction of the OTD #2 contract. OTD #2 was advertised on March 12, 2012, and was awarded on March 29, 2012. Construction will begin on June 25, 2012.



Aerial View of the Eastbound Oakland Detour with the EBMUD Outfall Crossing Structure on the left and the Westbound Oakland Detour Open to Traffic

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

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

#### **H** Oakland Detour

Contractor: MCM Construction, Inc.

Approved Capital Outlay Budget: \$51.0 M

Status: 100% Complete as of April 2012

To ensure a simultaneous eastbound and westbound opening of the bridge by September 2013, the TBPOC has approved an acceleration plan that will construct a detour at the Oakland end of the bridge to allow for expedited construction of the OTD #2 contract. The detour realigns the existing bridge approach to the south to allow for construction of the remaining portion of OTD that was in conflict with the existing bridge.

**Status:** The westbound detour construction is complete and was opened to traffic on February 19, 2012. Existing pier demolition and cleanup was completed in April 2012.



Oakland Detour Westbound Expansion Structure



Oakland Westbound Detour (Looking East) AC Asphalt Installed



Preparation for Demolition of the Existing Westbound Partial Structure

# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

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

### Existing East Span Bridge Demolition

#### Existing East Span Demolition

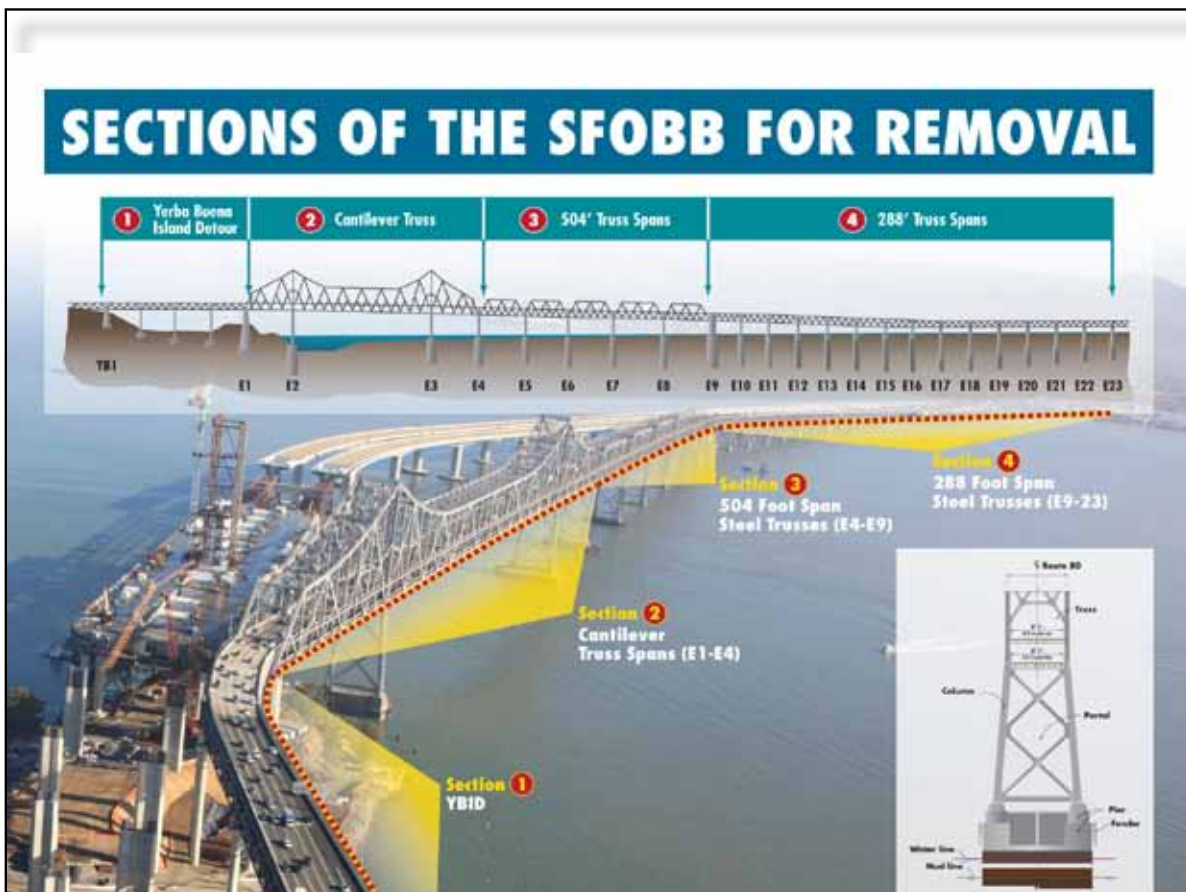
Contractor: TBD  
 Approved Capital Outlay Budget: \$239.1 M  
 Status: In Design

Design work on the demolition of the existing bridge is ongoing. The environmental clearance and all permits were received on February 29, 2012. To expedite the opening of a new eastbound on-ramp and the pedestrian/bicycle pathway from Yerba Buena Island to Oakland, the TBPOC has decided to split the existing bridge dismantling project into at least two contracts. The dismantling of the superstructure of the main cantilever section of the existing east span of the bridge was incorporated into the YBITS #2 contract, while the remaining portions will be removed by separate contract or contracts yet to be determined for the superstructure and marine foundations.



Dismantling Scope Included in the Future YBITS#2 Contract - YBI Detour at left, E-1 column in center, Cantilever Bridge Deck at right

**Status:** The cantilever portion of the demolition was advertised on April 9, 2012.



## 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.

#### **J** Electrical Cable Relocation

**Contractor:** Manson Construction  
**Approved Capital Outlay Budget:** \$9.6 M  
**Status:** Completed January 2008

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 replacement cables were run from Oakland to Treasure Island. The extra cable was funded by the Treasure Island Development Authority.

#### Yerba Buena Island Substation

**Contractor:** West Bay Builders  
**Approved Capital Outlay Budget:** \$11.6 M  
**Status:** Completed May 2005

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



Archeological Investigations



New YBI Electrical Substation



## Stormwater Treatment Measures

Contractor: Diablo Construction, Inc.  
 Approved Capital Outlay Budget: \$18.3 M  
 Status: Completed December 2008

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

## East Span Interim Seismic Retrofit

Contractors: 1) California Engineering  
 2) Balfour Beatty  
 Approved Capital Outlay Budget: \$30.8 M  
 Status: Completed October 2000

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 the San Francisco-Oakland Bay Bridge

## Pile Installation Demonstration

Contractor: Manson and Dutra, Joint Venture  
 Approved Capital Outlay Budget: \$9.2 M  
 Status: Completed December 2000

While large-diameter battered piles are common in offshore drilling, the new East Span is one of the first bridges to use them 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.



Battered Pile Installation Demonstration

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### Antioch Bridge Seismic Retrofit Project

Contractor: California Engineering Contractors, Inc.

Approved Capital Outlay Budget: \$51.0 M

Status: Seismically Complete as of April 12, 2012

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 1.8-mile-long steel plate girder bridge was opened in 1978 with one lane in each direction. The major retrofit measure for the bridge includes installing seismic isolation bearings at each of the 41 piers, strengthening piers 12 through 31 with steel cross-bracing between column bents, and installing steel casings at all columns located at the Sherman Island approach slab bridge.

**Status:** Seismic safety opening was achieved on April 12, 2012 and contract completion is forecast for July 2012.

Seismic isolation bearings will allow the superstructure of the bridge to move independently from the pier and column substructure during an earthquake. All seismic isolation bearings have been fabricated, tested and installed (100%).

At piers 12 through 31, center steel cross-bracing is being added between the pier columns to strengthen the pier. The work requires off-site fabrication of the steel cross-bracing and on-site preparation of the existing columns to ensure proper bond with the new bracing. Installation of cross-bracing has been completed at all 20 piers.

Columns supporting the approach slab bridge located on Sherman Island are being strengthened with steel column casing jackets. There are a total of 116 columns that have been retrofitted with steel casing jackets. The approach slab bridge expansion joints have been retrofitted with seat extenders. All of the 12 seat extenders have been installed.

Landscaping at the south end of the bridge is 100% complete and the 60-day plant establishment period ended April 26, 2012.

In addition to the retrofit work, seismic monitoring equipment is being installed to provide ground and structure motion information during future seismic events. The monitoring equipment is being installed at 250, 160, 80, 50, 20 and 4 feet below the ground surface (93% complete).



Temporary Contract Yard Removal



Temporary Roadway Removal Started May 15, 2012



Antioch Bridge Installing Cross Bracing as Part of the Seismic Retrofit Construction



Antioch Bridge with Completed Cross Bracings

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### Dumbarton Bridge Seismic Retrofit Project

Contractor: Shimmick Construction Company, Inc.

Approved Capital Outlay Budget: \$92.7 M

Status: 61% Complete as of April 2012

The current 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 has six lanes (three in each direction) and an eight-foot-wide bicycle/pedestrian pathway. The bridge is a combination of three bridge types; reinforced concrete slab approaches supported on multiple pile extension columns, precast-prestressed concrete delta girders and steel box girders supported on reinforced concrete piers. The current retrofit strategy for the bridge includes superstructure and deck modifications and installation of isolation bearings.

**Status:** The main bridge structure between piers 16-31 will be raised approximately 5 inches in order for isolation bearings to be installed to separate the superstructure from the substructure during seismic events. In preparation, the bridge piers are being widened with reinforced concrete to accommodate the new bearings. Work continues with reinforcing steel and concrete placement at these main bridge piers.

Along the reinforced concrete slab approaches, the bent caps are being extended and tied to new 48-inch diameter steel piles that have been installed to strengthen the bridge. Bent cap extensions along the east and west trestle approach are now complete.

The concrete coring operation to widen the pier caps is complete at all of the 14 locations. Concrete has been placed at 14 of 16 piers. The installation of jacking frames is complete at piers 17 through 22. Welding is ongoing at piers 27, 28, 29 and 30.

Work at the pumping plant is substantially complete. Fender rehabilitation work is ongoing at piers 23 and 24. Pier footing overlay concrete has been placed at piers 17 through 22 and piers 25 through 30.

Retrofitting of the existing damaged piles at the Ravenswood pier is ongoing in order to mobilize a crane to begin the pier removal operation. Demolition and reconstruction of the concrete barrier at the approach to the seismic joints at pier 16 is ongoing.

The Dumbarton bridge was closed for construction over the 2012 Memorial Day weekend to install a seismic joint in the westbound direction. Project progress is reported on page 34.



Ravenswood Staging for Footing Overlay Work



Pier 31 Platform 2



Piers 26 to 31



Pier 28 Jacking Frame

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### Other Completed Projects

In the 1990s, the State Legislature 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.

#### San Mateo-Hayward Bridge Seismic Retrofit Project

**Project Status: Completed 2000**

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



High-Rise Section of San Mateo-Hayward Bridge

#### 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.

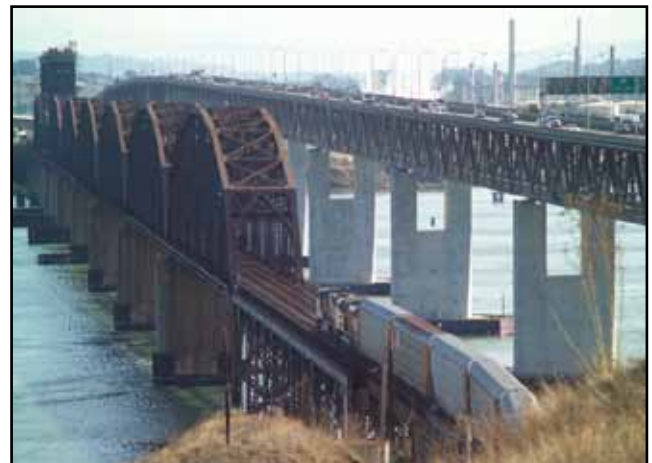


1958 Carquinez Bridge (foreground) with the 1927 Span (middle) under Demolition and the New Alfred Zampa Memorial Bridge (background)

#### 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 a seismic 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**

The Vincent Thomas Bridge is a 1,500-foot long suspension bridge crossing the Los Angeles Harbor in Los Angeles that links San Pedro with Terminal Island. The bridge was one of two state-owned toll bridges in Southern California (the other being the San Diego-Coronado Bridge). Opened in 1963, the bridge was seismically retrofitted as part of the TBSRP in 2000.



Los Angeles-Vincent Thomas Bridge

## San Diego-Coronado Bridge Seismic Retrofit Project

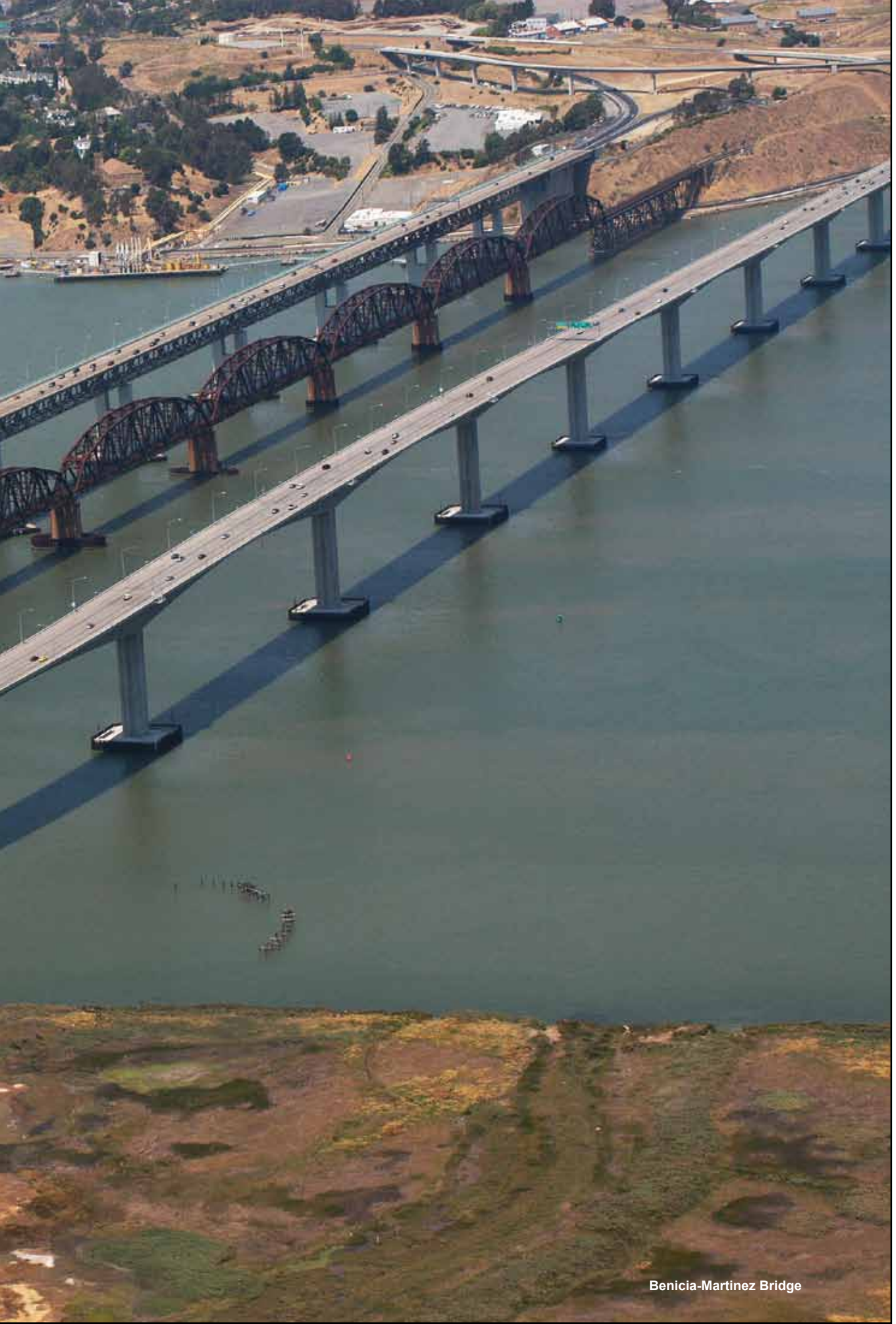
**Project Status: Completed 2002**

The San Diego-Coronado Bridge crosses over San Diego Bay and links the cities of San Diego and Coronado. Opened in 1969, the 2.1-mile long bridge was seismically retrofitted as part of the TBSRP in 2002.



San Diego-Coronado Bridge





**REGIONAL MEASURE 1 TOLL BRIDGE PROGRAM**

Benicia-Martinez Bridge

## REGIONAL MEASURE 1 PROGRAM

### Completed Projects

In November 1988, Bay Area voters approved Regional Measure 1 (RM 1), which authorized a standard auto toll of \$1 for all seven state-owned Bay Area toll bridges. The additional revenues generated by the toll increase were identified for use for certain highway and bridge improvements, public transit rail extensions, and other projects that reduce congestion in the bridge corridors.

The toll bridge projects identified by RM 1 are complete and are as follows:

#### 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.

#### San Mateo-Hayward Bridge Widening Project

**Project Status: Completed 2003**

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.



Widening of the San Mateo-Hayward Bridge Trestle on Left

#### 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/pedestrian pathway.



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

#### 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/pedestrian access in the area.

## 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

## Benicia-Martinez Bridge Project

### Project Status: **Completed 2009**

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 was 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 connects to Park Road in Benicia and to Marina Vista Boulevard in Martinez. Reconstruction of the east side of the bridge and approaches was completed in August 2008. Reconstruction of the west side of the bridge and its approaches and construction of the bicycle/pedestrian pathway were completed in August 2009.



Benicia-Martinez Bridge

## Interstate 880/State Route 92

### Project Status: **Completed 2011**

This corridor was consistently one of the Bay Area's most congested during the evening commute. This was due in part to the lane merging and weaving that was required by the then-existing cloverleaf interchange. The new interchange features direct freeway-to-freeway connector ramps that now increase traffic capacity and improve overall safety and traffic operations in the area. With the new direct-connector ramps, drivers coming off of the San Mateo-Hayward Bridge can access Interstate 880 without having to compete with traffic headed onto east Route 92 from south Interstate 880. A Caltrans landscaping project will be undertaken in 2012.



Aerial View of Completed 880/92 Interchange Project



Compacting the Parallel Wire Strands (PWS)



**APPENDICES**

- A. TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (A-1 and A-2).....44
- B. TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012.....48
- C. Regional Measure 1 Program Cost Detail.....51
- D. Project Progress Diagrams.....56
- E. Project Photos.....61
- F. Glossary of Terms.....72

## Appendix A-1: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions)

| Contract<br>a                                       | AB 144 / SB<br>66 Budget<br>(07/2005)<br>c | Approved<br>Changes<br>d | Current<br>Approved<br>Budget<br>(04/2012)<br>e = c + d | Cost to Date<br>(04/2012)<br>f | Cost<br>Forecast<br>(04/2012)<br>g | At-<br>Completion<br>Variance<br>h = g - e |
|---|--|--------------------------|---|--------------------------------|------------------------------------|--|
| <b>SFOBB East Span Replacement Project</b>          |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 959.3                                      | 261.5                    | 1,220.8   | 1,051.4                        | 1,264.1                            | 43.3                                       |
| Capital Outlay Construction                         | 4,492.2                                    | 588.0                    | 5,080.2   | 4,129.3                        | 5,145.0                            | 64.8                                       |
| Other Budgeted Capital                              | 35.1                                       | (3.3)                    | 31.8  | 0.7                            | 7.7                                | (24.1)                                     |
| <b>Total</b>  | <b>5,486.6</b>                             | <b>846.2</b>             | <b>6,332.8</b>  | <b>5,181.4</b>                 | <b>6,416.8</b>                     | <b>84.0</b>                                |
| <b>SFOBB West Approach Replacement</b>              |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 120.0                                      | (1.0)                    | 119.0   | 118.8                          | 119.0                              | -  |
| Capital Outlay Construction                         | 309.0                                      | 41.7                     | 350.7   | 331.1                          | 338.1                              | (12.6)                                     |
| <b>Total</b>  | <b>429.0</b>                               | <b>40.7</b>              | <b>469.7</b>  | <b>449.9</b>                   | <b>457.1</b>                       | <b>(12.6)</b>                              |
| <b>SFOBB West Span Retrofit</b>                     |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 75.0                                       | (0.2)                    | 74.8  | 74.9                           | 74.8                               | -  |
| Capital Outlay Construction                         | 232.9                                      | (5.5)                    | 227.4   | 227.4                          | 227.4                              | -  |
| <b>Total</b>  | <b>307.9</b>                               | <b>(5.7)</b>             | <b>302.2</b>  | <b>302.3</b>                   | <b>302.2</b>                       | <b>-</b>                                   |
| <b>Richmond-San Rafael Bridge Retrofit</b>          |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 134.0                                      | (7.0)                    | 127.0   | 126.8                          | 127.0                              | -  |
| Capital Outlay Construction                         | 780.0                                      | (90.5)                   | 689.5   | 667.5                          | 689.5                              | -  |
| <b>Total</b>  | <b>914.0</b>                               | <b>(97.5)</b>            | <b>816.5</b>  | <b>794.3</b>                   | <b>816.5</b>                       | <b>-</b>                                   |
| <b>Benicia-Martinez Bridge Retrofit</b>             |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 38.1                                       | -                        | 38.1  | 38.1                           | 38.1                               | -  |
| Capital Outlay Construction                         | 139.7                                      | -                        | 139.7   | 139.7                          | 139.7                              | -  |
| <b>Total</b>  | <b>177.8</b>                               | <b>-</b>                 | <b>177.8</b>  | <b>177.8</b>                   | <b>177.8</b>                       | <b>-</b>                                   |
| <b>Carquinez Bridge Retrofit</b>                    |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 28.7                                       | 0.1                      | 28.8  | 28.8                           | 28.8                               | -  |
| Capital Outlay Construction                         | 85.5                                       | (0.1)                    | 85.4  | 85.4                           | 85.4                               | -  |
| <b>Total</b>  | <b>114.2</b>                               | <b>-</b>                 | <b>114.2</b>  | <b>114.2</b>                   | <b>114.2</b>                       | <b>-</b>                                   |
| <b>San Mateo-Hayward Retrofit</b>                   |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 28.1                                       | -                        | 28.1  | 28.1                           | 28.1                               | -  |
| Capital Outlay Construction                         | 135.4                                      | (0.1)                    | 135.3   | 135.3                          | 135.3                              | -  |
| <b>Total</b>  | <b>163.5</b>                               | <b>(0.1)</b>             | <b>163.4</b>  | <b>163.4</b>                   | <b>163.4</b>                       | <b>-</b>                                   |
| <b>Vincent Thomas Bridge Retrofit (Los Angeles)</b> |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 16.4                                       | -                        | 16.4  | 16.4                           | 16.4                               | -  |
| Capital Outlay Construction                         | 42.1                                       | (0.1)                    | 42.0  | 42.0                           | 42.0                               | -  |
| <b>Total</b>  | <b>58.5</b>                                | <b>(0.1)</b>             | <b>58.4</b>   | <b>58.4</b>                    | <b>58.4</b>                        | <b>-</b>                                   |
| <b>San Diego-Coronado Bridge Retrofit</b>           |  |                          |   |                                |                                    |  |
| Capital Outlay Support                              | 33.5                                       | (0.3)                    | 33.2  | 33.2                           | 33.2                               | -  |
| Capital Outlay Construction                         | 70.0                                       | (0.6)                    | 69.4  | 69.4                           | 69.4                               | -  |
| <b>Total</b>  | <b>103.5</b>                               | <b>(0.9)</b>             | <b>102.6</b>  | <b>102.6</b>                   | <b>102.6</b>                       | <b>-</b>                                   |

## Appendix A-1: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions) Cont.

| Contract  | AB 144 / SB<br>66 Budget<br>(07/2005) | Approved<br>Changes | Current<br>Approved<br>Budget<br>(04/2012) | Cost to Date<br>(04/2012) | Cost<br>Forecast<br>(04/2012) | At-<br>Completion<br>Variance |
|---|---------------------------------------|---------------------|--|---------------------------|-------------------------------|-------------------------------|
| a   | c                                     | d                   | e = c + d                                  | f                         | g                             | h = g - e                     |
| <b>Antioch Bridge</b>                                   |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                  | -                                     | 31.0                | 31.0                                       | 16.2                      | 31.0                          | -                             |
| Capital Outlay Support by BATA                          |                                       |                     |  | 6.2                       |                               |                               |
| Capital Outlay Construction                             | -                                     | 51.0                | 51.0                                       | 44.0                      | 50.8                          | (0.2)                         |
| Total   | -                                     | 82.0                | 82.0                                       | 66.4                      | 81.8                          | (0.2)                         |
| <b>Dumbarton Bridge</b>                                 |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                  | -                                     | 56.0                | 56.0                                       | 27.6                      | 56.0                          | -                             |
| Capital Outlay Support by BATA                          |                                       |                     |  | 6.0                       |                               |                               |
| Capital Outlay Construction                             | -                                     | 92.7                | 92.7                                       | 42.5                      | 83.5                          | (9.2)                         |
| Total   | -                                     | 148.7               | 148.7                                      | 76.1                      | 139.5                         | (9.2)                         |
| Subtotal Capital Outlay Support                         | 1,433.1                               | 340.1               | 1,773.2                                    | 1,572.5                   | 1,816.5                       | 43.3                          |
| Subtotal Capital Outlay                                 | 6,286.8                               | 676.5               | 6,963.3                                    | 5,913.6                   | 7,006.1                       | 42.8                          |
| Subtotal Other Budgeted Capital                         | 35.1                                  | (3.3)               | 31.8                                       | 0.7                       | 7.7                           | (24.1)                        |
| Miscellaneous Program Costs                             | 30.0                                  | -                   | 30.0                                       | 25.5                      | 30.0                          | -                             |
| Subtotal Toll Bridge Seismic Retrofit Program           | 7,785.0                               | 1,013.3             | 8,798.3                                    | 7,512.3                   | 8,860.3                       | 62.0                          |
| Net Programmatic Risks*                                 | -                                     | -                   | -  | -                         | 92.0                          | 92.0                          |
| Program Contingency                                     | 900.0                                 | (616.3)             | 283.7                                      | -                         | 129.7                         | (154.0)                       |
| Total Toll Bridge Seismic Retrofit Program <sup>1</sup> | 8,685.0                               | 397.0               | 9,082.0                                    | 7,512.3                   | 9,082.0                       | -                             |

<sup>1</sup> Figures may not sum up to totals due to rounding effects.

## Appendix A-2: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions)

| Bridge  | AB 144 Baseline Budget | TBPOC Current Approved Budget | Expenditures to date and Encumbrances as of April 2012 see Note (1) | Estimated costs not yet spent or Encumbered as of April 2012 | Total Forecast as of April 2012 |
|---|------------------------|-------------------------------|---|--|---------------------------------|
| a   | b                      | c                             | d   | e  | f = d + e                       |
| <b>Other Completed Projects</b>               |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 144.9                  | 144.6                         | 144.6   | -  | 144.6                           |
| Capital Outlay                                | 472.6                  | 471.9                         | 472.6   | (0.8)  | 471.8                           |
| <b>Total</b>                                  | <b>617.5</b>           | <b>616.5</b>                  | <b>617.2</b>  | <b>(0.8)</b>   | <b>616.4</b>                    |
| <b>Richmond-San Rafael</b>                    |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 134.0                  | 127.0                         | 126.8   | 0.2  | 127.0                           |
| Capital Outlay                                | 698.0                  | 689.5                         | 667.5   | 22.0   | 689.5                           |
| Project Reserves                              | 82.0                   | -                             | -   | -  | -                               |
| <b>Total</b>                                  | <b>914.0</b>           | <b>816.5</b>                  | <b>794.3</b>  | <b>22.2</b>  | <b>816.5</b>                    |
| <b>West Span Retrofit</b>                     |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 75.0                   | 74.8                          | 74.9  | (0.1)  | 74.8                            |
| Capital Outlay                                | 232.9                  | 227.4                         | 232.8   | (5.4)  | 227.4                           |
| <b>Total</b>                                  | <b>307.9</b>           | <b>302.2</b>                  | <b>307.7</b>  | <b>(5.5)</b>   | <b>302.2</b>                    |
| <b>West Approach</b>                          |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 120.0                  | 119.0                         | 118.8   | 0.2  | 119.0                           |
| Capital Outlay                                | 309.0                  | 350.7                         | 346.0   | (7.9)  | 338.1                           |
| <b>Total</b>                                  | <b>429.0</b>           | <b>469.7</b>                  | <b>464.8</b>  | <b>(7.7)</b>   | <b>457.1</b>                    |
| <b>SFOBB East Span - Skyway</b>               |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 197.0                  | 181.2                         | 181.2   | -  | 181.2                           |
| Capital Outlay                                | 1,293.0                | 1,245.2                       | 1,237.2   | 8.0  | 1,245.2                         |
| <b>Total</b>                                  | <b>1,490.0</b>         | <b>1,426.4</b>                | <b>1,418.4</b>  | <b>8.0</b>   | <b>1,426.4</b>                  |
| <b>SFOBB East Span - SAS - Superstructure</b> |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 214.6                  | 419.0                         | 393.6   | 70.7   | 464.3                           |
| Capital Outlay                                | 1,753.7                | 2,046.8                       | 1,667.8   | 390.2  | 2,058.0                         |
| <b>Total</b>                                  | <b>1,968.3</b>         | <b>2,465.8</b>                | <b>2,061.4</b>  | <b>460.9</b>   | <b>2,522.3</b>                  |
| <b>SFOBB East Span - SAS - Foundations</b>    |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 62.5                   | 37.6                          | 37.6  | -  | 37.6                            |
| Capital Outlay                                | 339.9                  | 305.1                         | 309.3   | (4.3)  | 305.0                           |
| <b>Total</b>                                  | <b>402.4</b>           | <b>342.7</b>                  | <b>346.9</b>  | <b>(4.3)</b>   | <b>342.6</b>                    |
| <b>Small YBI Projects</b>                     |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 10.6                   | 10.6                          | 10.2  | 0.4  | 10.6                            |
| Capital Outlay                                | 15.6                   | 15.6                          | 15.5  | 0.2  | 15.7                            |
| <b>Total</b>                                  | <b>26.2</b>            | <b>26.2</b>                   | <b>25.7</b>   | <b>0.6</b>   | <b>26.3</b>                     |
| <b>YBI Detour</b>                             |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 29.5                   | 90.7                          | 88.9  | (1.2)  | 87.7                            |
| Capital Outlay                                | 131.9                  | 492.8                         | 492.9   | (10.1)   | 482.8                           |
| <b>Total</b>                                  | <b>161.4</b>           | <b>583.5</b>                  | <b>581.8</b>  | <b>(11.3)</b>  | <b>570.5</b>                    |
| <b>YBI- Transition Structures</b>             |                        |                               |   |  |                                 |
| Capital Outlay Support                        | 78.7                   | 106.4                         | 73.3  | 38.1   | 111.4                           |
| Capital Outlay                                | 299.4                  | 262.0                         | 133.1   | 193.6  | 326.7                           |
| <b>Total</b>                                  | <b>378.1</b>           | <b>368.4</b>                  | <b>206.4</b>  | <b>231.7</b>   | <b>438.1</b>                    |

## Appendix A-2: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions) Cont.

| Contract                              | AB 144<br>Baseline<br>Budget | TBPOC Current<br>Approved Budget | Expenditures to<br>date and<br>Encumbrances<br>as of April 2012<br>see Note (1) | Estimated Costs<br>not yet spent or<br>Encumbered as<br>of April 2012 | Total Forecast<br>as of April 2012 |
|---------------------------------------|------------------------------|----------------------------------|---|---|------------------------------------|
| a                                     | b                            | c                                | d   | e   | f = d + e                          |
| <b>Oakland Touchdown</b>              |                              |                                  |   |   |                                    |
| Capital Outlay Support                | 74.4                         | 108.9                            | 95.8  | 28.0  | 123.8                              |
| Capital Outlay                        | 283.8                        | 334.6                            | 250.6   | 76.7  | 327.3                              |
| <b>Total</b>                          | <b>358.2</b>                 | <b>443.5</b>                     | <b>346.4</b>  | <b>104.7</b>  | <b>451.1</b>                       |
| <b>East Span Other Small Projects</b> |                              |                                  |   |   |                                    |
| Capital Outlay Support                | 212.3                        | 206.5                            | 197.9   | 8.7   | 206.6                              |
| Capital Outlay                        | 170.8                        | 170.7                            | 118.4   | 36.2  | 154.6                              |
| <b>Total</b>                          | <b>383.1</b>                 | <b>377.2</b>                     | <b>316.3</b>  | <b>44.9</b>   | <b>361.2</b>                       |
| <b>Existing Bridge Demolition</b>     |                              |                                  |   |   |                                    |
| Capital Outlay Support                | 79.7                         | 59.9                             | 2.1   | 38.8  | 40.9                               |
| Capital Outlay                        | 239.2                        | 239.1                            | -   | 237.3   | 237.3                              |
| <b>Total</b>                          | <b>318.9</b>                 | <b>299.0</b>                     | <b>2.1</b>  | <b>276.1</b>  | <b>278.2</b>                       |
| <b>Antioch Bridge</b>                 |                              |                                  |   |   |                                    |
| Capital Outlay Support                | -                            | 31.0                             | 16.5  | 8.3   | 24.8                               |
| Capital Outlay Support by BATA        | -                            | -                                | 6.2   | -   | 6.2                                |
| Capital Outlay                        | -                            | 51.0                             | 47.4  | 3.4   | 50.8                               |
| <b>Total</b>                          | <b>-</b>                     | <b>82.0</b>                      | <b>70.1</b>   | <b>11.7</b>   | <b>81.8</b>                        |
| <b>Dumbarton Bridge</b>               |                              |                                  |   |   |                                    |
| Capital Outlay Support                | -                            | 56.0                             | 27.7  | 22.3  | 50.0                               |
| Capital Outlay Support by BATA        | -                            | -                                | 6.0   | -   | 6.0                                |
| Capital Outlay                        | -                            | 92.7                             | 55.8  | 27.7  | 83.5                               |
| <b>Total</b>                          | <b>-</b>                     | <b>148.7</b>                     | <b>89.5</b>   | <b>50.0</b>   | <b>139.5</b>                       |
| Miscellaneous Program Costs           | 30.0                         | 30.0                             | 25.5  | 4.5   | 30.0                               |
| <b>Total Capital Outlay Support</b>   | <b>1,463.2</b>               | <b>1,803.2</b>                   | <b>1,627.6</b>  | <b>218.9</b>  | <b>1,846.5</b>                     |
| <b>Total Capital Outlay</b>           | <b>6,321.8</b>               | <b>6,995.1</b>                   | <b>6,046.9</b>  | <b>966.9</b>  | <b>7,013.8</b>                     |
| <b>Program Total <sup>1</sup></b>     | <b>7,785.0</b>               | <b>8,798.3</b>                   | <b>7,674.5</b>  | <b>1,185.8</b>  | <b>8,860.3</b>                     |

(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 in 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.

<sup>1</sup> Figures may not sum up to totals due to rounding effects.

## Appendix B: TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions)

| Contract   | AB 144 / SB 66 Budget (07/2005) | Approved Changes | Current Approved Budget (04/2012) | Cost to Date (04/2012) | Cost Forecast (04/2012) | At-Completion Variance |
|--|---------------------------------|------------------|-----------------------------------|------------------------|-------------------------|------------------------|
| a  | c                               | d                | e = c + d                         | f                      | g                       | h = g - e              |
| San Francisco-Oakland Bay Bridge East Span Replacement Project |                                 |                  |                                   |                        |                         |                        |
| East Span - SAS Superstructure                                 |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   | 214.6                           | 204.4            | 419.0                             | 373.8                  | 464.3                   | 45.3                   |
| Capital Outlay Construction                                    | 1,753.7                         | 293.1            | 2,046.8                           | 1,665.7                | 2,058.0                 | 11.2                   |
| Total  | 1,968.3                         | 497.5            | 2,465.8                           | 2,039.5                | 2,522.3                 | 56.5                   |
| SAS W2 Foundations   |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   | 10.0                            | (0.8)            | 9.2                               | 9.2                    | 9.2                     | -                      |
| Capital Outlay Construction                                    | 26.4                            | 0.1              | 26.5                              | 26.5                   | 26.4                    | (0.1)                  |
| Total  | 36.4                            | (0.7)            | 35.7                              | 35.7                   | 35.6                    | (0.1)                  |
| YBI South/South Detour   |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   | 29.4                            | 61.3             | 90.7                              | 87.6                   | 87.7                    | (3.0)                  |
| Capital Outlay Construction                                    | 131.9                           | 360.9            | 492.8                             | 466.1                  | 482.8                   | (10.0)                 |
| Total  | 161.3                           | 422.2            | 583.5                             | 553.7                  | 570.5                   | (13.0)                 |
| East Span - Skyway   |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   | 197.0                           | (15.8)           | 181.2                             | 181.2                  | 181.2                   | -                      |
| Capital Outlay Construction                                    | 1,293.0                         | (47.8)           | 1,245.2                           | 1,237.1                | 1,245.2                 | -                      |
| Total  | 1,490.0                         | (63.6)           | 1,426.4                           | 1,418.3                | 1,426.4                 | -                      |
| East Span - SAS E2/T1 Foundations                              |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   | 52.5                            | (24.1)           | 28.4                              | 28.4                   | 28.4                    | -                      |
| Capital Outlay Construction                                    | 313.5                           | (34.9)           | 278.6                             | 274.8                  | 278.6                   | -                      |
| Total  | 366.0                           | (59.0)           | 307.0                             | 303.2                  | 307.0                   | -                      |
| YBI Transition Structures (see notes below)                    |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   | 78.7                            | 27.7             | 106.4                             | 69.7                   | 111.4                   | 5.0                    |
| Capital Outlay Construction                                    | 299.3                           | (37.3)           | 262.0                             | 118.5                  | 326.7                   | 64.7                   |
| Total  | 378.0                           | (9.6)            | 368.4                             | 188.2                  | 438.1                   | 69.7                   |
| * YBI- Transition Structures                                   |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   |                                 |                  | 16.4                              | 16.4                   | 16.4                    | -                      |
| Capital Outlay Construction                                    |                                 |                  | -                                 | -                      | -                       | -                      |
| Total  |                                 |                  | 16.4                              | 16.4                   | 16.4                    | -                      |
| * YBI- Transition Structures Contract No. 1                    |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   |                                 |                  | 57.0                              | 41.6                   | 59.8                    | 2.8                    |
| Capital Outlay Construction                                    |                                 |                  | 199.7                             | 118.5                  | 243.6                   | 43.9                   |
| Total  |                                 |                  | 256.7                             | 160.1                  | 303.4                   | 46.7                   |
| * YBI- Transition Structures Contract No. 2                    |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   |                                 |                  | 32.0                              | 11.7                   | 34.2                    | 2.2                    |
| Capital Outlay Construction                                    |                                 |                  | 59.0                              | -                      | 79.8                    | 20.8                   |
| Total  |                                 |                  | 91.0                              | 11.7                   | 114.0                   | 23.0                   |
| * YBI- Transition Structures Contract No. 3 Landscape          |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support   |                                 |                  | 1.0                               | -                      | 1.0                     | -                      |
| Capital Outlay Construction                                    |                                 |                  | 3.3                               | -                      | 3.3                     | -                      |
| Total  |                                 |                  | 4.3                               | -                      | 4.3                     | -                      |

## Appendix B: TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions) Cont.

| Contract<br>a                              | AB 144 / SB<br>66 Budget<br>(07/2005)<br>c | Approved<br>Changes<br>d | Current<br>Approved<br>Budget<br>(04/2012)<br>e = c + d | Cost to Date<br>(04/2012)<br>f | Cost<br>Forecast<br>(04/2012)<br>g | At-<br>Completion<br>Variance<br>h = g - e |
|--|--|--------------------------|---|--------------------------------|------------------------------------|--|
| <b>Oakland Touchdown (see notes below)</b> |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     | 74.4                                       | 34.5                     | 108.9   | 91.5                           | 123.8                              | 14.9                                       |
| Capital Outlay Construction                | 283.8                                      | 50.8                     | 334.6   | 208.7                          | 327.3                              | (7.3)                                      |
| <b>Total</b>                               | <b>358.2</b>                               | <b>85.3</b>              | <b>443.5</b>  | <b>300.2</b>                   | <b>451.1</b>                       | <b>7.6</b>                                 |
| <b>* OTD Prior-to-Split Costs</b>          |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | 21.7  | 20.0                           | 21.7                               | -  |
| Capital Outlay Construction                |  |                          | -   | -                              | -                                  | 4.4  |
| <b>Total</b>                               |  |                          | <b>21.7</b>   | <b>20.0</b>                    | <b>21.7</b>                        | <b>4.4</b>                                 |
| <b>* OTD Submarine Cable(1)</b>            |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | 0.9   | 0.9                            | 0.9                                | -  |
| Capital Outlay Construction                |  |                          | 9.6   | 5.7                            | 9.6                                | -  |
| <b>Total</b>                               |  |                          | <b>10.5</b>   | <b>6.6</b>                     | <b>10.5</b>                        | <b>-</b>                                   |
| <b>* OTD No. 1 (Westbound)</b>             |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | 47.3  | 51.2                           | 51.3                               | 4.0  |
| Capital Outlay Construction                |  |                          | 212.0   | 203.0                          | 203.3                              | (8.7)                                      |
| <b>Total</b>                               |  |                          | <b>259.3</b>  | <b>254.2</b>                   | <b>254.6</b>                       | <b>(4.7)</b>                               |
| <b>* OTD No. 2 (Eastbound)</b>             |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | 22.5  | 13.3                           | 35.3                               | 12.8                                       |
| Capital Outlay Construction                |  |                          | 62.0  | -                              | 56.3                               | (5.7)                                      |
| <b>Total</b>                               |  |                          | <b>84.5</b>   | <b>13.3</b>                    | <b>91.6</b>                        | <b>7.1</b>                                 |
| <b>* OTD Touchdown 2 Detour(2)</b>         |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | 15.0  | 5.3                            | 13.1                               | (1.9)                                      |
| Capital Outlay Construction                |  |                          | 51.0  | -                              | 53.7                               | 2.7  |
| <b>Total</b>                               |  |                          | <b>66.0</b>   | <b>5.3</b>                     | <b>66.8</b>                        | <b>0.8</b>                                 |
| <b>* OTD Electrical Systems</b>            |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | 1.5   | 0.8                            | 1.5                                | -  |
| Capital Outlay Construction                |  |                          | -   | -                              | 4.4                                | 4.4  |
| <b>Total</b>                               |  |                          | <b>1.5</b>  | <b>0.8</b>                     | <b>5.9</b>                         | <b>4.4</b>                                 |
| <b>Existing Bridge Demolition</b>          |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     | 79.7                                       | (19.8)                   | 59.9  | 1.9                            | 40.9                               | (19.0)                                     |
| Capital Outlay Construction                | 239.2                                      | (0.1)                    | 239.1   | -                              | 237.3                              | (1.8)                                      |
| <b>Total</b>                               | <b>318.9</b>                               | <b>(19.9)</b>            | <b>299.0</b>  | <b>1.9</b>                     | <b>278.2</b>                       | <b>(20.8)</b>                              |
| <b>* Cantilever Section</b>                |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | -   | -                              | 15.0                               |  |
| Capital Outlay Construction                |  |                          | -   | -                              | 60.4                               |  |
| <b>Total</b>                               |  |                          | <b>-</b>  | <b>-</b>                       | <b>75.4</b>                        |  |
| <b>* 504/288 Sections</b>                  |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     |  |                          | -   | 1.9                            | 25.9                               |  |
| Capital Outlay Construction                |  |                          | -   | -                              | 176.9                              |  |
| <b>Total</b>                               |  |                          | <b>-</b>  | <b>1.9</b>                     | <b>202.8</b>                       |  |
| <b>YBI/SAS Archeology</b>                  |  |                          |   |                                |                                    |  |
| Capital Outlay Support                     | 1.1  | -                        | 1.1   | 1.1                            | 1.1                                | -  |
| Capital Outlay Construction                | 1.1  | -                        | 1.1   | 1.1                            | 1.1                                | -  |
| <b>Total</b>                               | <b>2.2</b>                                 | <b>-</b>                 | <b>2.2</b>  | <b>2.2</b>                     | <b>2.2</b>                         | <b>-</b>                                   |

## Appendix B: TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through April 31, 2012 (\$ Millions) Cont.

| Contract   | AB 144 / SB 66 Budget (07/2005) | Approved Changes | Current Approved Budget (04/2012) | Cost to Date (04/2012) | Cost Forecast (04/2012) | At-Completion Variance |
|--|---------------------------------|------------------|-----------------------------------|------------------------|-------------------------|------------------------|
| a  | c                               | d                | e = c + d                         | f                      | g                       | h = g - e              |
| <b>YBI - USCG Road Relocation</b>                |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | 3.0                             | -                | 3.0                               | 2.7                    | 3.0                     | -                      |
| Capital Outlay Construction                      | 3.0                             | -                | 3.0                               | 2.8                    | 3.0                     | -                      |
| <b>Total</b>                                     | <b>6.0</b>                      | <b>-</b>         | <b>6.0</b>                        | <b>5.5</b>             | <b>6.0</b>              | <b>-</b>               |
| <b>YBI - Substation and Viaduct</b>              |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | 6.5                             | -                | 6.5                               | 6.4                    | 6.5                     | -                      |
| Capital Outlay Construction                      | 11.6                            | -                | 11.6                              | 11.3                   | 11.6                    | -                      |
| <b>Total</b>                                     | <b>18.1</b>                     | <b>-</b>         | <b>18.1</b>                       | <b>17.7</b>            | <b>18.1</b>             | <b>-</b>               |
| <b>Oakland Geofill</b>                           |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | 2.5                             | -                | 2.5                               | 2.5                    | 2.5                     | -                      |
| Capital Outlay Construction                      | 8.2                             | -                | 8.2                               | 8.2                    | 8.2                     | -                      |
| <b>Total</b>                                     | <b>10.7</b>                     | <b>-</b>         | <b>10.7</b>                       | <b>10.7</b>            | <b>10.7</b>             | <b>-</b>               |
| <b>Pile Installation Demonstration Project</b>   |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | 1.8                             | -                | 1.8                               | 1.8                    | 1.8                     | -                      |
| Capital Outlay Construction                      | 9.3                             | (0.1)            | 9.2                               | 9.2                    | 9.3                     | -                      |
| <b>Total</b>                                     | <b>11.1</b>                     | <b>(0.1)</b>     | <b>11.0</b>                       | <b>11.0</b>            | <b>11.1</b>             | <b>-</b>               |
| <b>Stormwater Treatment Measures</b>             |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | 6.0                             | 2.2              | 8.2                               | 8.2                    | 8.2                     | -                      |
| Capital Outlay Construction                      | 15.0                            | 3.3              | 18.3                              | 16.8                   | 18.3                    | -                      |
| <b>Total</b>                                     | <b>21.0</b>                     | <b>5.5</b>       | <b>26.5</b>                       | <b>25.0</b>            | <b>26.5</b>             | <b>-</b>               |
| <b>Right-of-Way and Environmental Mitigation</b> |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | -                               | -                | -                                 | -                      | -                       | -                      |
| Capital Outlay & Right-of-Way                    | 72.4                            | -                | 72.4                              | 51.7                   | 80.4                    | 8.0                    |
| <b>Total</b>                                     | <b>72.4</b>                     | <b>-</b>         | <b>72.4</b>                       | <b>51.7</b>            | <b>80.4</b>             | <b>8.0</b>             |
| <b>Sunk Cost - Existing East Span Retrofit</b>   |                                 |                  |                                   |                        |                         |                        |
| Capital Outlay Support                           | 39.5                            | -                | 39.5                              | 39.5                   | 39.5                    | -                      |
| Capital Outlay Construction                      | 30.8                            | -                | 30.8                              | 30.8                   | 30.8                    | -                      |
| <b>Total</b>                                     | <b>70.3</b>                     | <b>-</b>         | <b>70.3</b>                       | <b>70.3</b>            | <b>70.3</b>             | <b>-</b>               |
| <b>Other Capital Outlay Support</b>              |                                 |                  |                                   |                        |                         |                        |
| Environmental Phase                              | 97.7                            | -                | 97.7                              | 97.8                   | 97.7                    | -                      |
| Pre-Split Project Expenditures                   | 44.9                            | -                | 44.9                              | 44.9                   | 44.9                    | -                      |
| Non-Project Specific Costs                       | 20.0                            | (8.0)            | 12.0                              | 3.2                    | 12.0                    | -                      |
| <b>Total</b>                                     | <b>162.6</b>                    | <b>(8.0)</b>     | <b>154.6</b>                      | <b>145.9</b>           | <b>154.6</b>            | <b>-</b>               |
| Subtotal Capital Outlay Support                  | 959.3                           | 261.5            | 1,220.8                           | 1,051.4                | 1,264.1                 | 43.3                   |
| Subtotal Capital Outlay Construction             | 4,492.2                         | 588.0            | 5,080.2                           | 4,129.3                | 5,145.0                 | 64.8                   |
| Other Budgeted Capital                           | 35.1                            | (3.3)            | 31.8                              | 0.7                    | 7.7                     | (24.1)                 |
| <b>Total SFOBB East Span Replacement Project</b> | <b>5,486.6</b>                  | <b>846.2</b>     | <b>6,332.8</b>                    | <b>5,181.4</b>         | <b>6,416.8</b>          | <b>84.0</b>            |

<sup>1</sup> Figures may not sum up to totals due to rounding effects.

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

| Contract   | AB 144 / SB<br>66 Budget<br>(07/2005) | Approved<br>Changes | Current<br>Approved<br>Budget<br>(04/2012) | Cost to Date<br>(04/2012) | Cost<br>Forecast<br>(04/2012) | At-<br>Completion<br>Variance |
|--|---------------------------------------|---------------------|--|---------------------------|-------------------------------|-------------------------------|
| a  | c                                     | d                   | e = c + d                                  | f                         | g                             | h = g - e                     |
| <b>New Benicia-Martinez Bridge Project</b>             |                                       |                     |  |                           |                               |                               |
| <b>New Bridge</b>                                      |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                 |                                       |                     |  |                           |                               |                               |
| BATA Funding   | 84.9                                  | 7.2                 | 92.1                                       | 91.9                      | 92.1                          | -                             |
| Non-BATA Funding                                       | -                                     | 0.1                 | 0.1  | 0.1                       | 0.1                           | -                             |
| Subtotal   | 84.9                                  | 7.3                 | 92.2                                       | 92.0                      | 92.2                          | -                             |
| Capital Outlay Construction                            |                                       |                     |  |                           |                               |                               |
| BATA Funding   | 661.9                                 | 94.6                | 756.5                                      | 753.7                     | 756.5                         | -                             |
| Non-BATA Funding                                       | 10.1                                  | -                   | 10.1                                       | 10.1                      | 10.1                          | -                             |
| Subtotal   | 672.0                                 | 94.6                | 766.6                                      | 763.8                     | 766.6                         | -                             |
| <b>Total</b>   | <b>756.9</b>                          | <b>101.9</b>        | <b>858.8</b>                               | <b>855.8</b>              | <b>858.8</b>                  | <b>-</b>                      |
| <b>I-680/I-780 Interchange Reconstruction</b>          |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                 |                                       |                     |  |                           |                               |                               |
| BATA Funding   | 24.9                                  | 5.2                 | 30.1                                       | 30.1                      | 30.1                          | -                             |
| Non-BATA Funding                                       | 1.4                                   | 5.2                 | 6.6  | 6.2                       | 6.6                           | -                             |
| Subtotal   | 26.3                                  | 10.4                | 36.7                                       | 36.3                      | 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                      | 21.7                          | 0.1                           |
| Subtotal   | 76.3                                  | 26.9                | 103.2                                      | 98.8                      | 103.3                         | 0.1                           |
| <b>Total</b>   | <b>102.6</b>                          | <b>37.3</b>         | <b>139.9</b>                               | <b>135.1</b>              | <b>140.0</b>                  | <b>0.1</b>                    |
| <b>I-680/Marina Vista Interchange Reconstruction</b>   |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                 | 18.3                                  | 1.9                 | 20.2                                       | 20.2                      | 20.2                          | -                             |
| Capital Outlay Construction                            | 51.5                                  | 4.9                 | 56.4                                       | 56.1                      | 56.4                          | -                             |
| <b>Total</b>   | <b>69.8</b>                           | <b>6.8</b>          | <b>76.6</b>                                | <b>76.3</b>               | <b>76.6</b>                   | <b>-</b>                      |
| <b>New Toll Plaza and Administration Building</b>      |                                       |                     |  |                           |                               |                               |
| 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                          | -                             |
| <b>Total</b>   | <b>36.2</b>                           | <b>5.8</b>          | <b>42.0</b>                                | <b>40.8</b>               | <b>42.0</b>                   | <b>-</b>                      |
| <b>Existing Bridge &amp; Interchange Modifications</b> |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                 |                                       |                     |  |                           |                               |                               |
| BATA Funding   | 4.3                                   | 13.7                | 18.0                                       | 18.0                      | 18.0                          | -                             |
| Non-BATA Funding                                       | -                                     | 0.9                 | 0.9  | 0.8                       | 0.9                           | -                             |
| Subtotal   | 4.3                                   | 14.6                | 18.9                                       | 18.8                      | 18.9                          | -                             |
| Capital Outlay Construction                            |                                       |                     |  |                           |                               |                               |
| BATA Funding   | 17.2                                  | 32.8                | 50.0                                       | 37.2                      | 50.0                          | -                             |
| Non-BATA Funding                                       | -                                     | 9.5                 | 9.5  | -                         | 9.5                           | -                             |
| Subtotal   | 17.2                                  | 42.3                | 59.5                                       | 37.2                      | 59.5                          | -                             |
| <b>Total</b>   | <b>21.5</b>                           | <b>56.9</b>         | <b>78.4</b>                                | <b>56.0</b>               | <b>78.4</b>                   | <b>-</b>                      |
| <b>Other Contracts</b>                                 |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support                                 | 11.4                                  | (0.9)               | 10.5                                       | 9.7                       | 10.5                          | -                             |
| Capital Outlay Construction                            | 20.3                                  | 3.3                 | 23.6                                       | 18.6                      | 23.6                          | -                             |
| Capital Outlay Right-of-Way                            | 20.4                                  | (0.1)               | 20.3                                       | 17.0                      | 20.3                          | -                             |
| <b>Total</b>   | <b>52.1</b>                           | <b>2.3</b>          | <b>54.4</b>                                | <b>45.3</b>               | <b>54.4</b>                   | <b>-</b>                      |

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

| Contract<br>a  | AB 144 / SB<br>66 Budget<br>(07/2005)<br>c   | Approved<br>Changes<br>d | Current<br>Approved<br>Budget<br>(04/2012)<br>e = c + d | Cost to Date<br>(04/2012)<br>f | Cost<br>Forecast<br>(04/2012)<br>g | At-<br>Completion<br>Variance<br>h = g - e |
|--|--|--------------------------|---|--------------------------------|------------------------------------|--|
| New Benicia-Martinez Bridge Project continued...               |  |                          |   |                                |                                    |  |
| Subtotal BATA Capital Outlay Support                           | 155.7  | 30.9                     | 186.6   | 185.6                          | 186.6                              | -  |
| Subtotal BATA Capital Outlay Construction                      | 829.9  | 164.5                    | 994.4   | 967.8                          | 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   | 7.1                            | 7.6                                | -  |
| Subtotal Non-BATA Capital Outlay Construction                  | 31.7   | 9.5                      | 41.2  | 31.8                           | 41.3                               | 0.1  |
| Project Reserves   | 20.8   | 1.6                      | 22.4  | -                              | 22.3                               | (0.1)                                      |
| <b>Total New Benicia-Martinez Bridge Project</b>               | <b>1,059.9</b>   | <b>212.6</b>             | <b>1,272.5</b>  | <b>1,209.3</b>                 | <b>1,272.5</b>                     | <b>-</b>                                   |
| Notes:   | Includes EAs 00601_,00603_,00605_,00606_,00608_,00609_,0060A_,0060C_,0060E_,0060F_,0060G_,0060H_, and all Project Right-of-Way   |                          |   |                                |                                    |  |
| Carquinez Bridge Replacement Project                           |  |                          |   |                                |                                    |  |
| New Bridge   |  |                          |   |                                |                                    |  |
| 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                              | -  |
| <b>Total</b>   | <b>313.8</b>   | <b>2.4</b>               | <b>316.2</b>  | <b>316.1</b>                   | <b>316.2</b>                       | <b>-</b>                                   |
| Crockett Interchange Reconstruction                            |  |                          |   |                                |                                    |  |
| 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                               | -  |
| <b>Total</b>   | <b>105.9</b>   | <b>(2.0)</b>             | <b>103.9</b>  | <b>103.8</b>                   | <b>103.9</b>                       | <b>-</b>                                   |
| Existing 1927 Bridge Demolition                                |  |                          |   |                                |                                    |  |
| Capital Outlay Support   | 16.1   | (0.3)                    | 15.8  | 15.8                           | 15.8                               | -  |
| Capital Outlay Construction                                    | 35.2   | -                        | 35.2  | 35.0                           | 35.2                               | -  |
| <b>Total</b>   | <b>51.3</b>  | <b>(0.3)</b>             | <b>51.0</b>   | <b>50.8</b>                    | <b>51.0</b>                        | <b>-</b>                                   |
| Other Contracts  |  |                          |   |                                |                                    |  |
| Capital Outlay Support   | 15.8   | 0.9                      | 16.7  | 16.5                           | 16.7                               | -  |
| Capital Outlay Construction                                    | 18.8   | (1.2)                    | 17.6  | 16.4                           | 17.6                               | -  |
| Capital Outlay Right-of-Way                                    | 10.5   | (0.1)                    | 10.4  | 10.0                           | 10.4                               | -  |
| <b>Total</b>   | <b>45.1</b>  | <b>(0.4)</b>             | <b>44.7</b>   | <b>42.9</b>                    | <b>44.7</b>                        | <b>-</b>                                   |
| Subtotal BATA Capital Outlay Support                           | 124.4  | 0.2                      | 124.6   | 124.4                          | 124.6                              | -  |
| Subtotal BATA Capital Outlay Construction                      | 381.2  | (0.4)                    | 380.8   | 379.2                          | 380.8                              | -  |
| Subtotal Capital Outlay Right-of-Way                           | 10.5   | (0.1)                    | 10.4  | 10.0                           | 10.4                               | -  |
| Project Reserves   | 12.1   | (9.7)                    | 2.4   | -                              | 2.4                                | -  |
| <b>Total Carquinez Bridge Replacement Project <sup>1</sup></b> | <b>528.2</b>   | <b>(10.0)</b>            | <b>518.2</b>  | <b>513.6</b>                   | <b>518.2</b>                       | <b>-</b>                                   |
| Notes  | Other Contracts include EAs 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 |                          |   |                                |                                    |  |

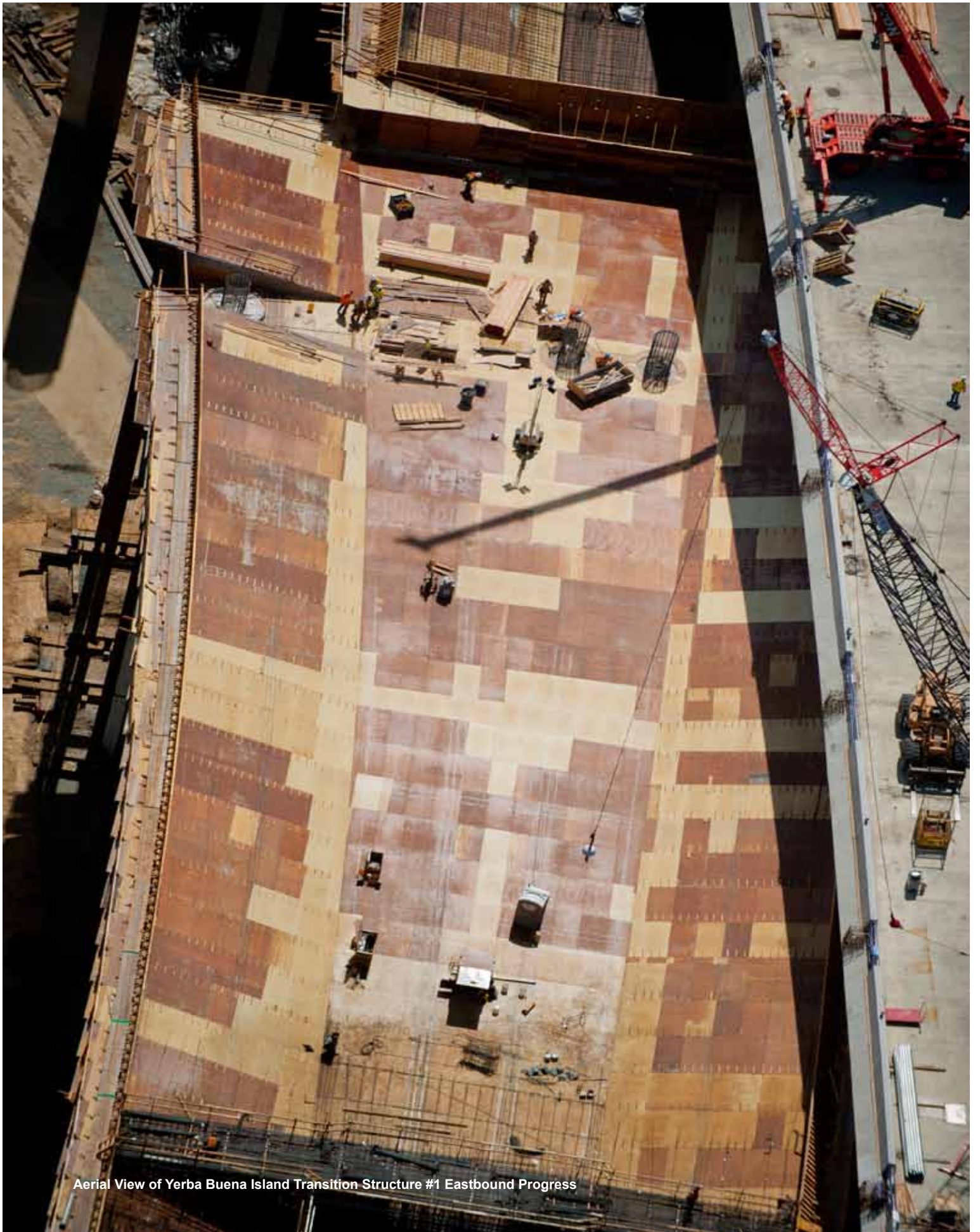
<sup>1</sup> Figures may not sum up to totals due to rounding effects.

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

| Contract   | AB 144 / SB<br>66 Budget<br>(07/2005) | Approved<br>Changes | Current<br>Approved<br>Budget<br>(04/2012) | Cost to Date<br>(04/2012) | Cost<br>Forecast<br>(04/2012) | At-<br>Completion<br>Variance |
|--|---------------------------------------|---------------------|--|---------------------------|-------------------------------|-------------------------------|
| a  | c                                     | d                   | e = c + d                                  | f                         | g                             | h = g - e                     |
| <b>Richmond-San Rafael Bridge Trestle, Fender, and Deck Joint Rehabilitation</b> |                                       |                     |  |                           |                               |                               |
| 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                          | -                             |
| <b>Richmond-San Rafael Bridge Deck Overlay Rehabilitation</b>                    |                                       |                     |  |                           |                               |                               |
| 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                          | -                             |
| <b>Richmond Parkway Project (RM 1 Share Only)</b>                                |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support   | -                                     | -                   | -  | -                         | -                             | -                             |
| Capital Outlay Construction  | 5.9                                   | -                   | 5.9  | 4.3                       | 5.9                           | -                             |
| Total  | 5.9                                   | -                   | 5.9  | 4.3                       | 5.9                           | -                             |
| <b>San Mateo-Hayward Bridge Widening</b>   |                                       |                     |  |                           |                               |                               |
| 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  | 0.6                       | 0.6                           | -                             |
| Project Reserves   | 1.5                                   | (0.5)               | 1.0  | -                         | 1.0                           | -                             |
| Total  | 217.8                                 | (8.0)               | 209.8                                      | 208.8                     | 209.8                         | -                             |
| <b>I-880/SR-92 Interchange Reconstruction</b>                                    |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support   | 28.8                                  | 35.8                | 64.6                                       | 62.2                      | 64.6                          | -                             |
| Capital Outlay Construction  |                                       |                     |  |                           |                               |                               |
| BATA Funding   | 85.2                                  | 68.4                | 153.6                                      | 150.2                     | 153.6                         | -                             |
| Non-BATA Funding   | 9.6                                   | -                   | 9.6  | -                         | 9.6                           | -                             |
| Subtotal   | 94.8                                  | 68.4                | 163.2                                      | 150.2                     | 163.2                         | -                             |
| Capital Outlay Right-of-Way  | 9.9                                   | 7.3                 | 17.2                                       | 14.7                      | 17.2                          | -                             |
| Project Reserves   | 0.3                                   | (0.3)               | -  | -                         | -                             | -                             |
| Total  | 133.8                                 | 111.2               | 245.0                                      | 227.1                     | 245.0                         | -                             |
| <b>Bayfront Expressway Widening</b>  |                                       |                     |  |                           |                               |                               |
| Capital Outlay Support   | 8.6                                   | (0.2)               | 8.4  | 8.4                       | 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                                       | 33.5                      | 34.1                          | -                             |

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

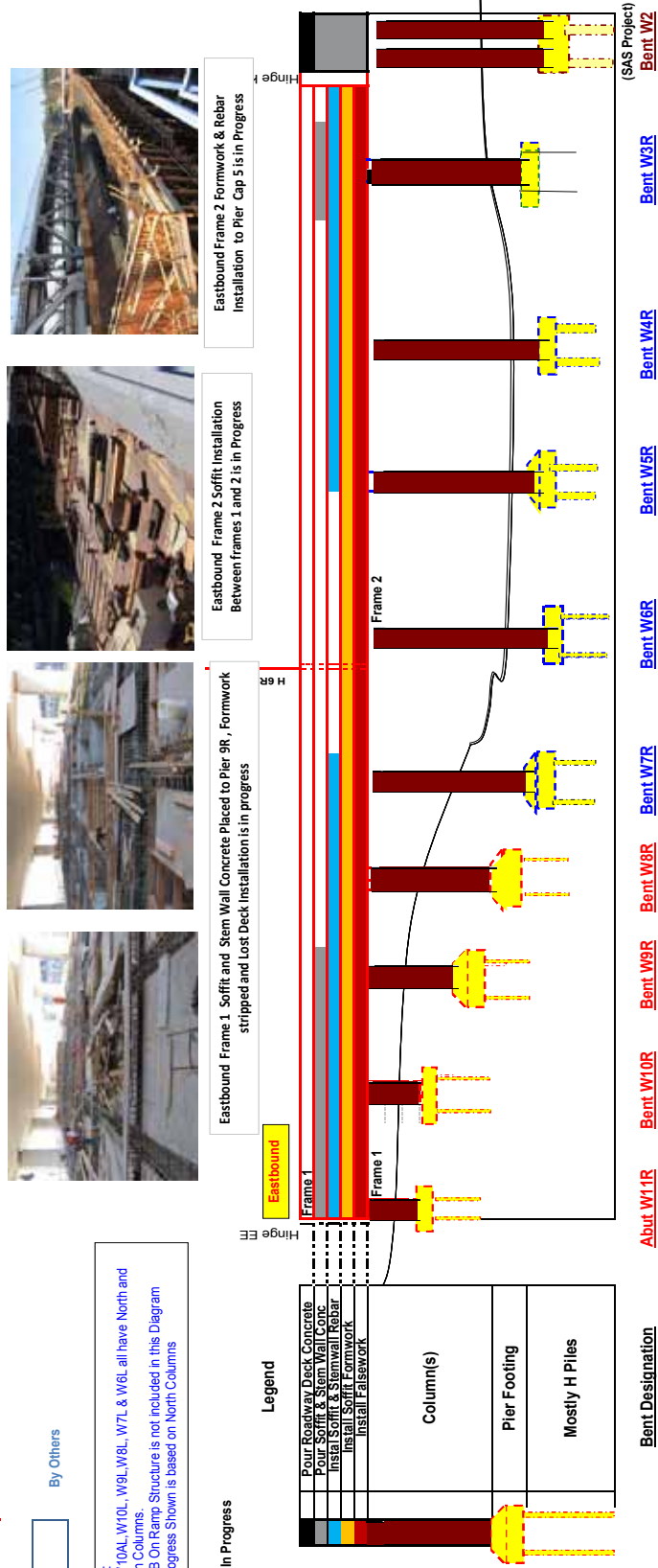
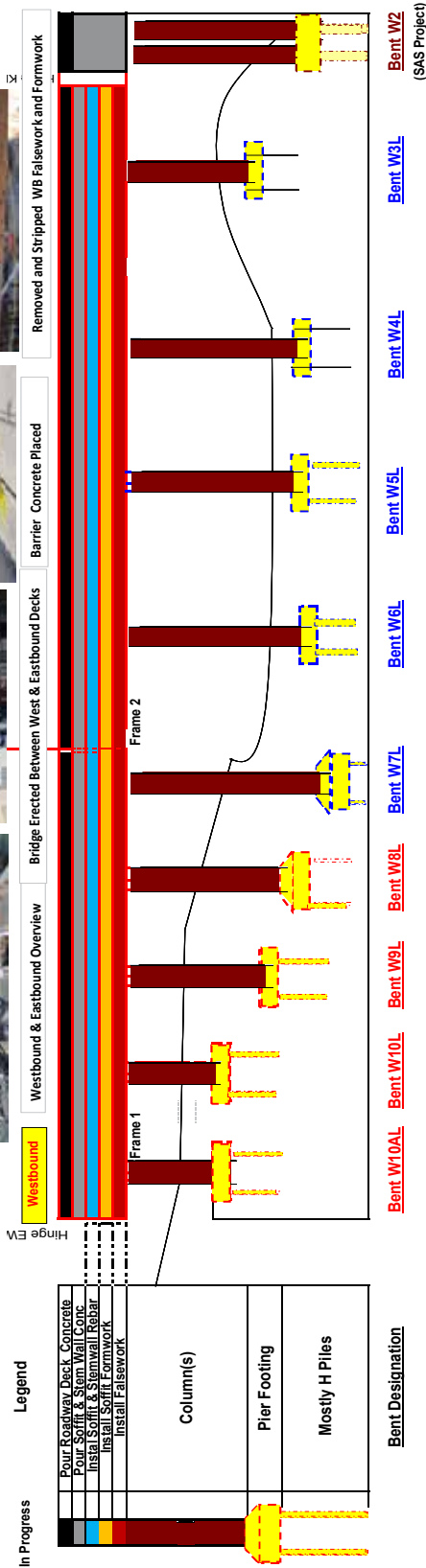
| Contract  | AB 144 / SB<br>66 Budget<br>(07/2005)   | Approved<br>Changes | Current<br>Approved<br>Budget<br>(04/2012) | Cost to Date<br>(04/2012) | Cost<br>Forecast<br>(04/2012) | At-<br>Completion<br>Variance |
|---|---|---------------------|--|---------------------------|-------------------------------|-------------------------------|
| a   | c   | d                   | e = c + d                                  | f                         | g                             | h = g - e                     |
| US 101/University Avenue Interchange Modification |   |                     |  |                           |                               |                               |
| 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   | 64.7                | 423.0                                      | 419.4                     | 423.0                         | -                             |
| Subtotal BATA Capital Outlay Construction         | 1,569.8   | 217.5               | 1,787.3                                    | 1,753.8                   | 1,787.3                       | -                             |
| Subtotal Capital Outlay Right-of-Way              | 42.5  | 6.2                 | 48.7                                       | 42.5                      | 48.7                          | -                             |
| Subtotal Non-BATA Capital Outlay Support          | 14.0  | 4.0                 | 18.0                                       | 17.5                      | 18.0                          | -                             |
| Subtotal Non-BATA Capital Outlay Construction     | 92.4  | 9.5                 | 101.9                                      | 82.9                      | 102.0                         | 0.1                           |
| Project Reserves                                  | 35.6  | (8.1)               | 27.5                                       | -                         | 27.4                          | (0.1)                         |
| Total RM1 Program                                 | 2,112.6   | 293.8               | 2,406.4                                    | 2,316.1                   | 2,406.4                       | -                             |
| Notes:  | 1 Richmond-San Rafael Bridge Trestle, Fender, and Deck Joint Rehabilitation Includes Non-TBSRP Expenses for EA 0438U_ and 04157_            |                     |  |                           |                               |                               |
|   | 2 San Mateo-Hayward Bridge Widening includes EAs 00305_,04501_,04503_,04504_,04504_,04505_,04506_,04507_,04508_,04509_,27740_,27790_,04860_ |                     |  |                           |                               |                               |



Aerial View of Yerba Buena Island Transition Structure #1 Eastbound Progress

# Appendix D: Progress Diagrams Yerba Buena Island Transition Structures

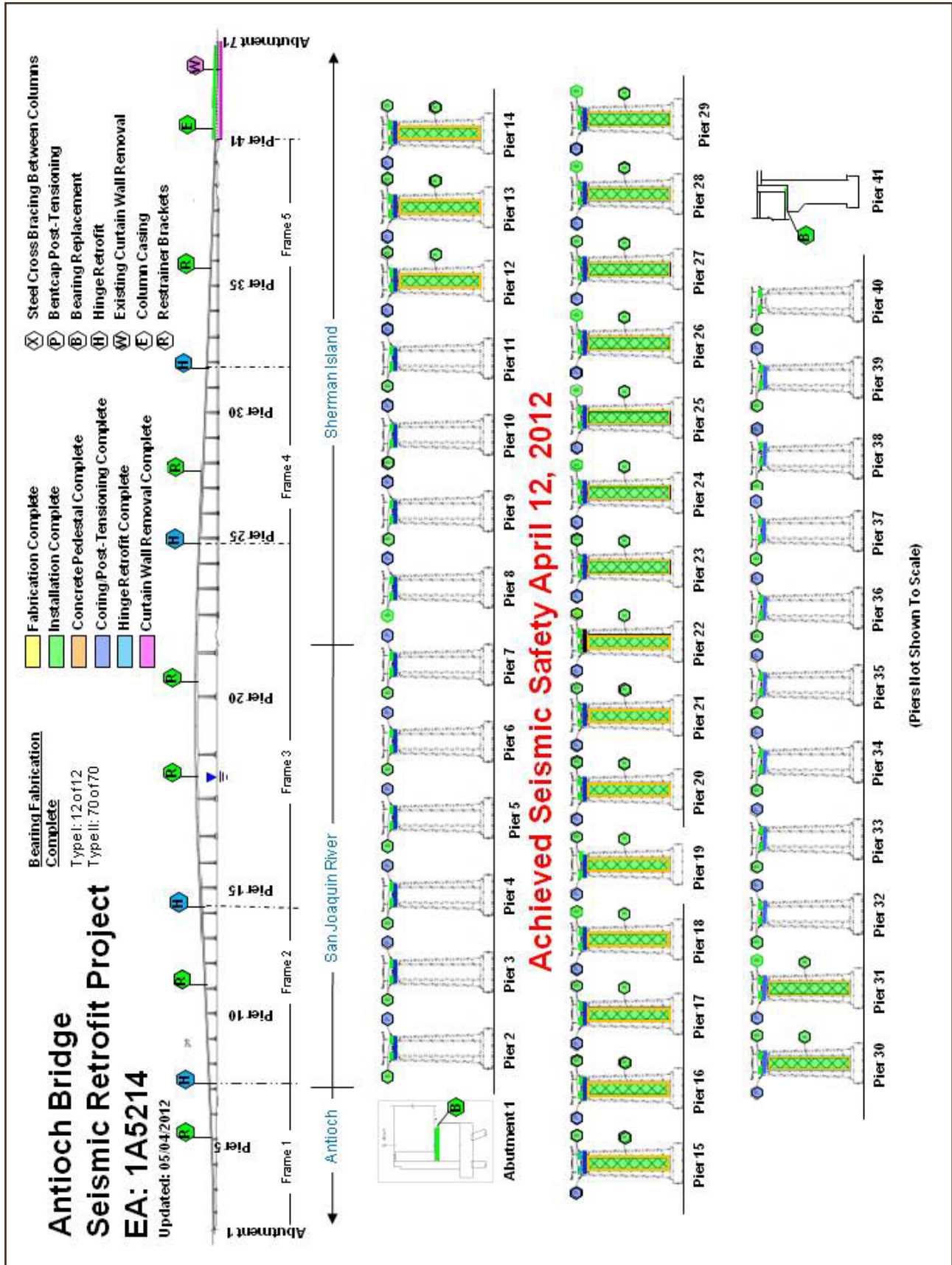
## SFOBB SEISMIC RETROFIT PROJECT YBITS #1 PROGRESS DIAGRAM as of April 24, 2012



**Note:**

- W10AL, W10L, W9L, W8L, W7L & W6L all have North and South Columns.
- EB On Ramp Structure is not included in this Diagram
- Progress Shown is based on North Columns

# Appendix D: Progress Diagrams (cont.) Antioch Bridge



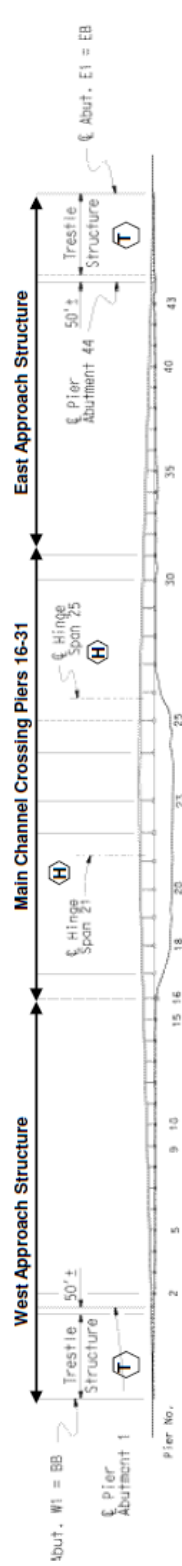
# Appendix D: Progress Diagrams (cont.) Dumbarton Bridge

## Dumbarton Bridge Seismic Retrofit Project EA: 04-1A5224

Updated: 02/03/2012

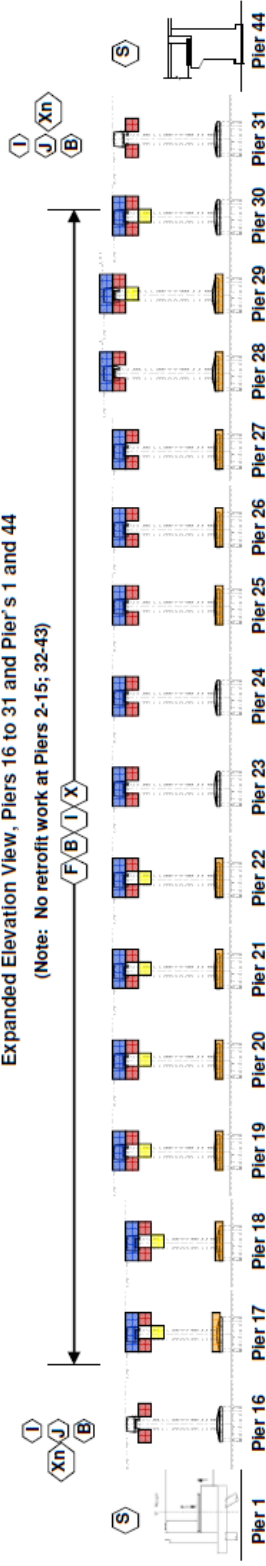
- Steel Cross Frame Complete
- Footing Overlay Complete
- Pier Cap Retrofit Complete
- Hinge Retrofit Complete
- Isolation Bearing Complete
- Trestle Piles Complete
- Trestle Bent Caps Complete
- Trestle Columns Complete
- Temp Platforms Installed
- Bearing Fabrication Status
- 70 of the total 96 complete

- Backwall Seat Retrofit
- Trestle Retrofit
- New Steel Cross Frame
- Pier Cap Retrofit
- Footing Overlay
- Isolation Bearing
- Steel Cross Frame Retrofit
- Hinge Retrofit
- Seismic Joint



### Expanded Elevation View, Piers 16 to 31 and Pier's 1 and 44

(Note: No retrofit work at Piers 2-15; 32-43)



(Piers Not Shown To Scale)

Removing Compaction Equipment from West Deviation Saddle Area







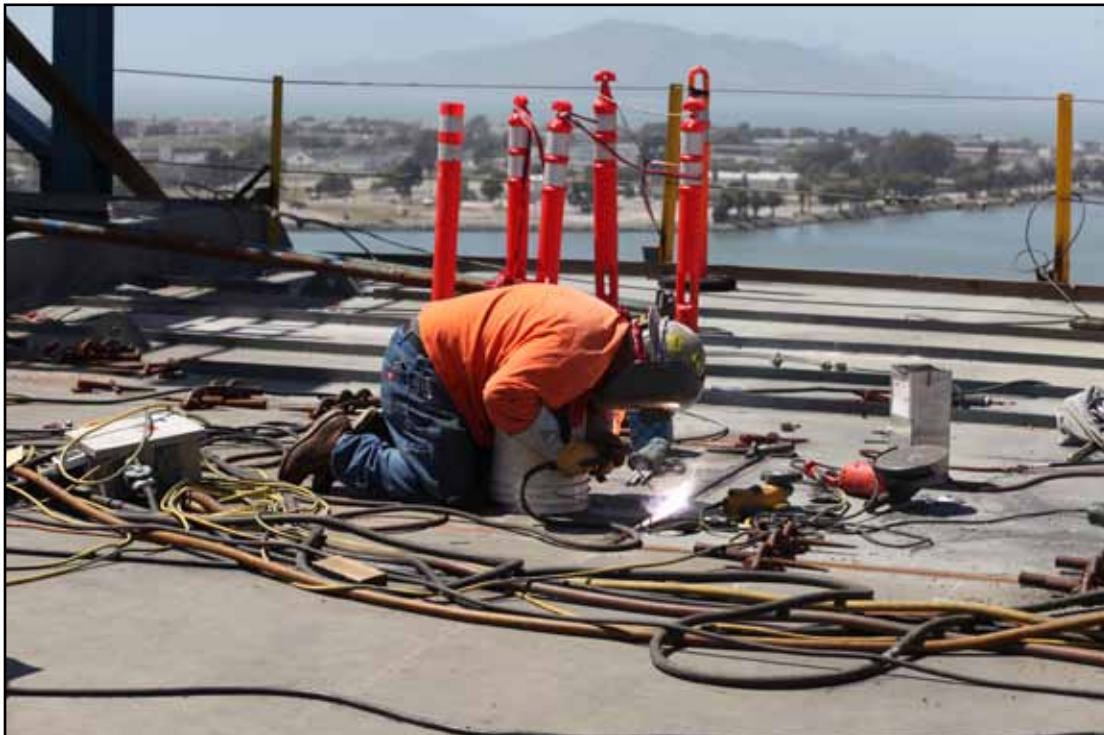
# Project Photos

## Appendix E: Project Progress Photographs

### Self-Anchored Suspension Bridge Field Work



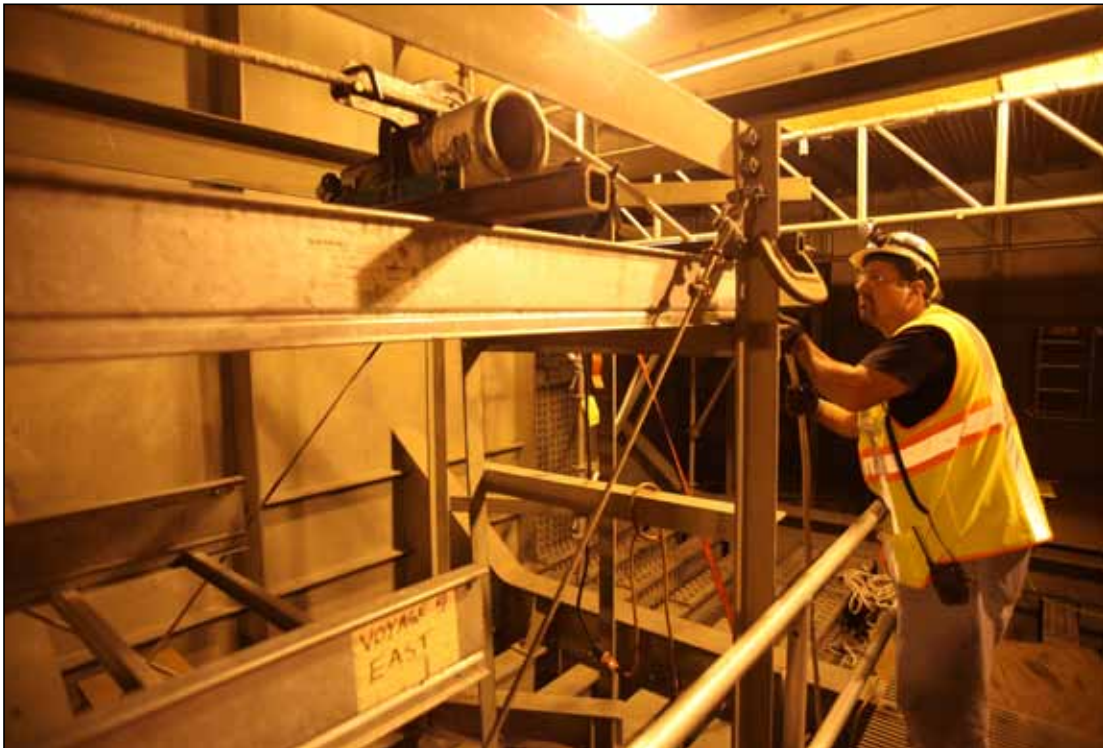
Verifying the Initial Length of the Cable Band Bolts on the West Loop



Welding Deck Plate over Parallel Wire Strand (PWS) Anchorage Area on Westbound Roadway Box



Compacting North Main span PWS Cable Near Completion at East Saddle



Pulling 600V Cable inside Eastbound Roadway Box



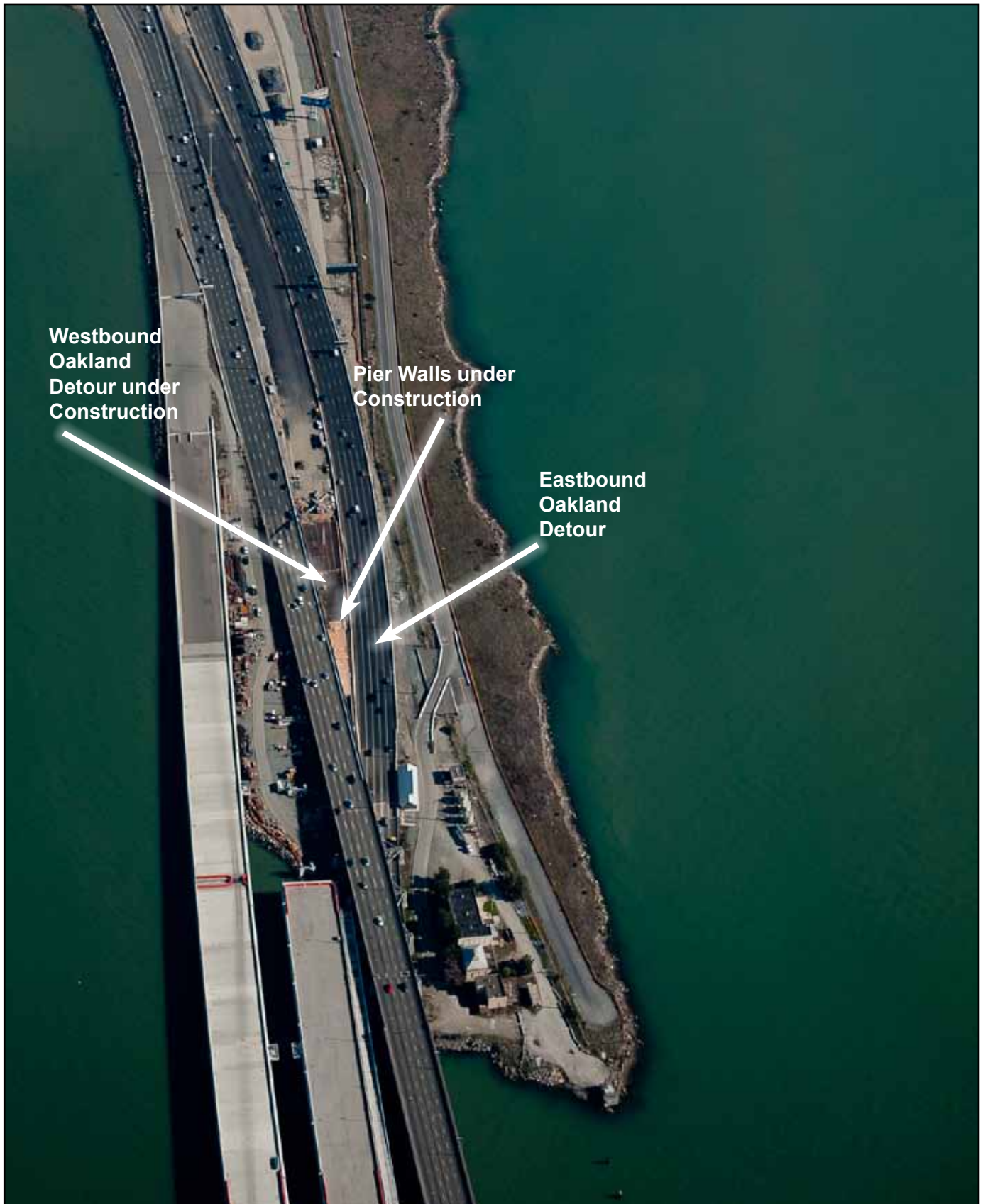
Dismantling South Main Span-Compactor



## Appendix E: Project Progress Photographs

### Westbound Oakland Detour

### Before Opening to Traffic



# After Opening to Traffic



Westbound Oakland Detour Construction Progress

## Appendix E: Project Progress Photographs

### Yerba Buena Island Transition Structure #1 Westbound



YBITS #1 Soffit Formwork and Rebar Installation in Progress



Stripping Stem Wall Forms on YBITS#1 Eastbound



YBITS #1 Westbound Roadway Deck Nearing Completion

## Appendix E: Project Progress Photographs

### Antioch Bridge



Antioch Bridge - Pier 41 Girders on Temporary Jacks prior to Installation of Isolation Bearings



Antioch Bridge - Welding of Jacking Stiffeners at Existing Girder Web

## Appendix E: Project Progress Photographs Dumbarton Bridge



Dumbarton Bridge - Ravenswood Pier Staging for Footing Overlay Work



Dumbarton Bridge - Pier 26 Footing Overlay - All Footing Overlay Completed Except Piers 23 & 24

## Appendix F: Glossary of Terms

# Glossary of Terms

**AB 144/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.

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

**APPROVED CHANGES:** For cost, changes to the AB 144/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.

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

**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.

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

**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.

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

**CURRENT APPROVED BUDGET:** The sum of the AB 144/SB 66 Budget or BATA Budget and Approved Changes.

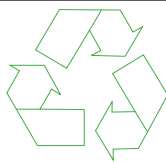
**HINGE PIPE BEAMS:** Pipes between roadway sections designed to move within their sleeves during expansion or contraction of the decks during minor events, such as changes in temperature. The beams are designed to absorb the energy of an earthquake by deforming in their middle or “fuse” section. Hinge pipe beams are also found at the western piers where the SAS connects to the YBITS (Hinge “K” pipe beams).

**PROJECT COMPLETE CURRENT APPROVED SCHEDULE:** The sum of the AB 144/SB 66 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.



100% Recyclable

This document, including the coil binding, is 100% recyclable

*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.*

**URS**

Bay Area Management Consultants  
An Association of URS Corporation and Hatch Mott Macdonald



Hatch Mott  
MacDonald



Parallel Wire Strands on North Main Span Looking West towards the Self-Anchored Suspension Bridge Tower



