

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

**2011 Third Quarter  
Project Progress and  
Financial Update**



**TOLL BRIDGE PROGRAM  
OVERSIGHT COMMITTEE**

CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

**Released: November 2011**

View from the Top of the Backspan Catwalk Looking West over Yerba Buena Island Transition Structure Contract #1 on the right and the Yerba Buena Island Detour on the left







## TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

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

November 8, 2011

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

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

Dear Messrs Schmidt and Wilson:

The Toll Bridge Program Oversight Committee (TBPOC) is pleased to submit the 2011 Third Quarter Project Progress and Financial Update for the San Francisco Bay Area Toll Bridge Seismic Retrofit and Regional Measure 1 Programs, prepared pursuant to California Streets and Highways Code Section 30952.

The TBPOC is tasked to perform project oversight and control over the Toll Bridge Seismic Retrofit Program (TBSRP) and is comprised of the Director of the Department of Transportation (Caltrans), the Executive Director of the Bay Area Toll Authority (BATA), and the Executive Director of the California Transportation Commission (CTC). This third quarter report includes project progress and activities for the Toll Bridge Seismic Retrofit Program through September 30, 2011 with more recent accomplishments addressed in this letter.

On October 28, 2011, a crucial milestone on the San Francisco-Oakland Bay Bridge East Span Replacement Project was reached with the installment of the last steel roadway box that makes the long-awaited connection between the signature Self-Anchored Suspension Span (SAS) to the already completed Skyway viaduct. Along with the placement of the main tower cable saddle last May, all critical structural steel segments of the SAS are now in place with only cable installation and load transfer remaining as critical steps to opening the new bridge to traffic.

While the main cable will be spun like on traditional suspension bridges, the cable of an SAS bridge is nontraditional as it anchors into the roadway, rather than the ground. Starting at the bridge's eastern end, the cable will travel up and over the double saddle to the western span, then loop back over the tower to anchor into the east end again. In a sign of further progress, orange catwalks have been erected from atop the tower to provide safe access for workers to install the main cable erection system with plans to start pulling strands of the main cable in December 2011.

While the installation of the last roadway box is a major step forward, we continue to be mindful of the challenges that remain and of our goal to open the new bridge to traffic as soon as possible. To those ends, we are working toward a "seismic safety opening" of the bridge before the end of 2013 with contract incentives and disincentives and selective acceleration of certain critical path activities. One acceleration activity will be realignment and widening of the eastern end of the existing bridge in Oakland to allow for both eastbound and westbound directions of the new bridge to open to traffic when the SAS is ready. The eastbound realignment opened as scheduled over the 2011 Memorial Day weekend without significantly impacting traffic. The westbound realignment is scheduled to open in early 2012 pending unforeseen delays due to weather.

Seismic retrofit work on the Dumbarton and Antioch bridges is also ongoing. On the Antioch Bridge, new seismic isolation bearings are now being installed to give the bridge more flexibility during an earthquake and new steel cross bracing is being fabricated and installed. We are pleased to report that this retrofit is forecast to achieve seismic safety in early 2012, ahead of schedule. On the Dumbarton Bridge, structural steel is being added to the bridge to strengthen it during the next large earthquake and to allow for the installation of new seismic isolation bearings.

As of the end of the third quarter of 2011, the 50 percent probable draw on program contingency is \$223 million. The potential draw ranges from \$110 million to \$310 million. The current \$308 million program contingency balance can be used to cover the costs of these 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.

Finally, we are pleased to announce relief for the over 235,000 daily commuters who use the State Route 92/Interstate 880 interchange in Hayward, thanks to the major reconstruction of the facility as the final project of Regional Measure 1 Toll Bridge Program by Caltrans and the Bay Area Toll Authority. On October 7, 2011, officials gathered to celebrate the completion of the \$245 million project that was nearly entirely funded from BATA toll bridge funds and completed within budget and without any construction delays.

The TBPOC is committed to providing the Legislature with comprehensive and timely reporting on the TBSRP. If there are any questions, or if any additional information is required, please do not hesitate to contact the members of the TBPOC.

Sincerely,



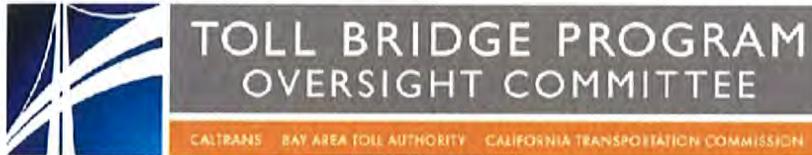
STEVE HEMINGER  
TBPOC Chair  
Executive Director  
Bay Area Toll Authority



BIMLA G. RHINEHART  
TBPOC Vice-Chair  
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California Transportation Commission



MALCOLM DOUGHERTY  
Acting Director  
California Department of Transportation



Toll Bridge Program Oversight Committee  
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Mr. Dario Frommer, Chair  
California Transportation Commission  
1120 N Street, Room 2221  
Sacramento, CA 95814

Mr. James C. Ghielmetti, Vice-Chair  
California Transportation Commission  
1120 N Street, Room 2221  
Sacramento, CA 95814

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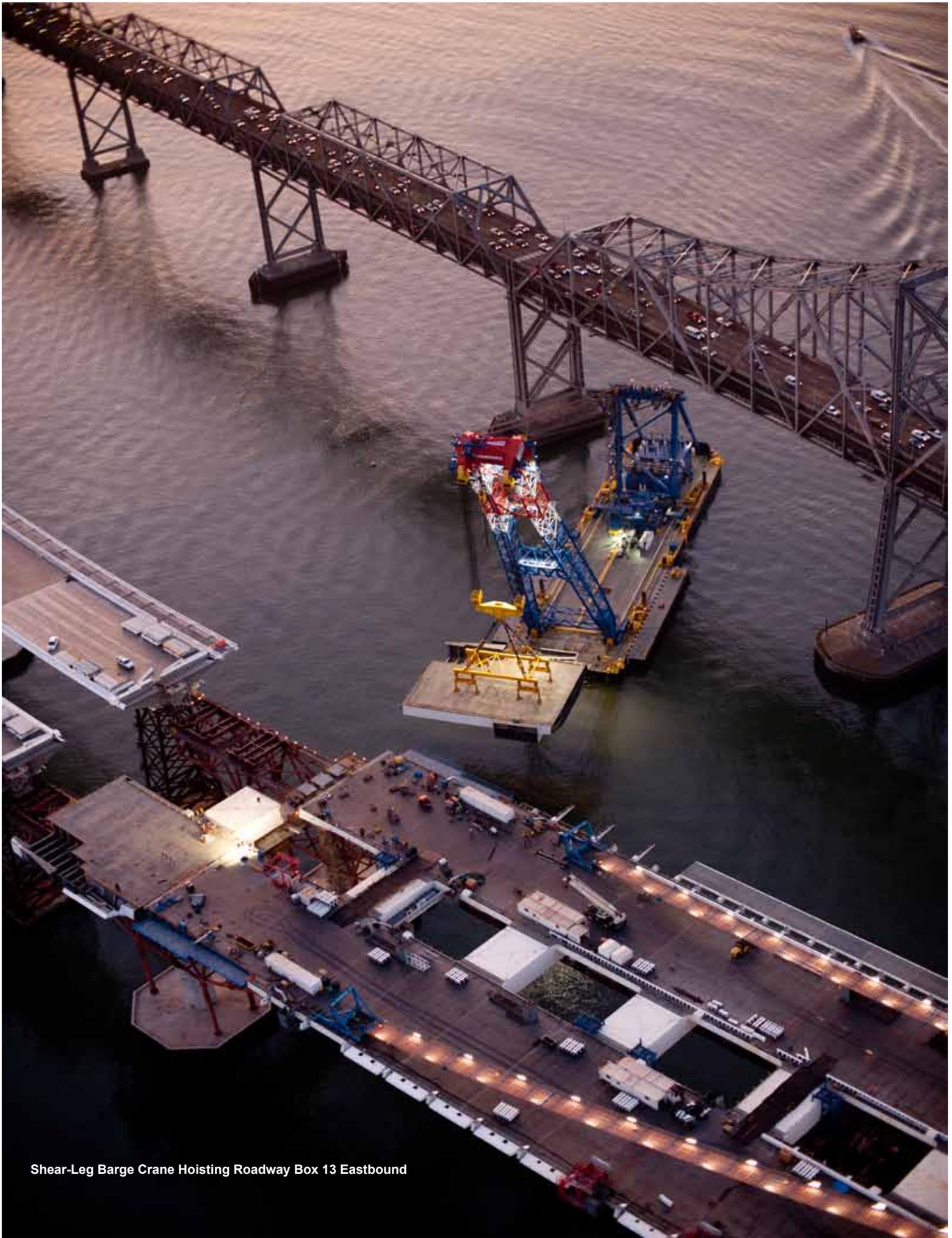
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Acting Director  
California Department of Transportation



Shear-Leg Barge Crane Hoisting Roadway Box 13 Eastbound

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

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

Regional Measure 1 Projects	Open to Traffic Status
Interstate 880/State Route 92 Interchange Reconstruction	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

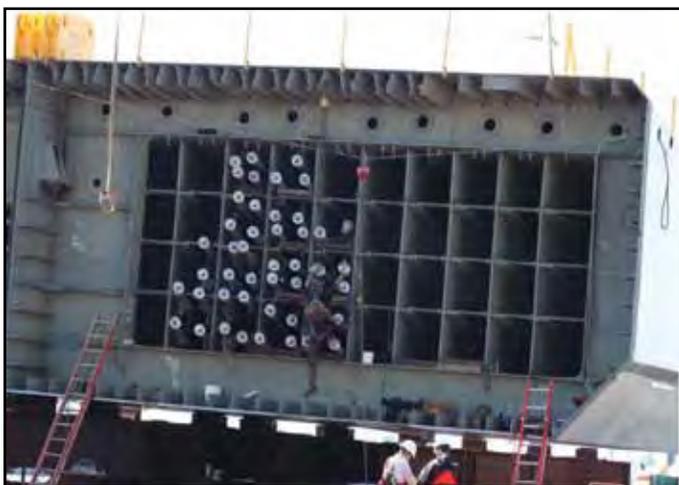
## SUMMARY OF MAJOR PROJECT HIGHLIGHTS, ISSUES, AND ACTIONS



Shear-Leg Barge Crane Hoisting Roadway Box 13 Eastbound for Installation



Cable Tramway and Roller System at top of Tower Saddle



Parallel Wire Strand Cable Anchorage Rods Installation in Roadway Box 14 Eastbound

### Toll Bridge Seismic Retrofit Program Risk Management

A major element of the 2005 AB144, 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.

As of the end of the third quarter of 2011, the 50 percent probable draw on program contingency is 223 million. The potential draw ranges from \$110 million to \$310 million.

The \$308 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 Superstructure 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). Significant progress is being made both in the Bay Area and around the world.

The structural elements of the main tower are now complete with the saddle in place. Just shy of its 525-foot apex, the signature tower will be crowned with a decorative head after the cable is installed early next year.

The first 26 of 28 steel roadway boxes were installed as of the end of September 2011. The remaining two roadway boxes arrived in the Bay Area on August 28, 2011 and will be installed in October 2011.

These boxes, fabricated in Shanghai, China, join other bridge components that have been arriving from around the country and the world. All bridge components undergo a rigorous quality review by the fabricator, ABF, and Caltrans to ensure that only bridge components that have been built in accordance to the specifications will be shipped. The TBPOC's goal is to open the bridge to traffic in both directions by December 2013.

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 1/2 - foot in diameter and nearly mile long main cable. The single cable is made up of 137 separate bundled strands which contain 127 individual pencil thin wires (see photo on page 26). Each of the 137 bundled strands will be individually pulled by a tramway system from the northeastern end of the bridge, up and over the tower, and around the west end of the bridge before returning over the tower and to the southeastern end of the bridge.

To pull the strands up and around the bridge, a tramway system, similar to a ski lift, will be used to support, pull and place the main cable during installation. Installation of this system has begun and will be ongoing throughout rest of the year. Cable strand installation is scheduled to start in December 2011.

## Yerba Buena Island Transition Structures #1 Contract

The YBITS#1 contract has been 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.

Work is focused on the westbound transition structure's substructure and superstructure from the tunnel to the Self-Anchored Suspension bridge as shown in the picture below.



YBITS #1 Westbound Span 3 Rebar Installation for Soffit and Stem Walls

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



Oakland Detour - Westbound Work in Progress

### 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 on May 30, 2011. The westbound detour is forecast to open in February in 2012. The detour will require a closure of the bridge. Staff will report with additional information when a date is determined.

### Oakland Touchdown #2 Contract

The OTD #2 contract for construction will be advertised in October 2011 and awarded in April 2012.



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

### Existing SFOBB Dismantling

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.

### 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. Staff has reported that work is progressing well and that seismic safety is forecast to be completed ahead of schedule by early 2012. See project progress on page 34.



Antioch Bridge - Last Cross Frames Being Installed at Piers 20 and 21

### Dumbarton Bridge Seismic Retrofit

The Dumbarton 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. See project progress on page 36.



Antioch Bridge - Cross Frames Installed between Bent Columns



Aerial View of the Recently Completed 92/880 Interchange Looking East



Recently Completed 92/880 Interchange

## TBSRP Capital Outlay Support

The capital outlay support (COS) budget, originally established as a part of AB 144 in 2005, was based on a schedule that assumed bridge opening in 2012. After the SAS contract was rebid, interested contractors requested an additional year to be added to the schedule. To ensure a competitive bidding pool, the TBPOC changed the approved schedule to reflect bridge opening in 2013, but delayed increasing the COS budget to cover the project extension with the belief that an accelerated early completion was still possible and that COS costs could be contained. Since that time, early completion has not materialized and the TBPOC has subsequently approved COS budget increases to be funded from the COS reserves set aside within the original program contingency for project extensions or delays. Opportunities to economize and reduce costs in this area will continue to be pursued. However, additional COS is forecast to be needed from the program contingency.

## TBSRP Programmatic Risks

This category includes risks that are not yet scoped within existing contracts and/or that spread across multiple contracts. The interdependencies between all of the contracts in the program result in the potential for one contract's delay to impact the entire program that are accounted for in the net programmatic risks.

## Regional Measure 1 Toll Bridge Program (RM1)

### Interstate 880/State Route 92 Interchange Reconstruction Project

On October 7, 2011, officials gathered to celebrate the completion of the \$245 million project that was almost entirely funded from BATA toll bridge funds and completed within budget and without any construction delays. This milestone provides relief to 235,000 daily commuters who use the State Route 92/Interstate 880 interchange in Hayward, thanks to the major reconstruction of the facility as the final project of Regional Measure 1 Toll Bridge Program by Caltrans and the Bay Area Toll Authority.

## Toll Bridge Seismic Retrofit Program Cost Summary

	Contract Status	AB 144/SB 66 Budget (August 2005)	TBPOC Approved Changes	Current TBPOC Approved Budget (September 2011)	Cost to Date (September 2011)	Current Cost Forecast (September 2011)	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	(38.9)	1,254.1	1,237.1	1,245.2	(8.9)	●
SAS Marine Foundations	Completed	313.5	(32.6)	280.9	274.8	278.6	(2.3)	●
SAS Superstructure	Construction	1,753.7	293.1	2,046.8	1,597.3	2,085.6	38.8	●
YBI Detour	Completed	131.9	360.9	492.8	465.9	482.8	(10.0)	●
YBI Transition Structures (YBITS)		299.3	(51.5)	247.8	60.9	308.4	60.6	●
YBITS 1	Construction			185.5	60.9	226.8	41.3	●
YBITS 2	Design			59.0	-	78.3	19.3	●
YBITS Landscaping	Design			3.3	-	3.3	-	●
Oakland Touchdown (OTD)		283.8	55.2	339.0	208.7	333.9	(5.1)	●
OTD 1	Completed			212.0	202.9	203.3	(8.7)	●
OTD 2	Design			62.0	-	58.1	(3.9)	●
Detour	Construction			51.0	-	58.5	7.5	●
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	-	244.3	5.2	●
*Cantilever Section	Design			-	-	61.4	-	
*504/288 Sections	Design			-	-	182.9	-	
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	218.0	1,177.3	998.8	1,275.1	97.8	●
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>804.1</b>	<b>6,290.7</b>	<b>5,002.6</b>	<b>6,450.7</b>	<b>160.0</b>	
<b>Antioch Bridge Seismic Retrofit</b>								
Capital Outlay Construction and Mitigation	Construction		70.0	70.0	35.9	51.2	(18.8)	●
Capital Outlay Support			31.0	31.0	20.6	34.7	3.7	●
<b>Total Antioch Bridge Seismic Retrofit</b>		<b>-</b>	<b>101.0</b>	<b>101.0</b>	<b>56.5</b>	<b>85.9</b>	<b>(15.1)</b>	
<b>Dumbarton Bridge Seismic Retrofit</b>								
Capital Outlay Construction and Mitigation	Construction		92.7	92.7	18.1	87.7	(5.0)	●
Capital Outlay Support			56.0	56.0	28.9	57.7	1.7	●
<b>Total Dumbarton Bridge Seismic Retrofit</b>		<b>-</b>	<b>148.7</b>	<b>148.7</b>	<b>47.0</b>	<b>145.4</b>	<b>(3.3)</b>	
<b>Other Program Projects</b>		<b>2,268.4</b>	<b>(64.6)</b>	<b>2,203.8</b>	<b>2,161.7</b>	<b>2,192.2</b>	<b>(11.6)</b>	●
Miscellaneous Program Costs		30.0	-	30.0	25.5	30.0	-	●
Net Programmatic Risks		-	-	-	-	93.2	93.2	●
Program Contingency		900.0	(592.2)	307.8	-	84.6	(223.2)	●
<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>7,293.3</b>	<b>9,082.0</b>	<b>-</b>	

## Toll Bridge Seismic Retrofit Program Schedule Summary

	AB144/SB 66 Project Completion Schedule Baseline (July 2005)	TBPOC Approved Changes (Months)	Current TBPOC Approved Completion Schedule (September 2011)	Current Completion Forecast (September 2011)	Schedule Variance (Months)	Schedule Status	Remarks/Notes
	g	h	i=g+h	j	k=j-i	l	
<b>SFOBB East Span Seismic Replacement</b>							
<b>Contract Completion</b>							
Skyway	Apr 2007	8	Dec 2007	Dec 2007	-	●	See Page 28
SAS Marine Foundations	Jun 2008	(5)	Jan 2008	Jan 2008	-	●	See Page 18
SAS Superstructure	Mar 2012	29	Aug 2014	Aug 2014	-	●	See Page 22
YBI Detour	Jul 2007	41	Dec 2010	Oct 2010	(2)	●	See Page 15
YBI Transition Structures (YBITS)	Nov 2013	12	Nov 2014	Mar 2015	4		See Page 16
YBITS 1			Sep 2013	Dec 2013	3	●	
YBITS 2			Nov 2014	Mar 2015	4	●	
YBITS Landscaping			TBD	TBD	-	●	
Oakland Touchdown	Nov 2013	12	Nov 2014	Nov 2014	-		See Page 29
OTD 1			Jun 2010	Jun 2010	-	●	
OTD 2			Nov 2014	Nov 2014	-	●	
OTD Electrical Systems			TBD	TBD	-	●	
Submerged Electric Cable			Jan 2008	Jan 2008	-	●	
Existing Bridge Demolition	Sep 2014	12	Sep 2015	Dec 2015	3	●	
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	Dec 2013	-	●	
Eastbound Seismic Safety Open	Sep 2012	15	Dec 2013	Dec 2013	-		
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			Aug 2012	May 2012	(3)	●	See Page 34
<b>Dumbarton Bridge Seismic Retrofit</b>							
Contract Completion			Sep 2013	Sep 2013	-	●	See Page 36

- 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
- (1) Figures may not sum up to totals due to rounding effects.  
(2) Construction administration of the OTD Detour is under the YBITS#1 contract.

## Regional Measure 1 Program Cost Summary

	Contract Status	BATA Baseline Budget (July 2005)	BATA Approved Changes	Current BATA Approved Budget (September 2011)	Cost to Date (September 2011)	Current Cost Forecast (September 2011)	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	Construction	94.8	68.4	163.2	145.3	163.2	-	●
Capital Outlay Support		28.8	35.8	64.6	60.9	64.6	-	●
Capital Outlay Right-of-Way		9.9	7.3	17.2	14.6	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>220.8</b>	<b>245.0</b>	-	
Other Completed Program Projects		1,978.8	182.6	2,161.4	2,088.5	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>2,309.3</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

	BATA Baseline Completion Schedule (September 2005)	BATA Approved Changes (Months)	Current BATA Approved Completion Schedule (September 2011)	Current Completion Forecast (September 2011)	Schedule Variance (Months)	Schedule 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 50

View from below the Self-Anchored Suspension Bridge Tower and Catwalks





# 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 parallel, 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.



Architectural Rendering of the New East Span of the San Francisco-Oakland Bay Bridge



# TOLL BRIDGE SEISMIC RETROFIT PROGRAM

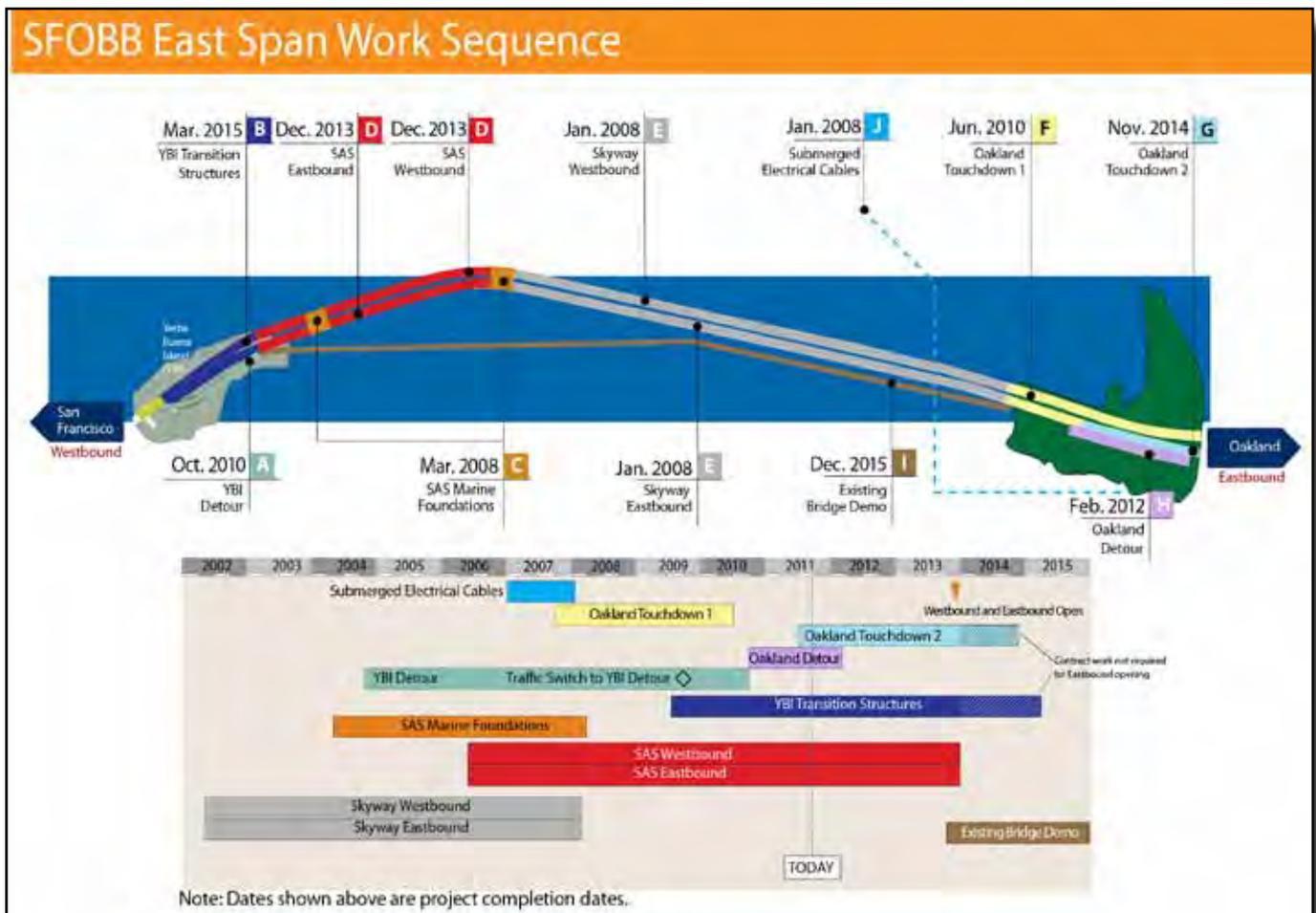
## San Francisco-Oakland Bay Bridge East Span Replacement Project Summary

The new East Span bridge can be split into four major components—the Skyway and the Self-Anchored Suspension bridge in the middle and the Yerba Buena Island Transition Structures and Oakland Touchdown approaches at either end. Each component is being constructed by one to three separate contracts that 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 Bay Bridge's seismic retrofit projects, crews must build the Yerba Buena Island Transition Structures (YBITS) without disrupting traffic. To accomplish this task, YBID eastbound and westbound traffic was shifted off the existing roadway and onto a temporary detour on Labor Day weekend 2009. Drivers will use this detour, just south of the original roadway, until traffic is moved onto the new East Span.

#### A YBID Contract

Contractor: C.C. Myers, Inc.

Approved Capital Outlay Budget: \$492.8 M

Status: 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. Due to the re-advertisement of the SAS Superstructure contract in 2005 because of a lack of funding at the time, the bridge opening was rescheduled to 2013. To better integrate the contract into the current East Span schedule and to improve seismic safety and mitigate future construction risks, the TBPOC has approved a number of changes to the contract, including adding the deck replacement work near the tunnel that was rolled in place over Labor Day weekend 2007, advancing future transition structure foundation work and making design enhancements to the temporary detour structure. These changes have increased the budget and forecast for the contract to cover the revised project scope and reduce project risks.

**Status:** Completed.



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

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

Contractor: MCM Construction, Inc.

Approved Capital Outlay Budget: \$185.5 M

Status: 30% Complete as of September 2011

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:** Construction of the eastbound and westbound footings and columns is complete. Work continues on frames 1 and 2 westbound formwork, rebar installation and concrete placement for the stem walls and soffit. The eastbound falsework fabrication is scheduled to start in October 2011.

#### YBITS #2 Contract

Contractor: TBD

Approved Capital Outlay Budget: \$59.0 M

Status: In Design

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

#### YBITS Landscaping Contract

Contractor: TBD

Approved Capital Outlay Budget \$3.3M

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 Westbound Falsework Looking West



Overview of the Yerba Buena Island Westbound Transition Structure on right and Yerba Buena Island Temporary Detour on left

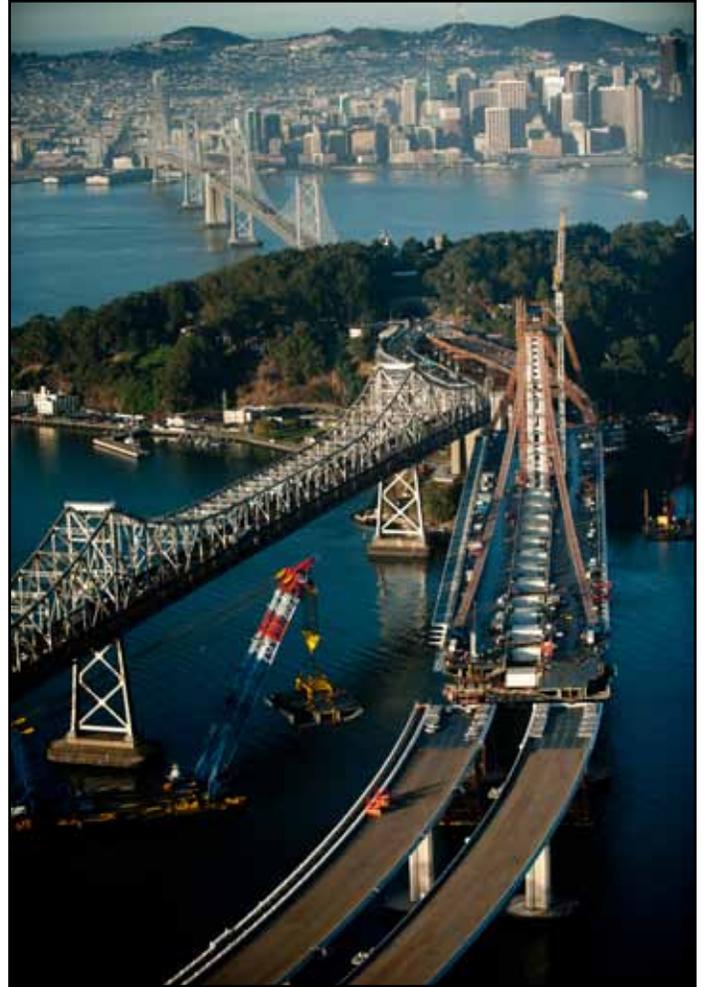


## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### 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.



Aerial View of the Self-Anchored Suspension Bridge with Shear-Leg Crane Barge Hoisting Roadway Box 13 Eastbound for Installation

#### SAS Land Foundation Contract

Contractor: West Bay Builders, Inc.  
Approved Capital Outlay Budget: \$26.4 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: \$280.9 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: 78% Complete as of September 2011

The SAS bridge is not just another suspension bridge. Rising 525 feet above mean sea level and embedded in rock, 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, there will actually only be 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

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

**Status:** Foundations and temporary support structures were completed in mid-September 2010.



Step 1

#### STEP 2 - INSTALL ROADWAYS

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

**Status:** Twenty-six of 28 roadway boxes have been erected as of the end of September. Eighteen crossbeams have been installed between the roadway boxes. Roadway boxes 13 and 14 eastbound and westbound arrived at Pier 7 in Oakland on August 28, 2011. Erection of the bike path decks on the eastbound is ongoing and service platforms, barriers, and traveler rails continues on the eastbound and westbound roadway decks. Roadway boxes 14 east and west are forecast for installation in October 2011.



Step 2

#### STEP 3 - INSTALL TOWER

Each of the four legs of the tower will be erected in four separate lifts. The four tower lifts, the grillage and the tower head will be installed using a temporary erection tower and lifting jacks.

**Status:** The tower legs, grillage and saddle have been installed. The tower head is on site and will be erected after the cables have been installed in May 2012. Tower pull-back strands were anchored to the top of the tower in September 2011. Catwalks have been anchored to the top of the tower in preparation for cable installation in early December 2011.



Step 3



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

The main cable will be pulled from the east end of the SAS bridge, over the tower, and wrapped around pier W2 before returning back over the tower to the east end of the SAS bridge deck. Suspenders cables will be added to lift the roadway decks off the temporary support structure.

**Status:** Cable installation is pending the erection of the cable temporary works and completion of roadway spans. All cables have been fabricated and stored in the warehouse at Pier 7 in Oakland. The catwalks have been installed on the SAS tower to provide safe access for workers who are installing the hauling and tramway systems that will pull the main cable for installation. The cable-pull test is scheduled for mid-October 2011.



Step 4

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

The new bridge will now open simultaneously in both the westbound and eastbound directions.

**Status:** The westbound and eastbound opening is forecast for December 2013.



Step 5



Aerial View of Current Progress on the Self-Anchored Suspension Bridge



## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

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

#### *Roadway and Tower Segments*

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

All components undergo a rigorous quality review by ZPMC, ABF, and Caltrans to ensure that only bridge components that have been built according to contract specifications will be shipped.

**Roadway Box Fabrication Status:** As shown in the diagram to the right, roadway boxes 1 through 14 east and west have been fabricated and delivered to the job site. Roadway boxes 13 and 14 arrived at Pier 7 on August 28, 2011.

**Tower Fabrication Status:** All tower components have been fabricated and were delivered to the job site in June 2012.

#### *Cables and Suspenders*

One continuous main cable will be used to support the roadway deck of the SAS bridge. The main cable will be anchored within the westbound roadway box at the east end of the SAS near pier E2, then extend west over the northeast saddle towards the tower saddle at T1. It will then loop around pier W2 westbound deviation saddle, extend through the jacking beam saddle and extend around the eastbound deviation saddle at W2 over the tower saddle at T1 again to the south east saddle and finally anchor within the eastbound roadway box near pier E2. The main cable is made up of 137 bundles of wire strands and a number of smaller suspender ropes will connect the roadway decks to the main cable.

**Status:** All main cable strands have been fabricated and delivered to the job site and stored at Pier 7 in Oakland. The cable bands are in fabrication and forecast to be completed in fall of 2011. The suspender ropes are in fabrication and forecast to be completed in October 2011.



Off Loading the Final Four Roadway Boxes at Pier 7 in Oakland

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

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

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

**Status:** The Hinge K pipe beams have been fabricated and installed. Hinge A seismic expansion joints are in fabrication and are currently scheduled for completion in December 2011. The SAS traveler rails and the Skyway bike path railings and crushable zone are in fabrication and are forecast for completion in October 2011. The anchor rods have been fabricated and shipped and are forecast for installation in roadway boxes 14 east and west in October 2011.



## Self-Anchored Suspension (SAS) Superstructure Roadway and Tower Box Installation Activities

Upon arrival in Oakland, the steel roadway and tower sections are off-loaded directly from the transport ship onto barges to await installation atop the temporary support structures. Steel roadway boxes will be installed from west to east. Due to the shallow waters near Yerba Buena Island, the eastbound lanes on the south side of the new bridge will be installed first, then to be followed by the westbound lanes. In total, there are 28 roadway boxes (14 in each direction) that range from 560 to 1660 tons and from 80 to 230 feet long.

The tower comprises four legs, each made up of four tower lifts that make up the majority of the height of the tower, the tower grillage, and finally the tower head.

**Status:** Twenty-six of 28 roadway boxes have been erected to form a continuous roadway as of the end of September 2011. Painting, welding and bolting continues on all roadway boxes. All four tower legs along with the tower grillage and the tower saddle have been installed as of mid-May 2011. As of the end of September, roadway boxes 13 eastbound and westbound were lifted into place. Roadway box 14 eastbound and westbound and crossbeam 19 are forecast for erection in October 2011.





The Shear-Leg Barge Crane Hoisting Roadway Box 13 Eastbound



## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### *Self-Anchored Suspension (SAS) Superstructure Cable Installation Activities*

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 1/2 - foot in diameter and nearly mile long main cable. The single cable is made up of 137 separate bundled strands which contain 127 individual pencil thin wires. Each of the 137 bundled strands will be individually pulled by a tramway system from the northeastern end of the bridge, up and over the tower, and around the west end of the bridge before returning over the tower and to the southeastern end of the bridge.

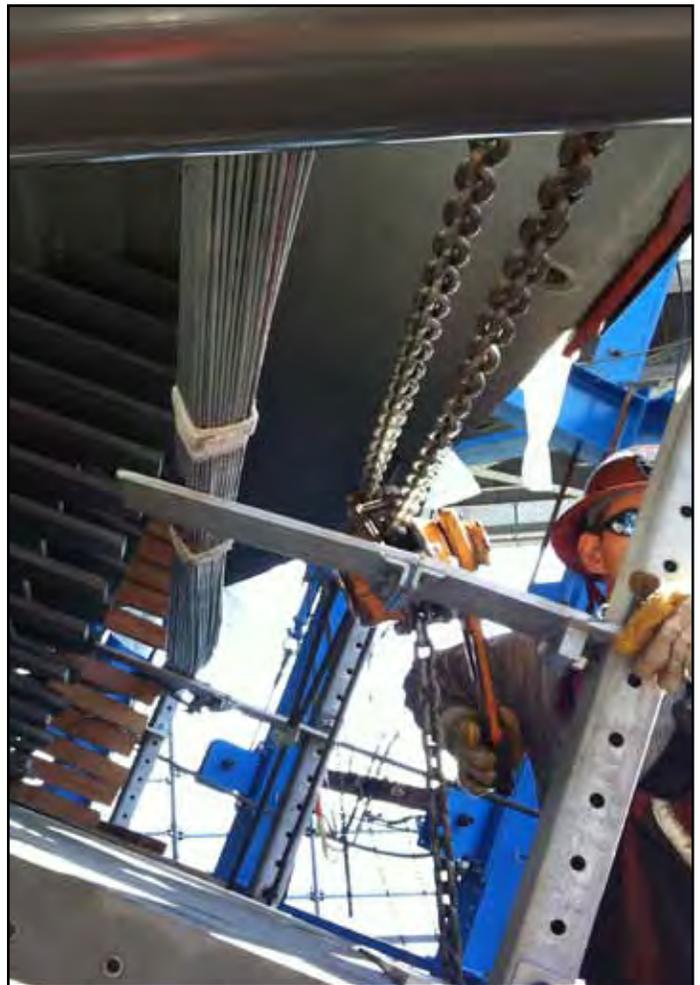
**Status:** Workers installed the orange-colored 12-foot-wide catwalks from the roadway to the top of the tower in August 2011. The catwalks provide workers with safe access during the installation of the hauling system, tramway system and main cable strands.

Because the bridge is asymmetric with a longer span to the east than to the west, the tower will be pulled back 20 inches to the west so that the tower will return to a plumb position when the weight of the heavier east side of the bridge is transferred to the main cable. The tower pull back was completed in September 2011.

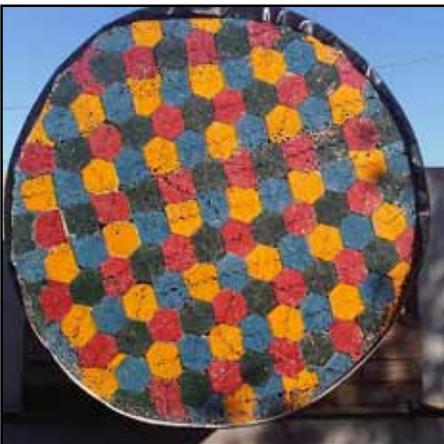
To pull the strands up and around the bridge, a tramway system, similar to a ski lift, will be used to support, pull and place the main cable during installation. Installation of this system has begun and will be ongoing throughout the rest of the year. Cable strand installation is scheduled to start in December 2011.



Self-Anchored Suspension Bridge Tower Saddle Area with Cable Tramway and Cable Installation Rollers in Place



Fitting Parallel Wire Test Strand (PWS) into the Jacking Saddle

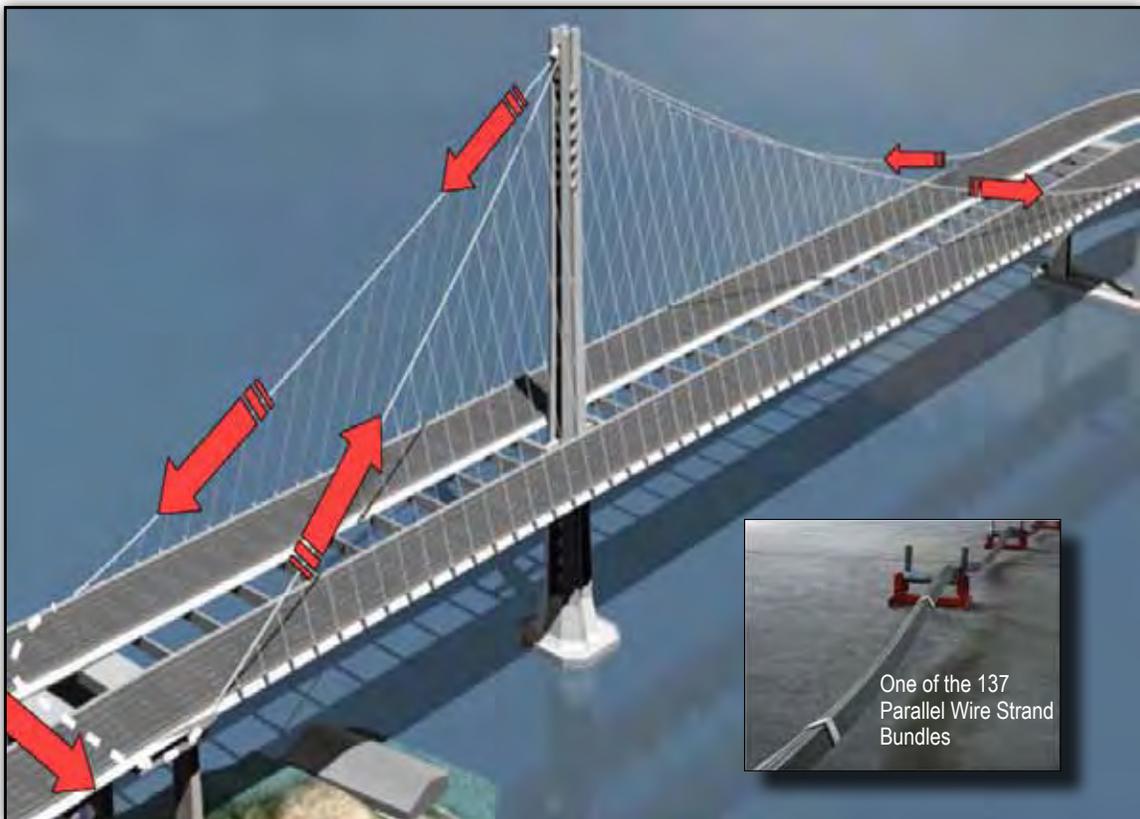


Sample of Cable Band Compaction Testing Performed at Pier 7 in Oakland





One Parallel Wire Cable Test Strand Being Hauled in Tramway System for Testing



Rendering of the Cable Pull Direction

## 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 March 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 new side-by-side decks of the new East Span. For westbound drivers, the OTD will be their introduction to the graceful new East Span. For eastbound drivers from San Francisco, this section of the bridge will carry them from the Skyway to the East Bay, offering unobstructed views of the Oakland hills.

The Oakland Touchdown (OTD) approach structures to the Skyway will be constructed in three phases. The first phase, constructed on the OTD #1 contract, built the new westbound approach structure. Due to physical constraints with the existing bridge, OTD #1 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 will construct 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: TBD

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 December 2013.

**Status:** 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. OTD #2 is currently in design and the contract for construction will be advertised in November 2011 and awarded in February 2012.



Oakland Touchdown #1 Eastbound Piers with Westbound in Background

## H Oakland Detour

Contractor: MCM Construction, Inc.  
 Approved Capital Outlay Budget: \$51.0 M  
 Status: **In Construction**

To ensure a simultaneous eastbound and westbound opening of the bridge by December 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 foundations are in progress and the westbound detour is forecast to be completed in early 2012 pending weather or construction delays.



Oakland Detour Lead Abatement Completed



Straddle Foundations Poured and Formwork Stripped



Aerial View of the Newly Opened Eastbound Oakland Detour with the EBMUD Outfall Crossing Structure on the right, the Relocated Clear Channel Sign and the Westbound Oakland Detour under Construction



Westbound Foundation Wall Formwork



## I Existing East Span Bridge Demolition

Contractor: TBD

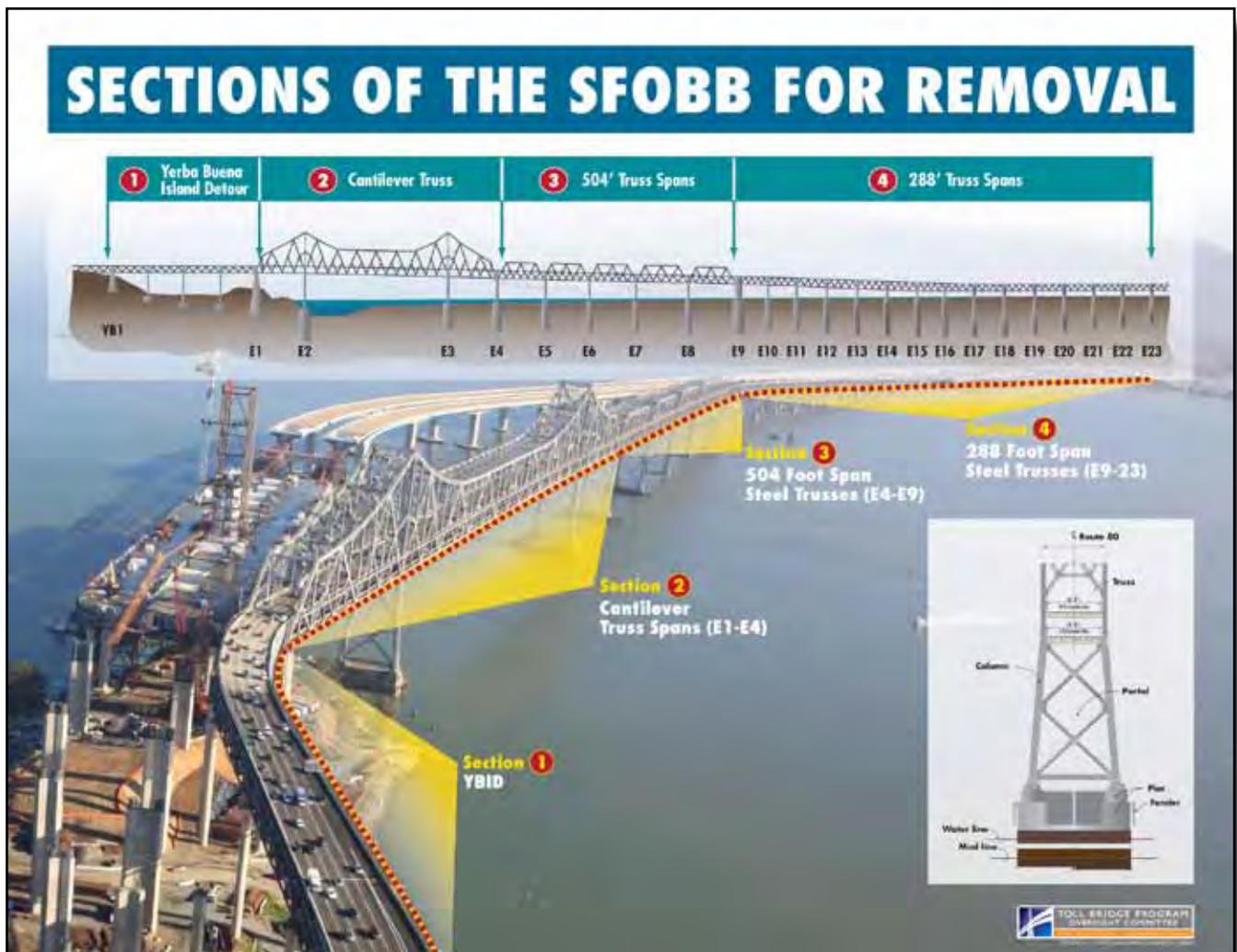
Approved Capital Outlay Budget: \$239.1 M

Status: In Design

Design work on the demolition of the existing bridge has started. The current plan is to complete the environmental clearance by December 2011 and obtain all permits by June 2012. 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 east span of the bridge will be 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 is projected to start in November 2012.



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



## 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 of 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: \$9.3 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: \$70.0 M

Status: 82% Complete as of September 2011

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:** Staff has reported that work is progressing well and that seismic safety is forecast to be completed ahead of schedule by the early 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 made ready for delivery. Fifty six bearings (68% complete) have been installed at 28 of the 41 piers.

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 all cross bracing has been completed at 20 piers. Field painting of the cross bracing is the last major activity of completing the pier retrofit. Fourteen of the 20 are completed. It is anticipated that all cross frames will be painted prior to the rainy season.

Columns located on Sherman Island are being strengthened with steel column casing jackets. Column casing installation started in September 2011 and all the remaining curtain walls have been removed at the approach.

In addition to the retrofit work, the bridge is being instrumented to provide ground and structure motion information during future seismic event. Seismic monitoring equipment is being installed at 250, 160, 80, 50, 20 and 4 feet below the ground surface.



Completed Cross Frames on Sherman Island



Fiona the Peregrine Falcon Hunting from a Pier on the Antioch Bridge



Removal of Curtain Wall



Installation of Web Stiffeners at Jacking Point, Pier 22

## Dumbarton Bridge Seismic Retrofit Project

Contractor: Shimmick Construction Company, Inc.

Approved Capital Outlay Budget: \$92.7 M

Status: 28% Complete as of September 2011

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 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 so isolation bearings can 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" 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 12 of the 14 locations. Concrete has been placed at 5 of 16 piers. The installation of jacking frames is complete at piers 17. Welding is ongoing at piers 18, 19 and 20.

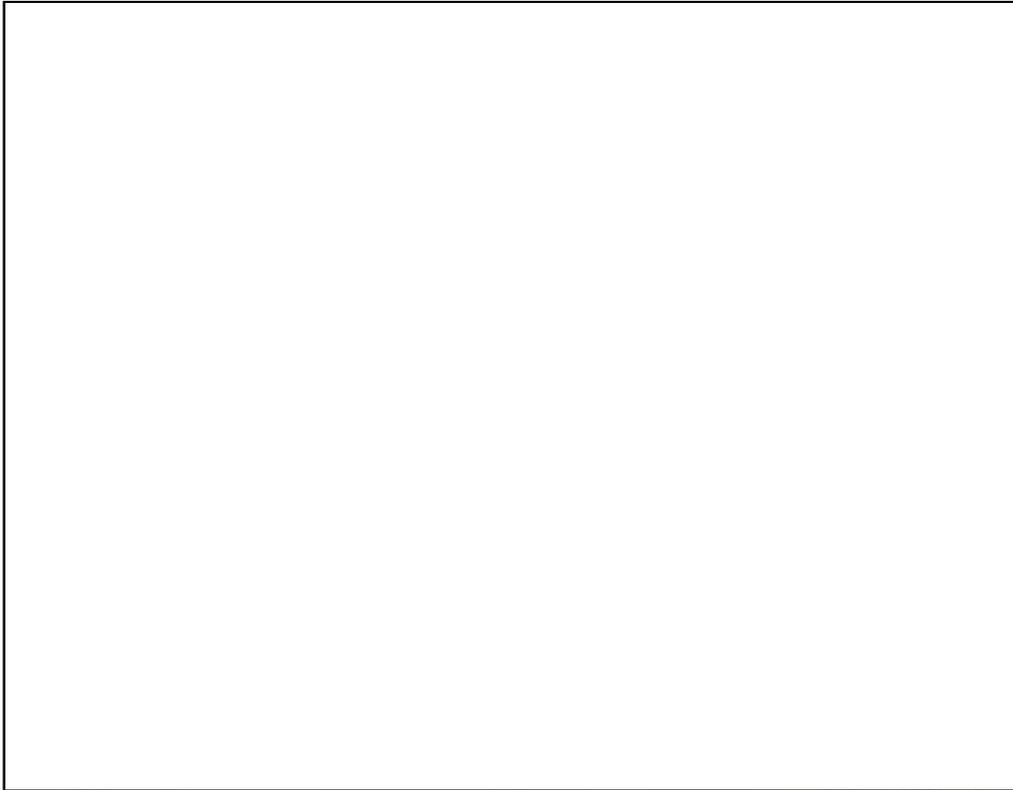
Work at the pumping plant is 95% complete. Fender rehabilitation work has begun at pier 23.



Steel Sheet Piles Driven for Cut-Off Walls for Installation of Drainage System and Flood Wall



Pier Cap Drill and bond Dowels at Pier 18



Pump Station Deck Rebar Being Placed



Welding Jacking Frame at Pier 18 Exterior Cell Eastbound Structure

## 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

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM Risk Management Program Update

### POTENTIAL DRAW ON PROGRAM RESERVE (PROGRAM CONTINGENCY)

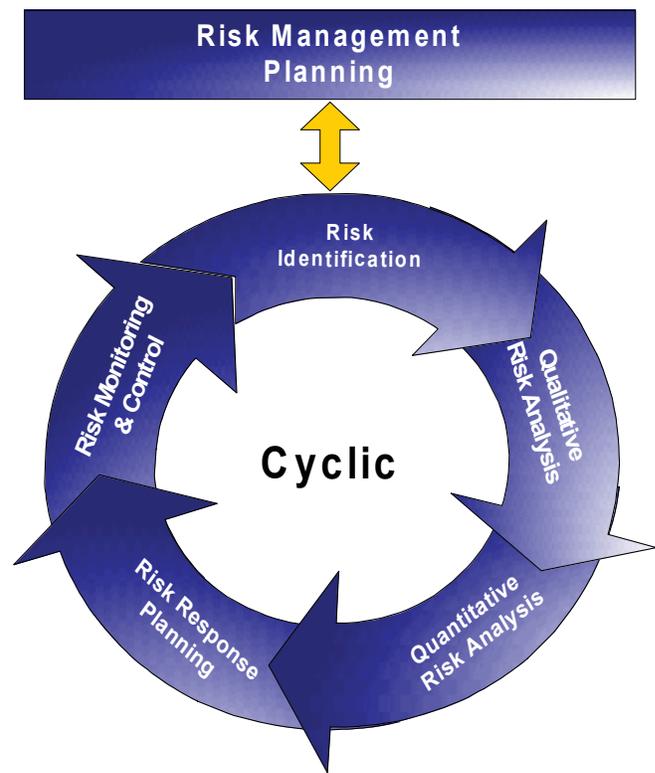
Assembly Bill (AB) 144 provides that Caltrans “regularly reassess its reserves for potential claims and unknown risks, incorporating information related to risks identified and quantified through its risk assessment processes.” AB 144 set a \$900 million Program Reserve (also referred to as the Program Contingency). On October 11, 2009, Governor Schwarzenegger approved Assembly Bill No. 1175 that added the Dumbarton and Antioch Bridges to the Toll Bridge Seismic Retrofit Program and this resulted in changes to Program Contingency. The Program Contingency is currently \$308 million according to the TBPOC Approved Budget.

The approved TBSRP Risk Management Plan provides for the determination of the estimated potential draw on Program Contingency each quarter based on the total of all risks and the contingencies remaining from the contracts. Each contract in design has an assigned contingency allowance. Each contract in construction has a remaining contingency, which is the difference between its budget and the sum of bid items, state-furnished materials, contract change orders and remaining supplemental work. Capital outlay support has no identified contingency allowance. The total of the contingencies is the amount that is available to cover the risks of all contracts, program-level risks (the risks not assigned to a particular contract), and capital outlay support risks. The amount by which the sum of all risks may exceed the total of all contingencies would represent a potential draw on the Program Contingency (i.e., Program Reserve).

The approved TBSRP Risk Management Plan provides for the determination of the estimated potential draw on Program Contingency each quarter, and compares it to the current balance in the Program Contingency. The third quarter of 2011 potential draw curve is shown in Figure 1.

As of the end of the third quarter of 2011, the 50 percent probable draw on Program Contingency is \$223 million. The potential draw ranges from about \$110 million to \$310 million.

The current Program Contingency balance is sufficient to cover the cost of currently 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.

### RISK MANAGEMENT DEVELOPMENTS

Cost risks on the SAS contract trended downward again this quarter. However, the forecast for the SAS contract did not change significantly as a result of corridor and architectural enhancement contract change orders approved by the TBPOC this quarter. Additional corridor enhancements (e.g., schedule compression of the dismantling project) are being considered by the TBPOC and, if approved, will be reflected in the Potential Draw on Program Contingency curve in future quarters.

The SAS contractor’s updated schedule meets the TBPOC’s milestones for opening the bridge in 2013. Actions are being implemented to mitigate potential interface and coordination issues between the SAS and YBITS#1 contractors. These actions include re-sequencing and coordinating the work between the contractors with the goal of merging the construction activities of both contracts to provide for the bridge opening as soon as possible. In addition to the coordination activities taking place, there is an effort underway to address constructability issues relating to the Hinge K – a critical corridor interface between the SAS and YBITS#1 contracts. A review of the bar reinforcing steel fabrication and placement sequence has begun and the intent is to create a scale model outlining

the sequence, along with challenges, off the critical path with the expectation of streamlining and expediting this work. The fabrication and shipment of the SAS deck and tower sections in China have concluded this quarter, within cost risk projections.

The corridor schedule risk analysis this quarter indicates about a two-month reduction in the 50 percent probable schedule risk to bridge opening. The reduction is due largely to completion of the Orthotropic Box Girders (OBG) fabrication in China, and a predicted early start of installing cable system temporary work. The risk associated with cable system installation, load transfer, and the completion of the corridor systems required for the bridge opening has not changed substantially this quarter. Teams are actively engaged in each of these areas to mitigate the risks to the greatest extent possible.

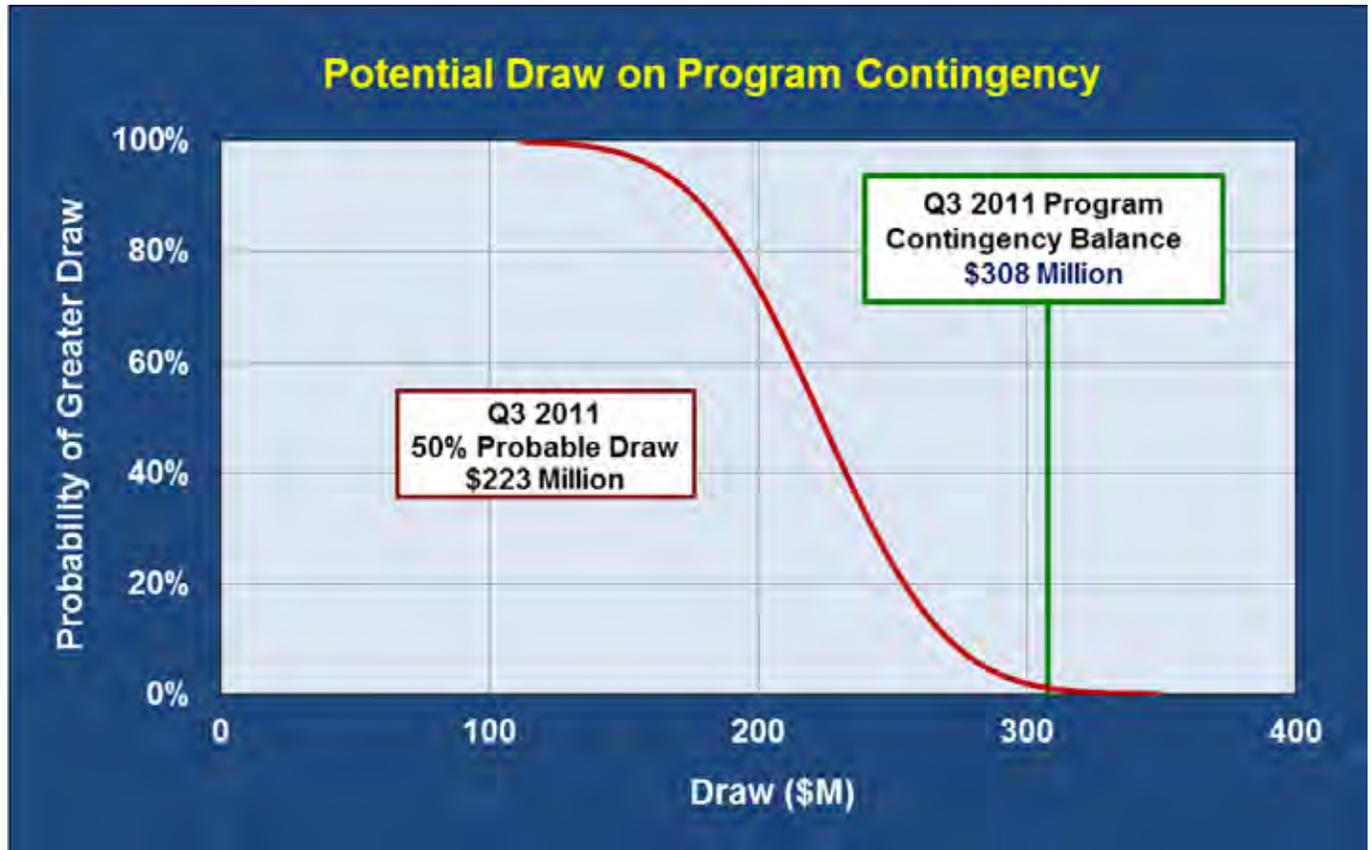
The cable system, the next major activity on the critical path to bridge opening, includes installing and compacting the cable, attaching the cable bands and suspenders, wrapping the cable, painting the cable

and suspenders, and installing the cable electrical systems. A team representing all aspects of the project has been meeting weekly for the past three years to resolve potential cable issues and many of their recommendations have been implemented, resulting in a reduction of risks.

**RISK MANAGEMENT LOOK AHEAD**

The corridor schedule is aggressive and there are risks to the future activities on the critical paths through SAS OBG erection, cable installation, load transfer, and completion of mechanical, electrical, and plumbing systems required for the bridge opening. The risk management team continues to monitor the SAS, YBITS#1, and the updated corridor schedules to alert management of approaching critical activities and to suggest mitigation responses for impending risks.

Caltrans and the SAS and YBITS#1 contractors are implementing a plan to enhance mutual schedule management in order to proactively identify impending



**Figure 1 – Potential Draw on Program Contingency\***

\*Figure 1 Notes:

1. The Program Contingency is currently \$308 million per the TBPOC Approved Budget.
2. Program Contingency may be used for other beneficial purposes than to cover risks.
3. Potential risks associated with potential out-of-scope corridor improvements are excluded. Proposed architectural enhancements and project improvements are currently under development; such proposals are excluded unless approved by the TBPOC.
4. The potential draw chart should not be construed as a forecast of the future balance of Program Contingency funds.

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### Risk Management Program Update (cont.)

risks so that action can be taken swiftly to prevent or mitigate potential delays. The risk management team has assessed the risks and identified Caltrans activities that must align with the incentivized milestones of the SAS and YBITS#1 contracts.

The San Francisco Ramps project is scheduled to start while the YBITS#1 contractor is working on Yerba Buena Island, giving rise to coordination issues such as slope stability, traffic maintenance, and conflicts in schedule and staging. Discussions are ongoing to resolve potential coordination issues and risks.

Aggressive planning for the future East Span dismantling work is underway. Project scope is being refined and an evaluation of the most prudent and efficient procurement strategy for the dismantling work is underway. Development of project plans, specifications, schedule, and cost is ongoing. In

concert with this effort, the risk management team will be updating the risk registers for the dismantling work. The comprehensive quantitative cost and schedule risk assessment will be refined next quarter and incorporated into the Program's quantitative cost and schedule results.



Hinge K Interface between the Self-Anchored Suspension Bridge and the Yerba Buena Island Transition Structure #1 Westbound

Overview of Yerba Buena Island Transition Structure Westbound on right and Yerba Buena Island Detour on the left



## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### Program Funding Status

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

**Table 1—Program Budget  
as of September 30, 2011 (\$ Millions)**

	Budgeted	Funding Available & Contribution
<b>Financing</b>		
Seismic Surcharge Revenue AB 1171	2,282.0	2,282.0
Seismic Surcharge Revenue AB 144	2,150.0	2,150.0
Seismic Surcharge Revenue AB 1175 <sup>(5)</sup>	750.0	750.0
BATA Consolidation	820.0	820.0
<b>Subtotal - Financing</b>	<b>6,002.0</b>	<b>6,002.0</b>
<b>Contributions</b>		
Proposition 192	790.0	789.0
San Diego Coronado Toll Bridge Revenue Fund	33.0	33.0
Vincent Thomas Bridge	15.0	6.9
State Highway Account <sup>(1)(2)</sup>	745.0	745.0
Public Transportation Account <sup>(1)(3)</sup>	130.0	130.0
ITIP/SHOPP/Federal Contingency	448.0	300.0
Federal Highway Bridge Replacement and Rehabilitation (HBRR)	642.0	642.0
SHA - East Span Demolition	300.0	-
SHA - "Efficiency Savings" <sup>(4)</sup>	130.0	113.0
Redirect Spillover	125.0	125.0
Motor Vehicle Account	75.0	75.0
<b>Subtotal - Contribution</b>	<b>3,433.0</b>	<b>2,958.9</b>
<b>Total Funding</b>	<b>9,435.0</b>	<b>8,960.9</b>
<b>Encumbered to Date</b>		<b>7,293.3</b>
<b>Remaining Unallocated</b>		<b>1,667.6</b>
<b>Expenditures :</b>		
Capital Outlay		5,742.5
State Operations		1,538.6
Antioch and Dumbarton Expenditures by BATA		12.2
	<b>Total Expenditures</b>	<b>7,293.3</b>
<b>Encumbrances : <sup>(6)</sup></b>		
Capital Outlay		-
State Operations		-
	<b>Total Encumbrances</b>	<b>-</b>
<b>Total Expenditures and Encumbrances</b>		<b>7,293.3</b>

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

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

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

<sup>(4)</sup>To date \$10 million has been transferred from the SHA to the TBSRP, representing the commitment of "Efficiency Savings" identified under AB 144.

Approximately \$120 million remains to be distributed as scheduled by the CTC.

<sup>(5)</sup>As of January 1, 2010, seismic retrofitting of Antioch and Dumbarton Bridges became part of the Toll Bridge Seismic Retrofit Program with the passage of AB 1175.

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

Pursuant to Streets and Highways Code Section 30952.1 (d), expenses incurred by Caltrans, BATA, and the California Transportation Commission (CTC) for costs directly related to the duties associated with the TBPOC are to be reimbursed by toll revenues. Table 3 -Toll Bridge Program Oversight Committee Estimated Expenses: July 1, 2005 through September 30, 2011 shows expenses through September 30, 2011 for TBPOC functioning, support, and monthly and quarterly reporting.

**Table 2—CTC Toll Bridge Seismic Retrofit Program Contributions Adopted December 2005**  
Schedule of Contributions to the Toll Bridge Seismic Retrofit Program (\$ Millions)

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

\* Caltrans Efficiency Savings

\*\* SFOBB East Span Demolition Cost

**Table 3—Toll Bridge Program Oversight Committee**  
Estimated Expenses: July 1, 2005 through September 30, 2011 (\$ Millions)

Agency/Program Activity	Expenses
<b>BATA</b>	2.0
<b>Caltrans</b>	2.3
<b>CTC</b>	1.9
<b>Reporting</b>	4.3
<b>Total Program</b>	10.5

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### Quarterly Environmental Compliance Highlights

Overall environmental compliance for the San Francisco -Oakland Bay Bridge (SFOBB) East Span project has been a success. The tasks for the current quarter are focused on mitigation, monitoring and environmental permitting. Key successes in this quarter are as follows:

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

Weekly monitoring of Canada geese along the I-80 roadway adjacent to the Emeryville Crescent for the year began on March 4, 2011 and continued through August 2011.

SFOBB environmental compliance and storm water pollution prevention plan (SWPPP) inspections were conducted weekly at all active project sites. The project team continues to work closely with contractors to ensure compliance with environmental permits and regulations and improve SWPPP and best management practices.

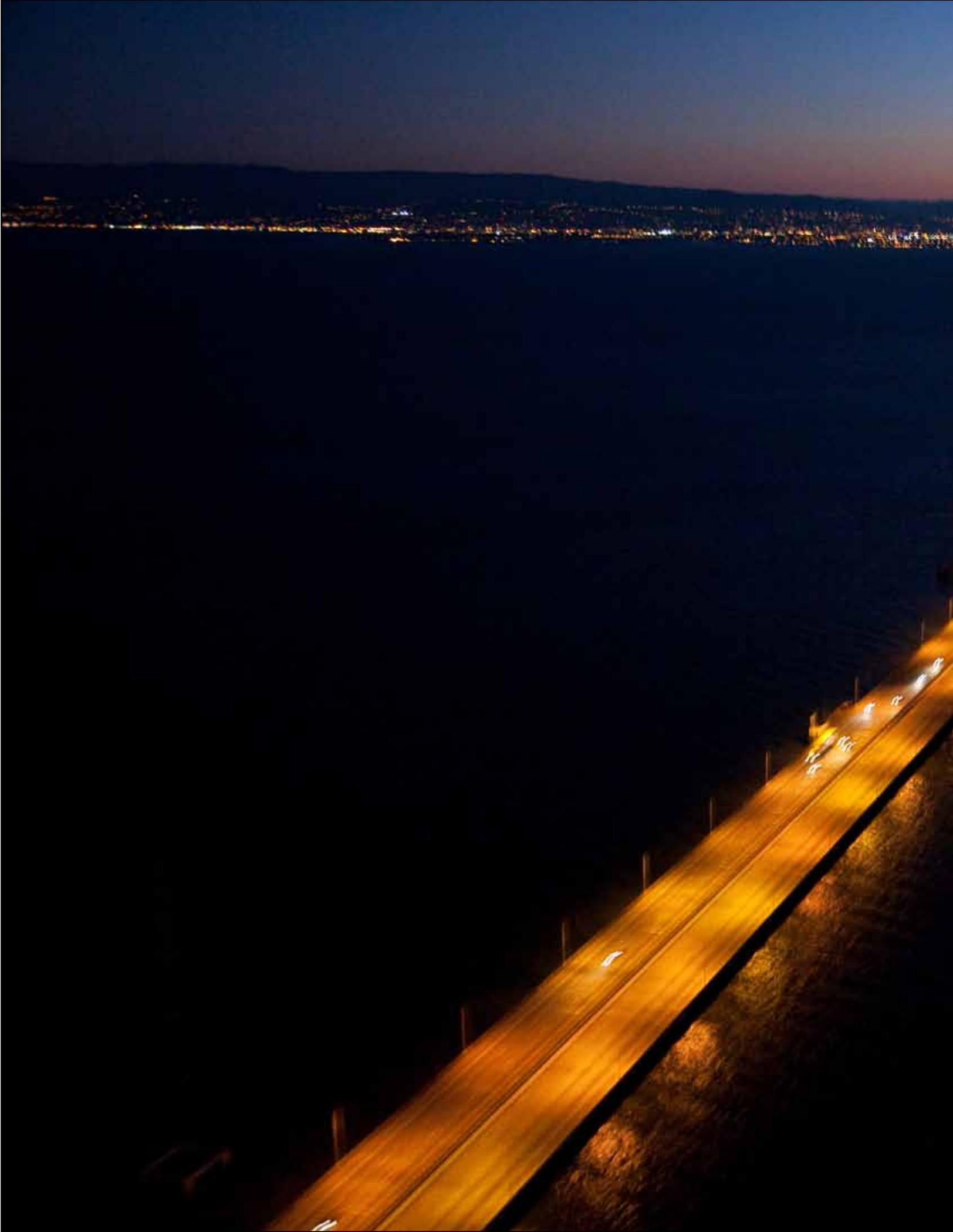
An amendment to the Bay Conservation and Development Commission (BCDC) Permit No.

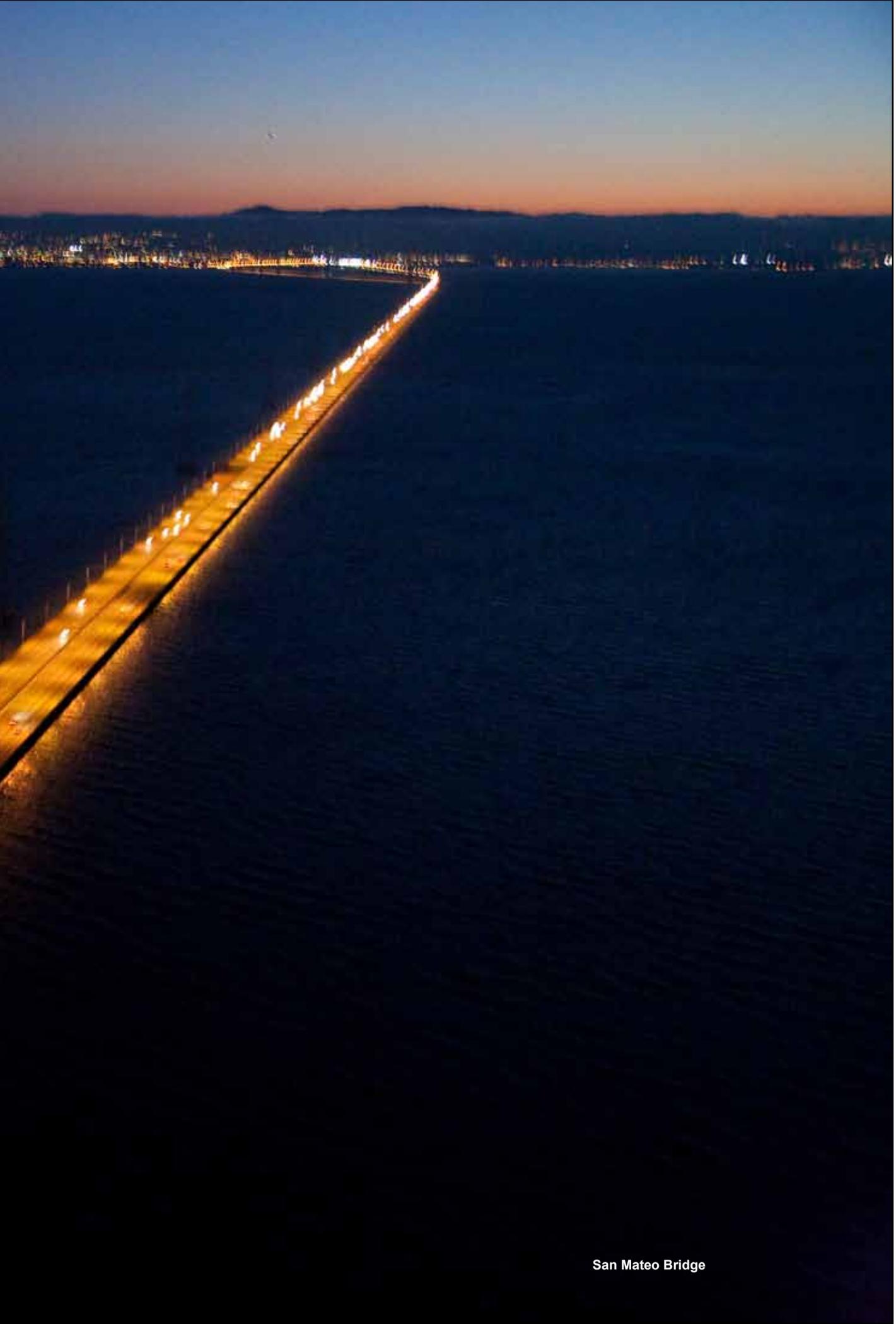
8-01 has been requested. This amendment will help facilitate the transfer of eelgrass mitigation funds to the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). Caltrans has continued efforts to finalize a cooperative agreement between NMFS and Caltrans.

Caltrans is working on the Environmental Phase for the dismantling of the existing East Span of the SFOBB.

The Office of Environmental Analysis with support from various functional units performed a comprehensive review of the 2001 Final Environmental Impact Statement (EIS)/Statutory Exemption and Final Section 4(f) Evaluation, current environmental standards and potential environmental impacts associated with the dismantling of the existing East Span. Analysis-driven technical studies were completed for water quality and biological resources as part of this review for the reevaluation of the EIS. The SFOBB East Span Seismic Safety Project EIS Biological Resources Reevaluation for Dismantling Activities Technical Memorandum was completed on August 17, 2011 and the SFOBB Dismantling Activities Water Quality Memorandum (Supporting the EIS Reevaluation for Dismantling of the Existing SFOBB) was completed on September 22, 2011.







San Mateo Bridge

# REGIONAL MEASURE 1 TOLL BRIDGE PROGRAM

## REGIONAL MEASURE 1 PROGRAM

### Interstate 880/State Route 92 Interchange Reconstruction Project

**Project Status: In Construction**

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

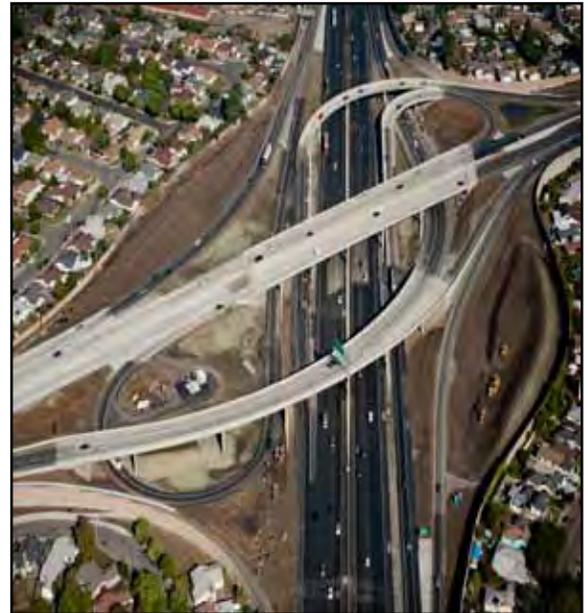
### Interstate 880/State Route 92 Interchange Reconstruction Contract

Contractor: Flatiron/Granite

Approved Capital Outlay Budget: \$163.2 M

Status: 100% Complete as of September 2011

This corridor is consistently one of the Bay Area's most congested during the evening commute. This is due in part to the lane merging and weaving that is required by the existing cloverleaf interchange. The new interchange will feature direct freeway-to-freeway connector ramps that will increase traffic capacity and improve overall safety and traffic operations in the area. With the new direct-connector ramps, drivers coming off 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 (see progress photos on pages 78 and 79).



Aerial View of Construction Progress



Aerial View of Construction Progress



Aerial View of 92/880 Interchange Construction Progress

## REGIONAL MEASURE 1 PROGRAM

### Other Completed Projects

#### 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

#### Richmond-San Rafael Bridge Rehabilitation Projects

**Project Status: Completed 2006**

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

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



New Richmond-San Rafael Bridge West Approach Trestle under Construction

#### Richmond Parkway Construction Project

**Project Status: Completed 2001**

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

## New Alfred Zampa Memorial (Carquinez) Bridge Project

**Project Status: Completed 2003**



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

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.

## Benicia-Martinez Bridge Project

**Project Status: Completed 2009**



Benicia-Martinez Bridge Bicycle/Pedestrian Pathway Opened to the Public in August 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.

## 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.





## APPENDICES

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## Appendix A-1: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2011 (\$ Millions)

Contract a	AB 144 / SB 66 Budget (07/2005) c	Approved Changes d	Current Approved Budget (09/2011) e = c + d	Cost to Date (09/2011) f	Cost Forecast (09/2011) g	At- Completion Variance h = g - e
<b>SFOBB East Span Replacement Project</b>						
Capital Outlay Support	959.3	218.0	1,177.3	998.8	1,275.1	97.8
Capital Outlay Construction	4,492.2	589.4	5,081.6	4,003.1	5,167.9	86.3
Other Budgeted Capital	35.1	(3.3)	31.8	0.7	7.7	(24.1)
<b>Total</b>	<b>5,486.6</b>	<b>804.1</b>	<b>6,290.7</b>	<b>5,002.6</b>	<b>6,450.7</b>	<b>160.0</b>
<b>SFOBB West Approach Replacement</b>						
Capital Outlay Support	120.0	(2.0)	118.0	118.5	119.0	1.0
Capital Outlay Construction	309.0	41.7	350.7	330.0	338.1	(12.6)
<b>Total</b>	<b>429.0</b>	<b>39.7</b>	<b>468.7</b>	<b>448.5</b>	<b>457.1</b>	<b>(11.6)</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	85.6	85.4	-
<b>Total</b>	<b>114.2</b>	<b>-</b>	<b>114.2</b>	<b>114.4</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 September 30, 2011 (\$ Millions) Cont.

Contract	AB 144 / SB 66 Budget (07/2005)	Approved Changes	Current Approved Budget (09/2011)	Cost to Date (09/2011)	Cost Forecast (09/2011)	At-Completion Variance
a	c	d	e = c + d	f	g	h = g - e
<b>Antioch Bridge</b>						
Capital Outlay Support	-	31.0	31.0	14.4	34.7	3.7
Capital Outlay Support by BATA				6.2		
Capital Outlay Construction	-	70.0	70.0	35.9	51.2	(18.8)
<b>Total</b>	<b>-</b>	<b>101.0</b>	<b>101.0</b>	<b>56.5</b>	<b>85.9</b>	<b>(15.1)</b>
<b>Dumbarton Bridge</b>						
Capital Outlay Support	-	56.0	56.0	22.9	57.7	1.7
Capital Outlay Support by BATA				6.0		
Capital Outlay Construction	-	92.7	92.7	18.1	87.7	(5.0)
<b>Total</b>	<b>-</b>	<b>148.7</b>	<b>148.7</b>	<b>47.0</b>	<b>145.4</b>	<b>(3.3)</b>
<b>Subtotal Capital Outlay Support</b>	<b>1,433.1</b>	<b>295.6</b>	<b>1,728.7</b>	<b>1,513.1</b>	<b>1,832.9</b>	<b>104.2</b>
<b>Subtotal Capital Outlay</b>	<b>6,286.8</b>	<b>696.9</b>	<b>6,983.7</b>	<b>5,754.0</b>	<b>7,033.6</b>	<b>49.9</b>
<b>Subtotal Other Budgeted Capital</b>	<b>35.1</b>	<b>(3.3)</b>	<b>31.8</b>	<b>0.7</b>	<b>7.7</b>	<b>(24.1)</b>
<b>Miscellaneous Program Costs</b>	<b>30.0</b>	<b>-</b>	<b>30.0</b>	<b>25.5</b>	<b>30.0</b>	<b>-</b>
<b>Subtotal Toll Bridge Seismic Retrofit Program</b>	<b>7,785.0</b>	<b>989.2</b>	<b>8,774.2</b>	<b>7,293.3</b>	<b>8,904.2</b>	<b>130.0</b>
<b>Net Programmatic Risks*</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>93.2</b>	<b>93.2</b>
<b>Program Contingency</b>	<b>900.0</b>	<b>(592.2)</b>	<b>307.8</b>	<b>-</b>	<b>84.6</b>	<b>(223.2)</b>
<b>Total Toll Bridge Seismic Retrofit Program <sup>1</sup></b>	<b>8,685.0</b>	<b>397.0</b>	<b>9,082.0</b>	<b>7,293.3</b>	<b>9,082.0</b>	<b>-</b>

<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 September 30, 2011 (\$ Millions)

Bridge	AB 144 Baseline Budget	TBPOC Current Approved Budget	Expenditures to date and Encumbrances as of September 2011 see Note (1)	Estimated costs not yet spent or Encumbered as of September 2011	Total Forecast as of September 2011
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	472.0	(0.2)	471.8
<b>Total</b>	<b>617.5</b>	<b>616.5</b>	<b>616.6</b>	<b>(0.2)</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	667.4	22.1	689.5
Project Reserves	82.0	-	-	-	-
<b>Total</b>	<b>914.0</b>	<b>816.5</b>	<b>794.2</b>	<b>22.3</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	227.3	0.1	227.4
<b>Total</b>	<b>307.9</b>	<b>302.2</b>	<b>302.2</b>	<b>(0.0)</b>	<b>302.2</b>
<b>West Approach</b>					
Capital Outlay Support	120.0	118.0	118.4	0.6	119.0
Capital Outlay	309.0	350.7	329.7	8.4	338.1
<b>Total</b>	<b>429.0</b>	<b>468.7</b>	<b>448.1</b>	<b>9.0</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	1,254.1	1,237.1	8.1	1,245.2
<b>Total</b>	<b>1,490.0</b>	<b>1,435.3</b>	<b>1,418.3</b>	<b>8.1</b>	<b>1,426.4</b>
<b>SFOBB East Span - SAS - Superstructure</b>					
Capital Outlay Support	214.6	375.5	335.1	139.3	474.4
Capital Outlay	1,753.7	2,046.8	1,597.3	488.3	2,085.6
<b>Total</b>	<b>1,968.3</b>	<b>2,422.3</b>	<b>1,932.4</b>	<b>627.6</b>	<b>2,560.0</b>
<b>SFOBB East Span - SAS - Foundations</b>					
Capital Outlay Support	62.5	37.6	37.6	-	37.6
Capital Outlay	339.9	307.3	301.3	3.7	305.0
<b>Total</b>	<b>402.4</b>	<b>344.9</b>	<b>338.9</b>	<b>3.7</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	15.2	0.5	15.7
<b>Total</b>	<b>26.2</b>	<b>26.2</b>	<b>25.4</b>	<b>0.9</b>	<b>26.3</b>
<b>YBI Detour</b>					
Capital Outlay Support	29.5	90.7	87.2	0.5	87.7
Capital Outlay	131.9	492.8	465.9	16.9	482.8
<b>Total</b>	<b>161.4</b>	<b>583.5</b>	<b>553.1</b>	<b>17.4</b>	<b>570.5</b>
<b>YBI- Transition Structures</b>					
Capital Outlay Support	78.7	106.4	54.6	63.6	118.2
Capital Outlay	299.4	247.8	43.1	265.3	308.4
<b>Total</b>	<b>378.1</b>	<b>354.2</b>	<b>97.7</b>	<b>328.9</b>	<b>426.6</b>

## Appendix A-2: TBSRP AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2011 (\$ Millions) Cont.

Contract	AB 144 Baseline Budget	TBPOC Current Approved Budget	Expenditures to date and Encumbrances as of September 2011 see Note (1)	Estimated Costs not yet spent or Encumbered as of September 2011	Total Forecast as of September 2011
a	b	c	d	e	f = d + e
<b>Oakland Touchdown</b>					
Capital Outlay Support	74.4	108.9	87.2	30.0	117.2
Capital Outlay	283.8	339.0	208.7	125.2	333.9
<b>Total</b>	<b>358.2</b>	<b>447.9</b>	<b>295.9</b>	<b>155.2</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	170.8	116.7	37.9	154.6
<b>Total</b>	<b>383.1</b>	<b>377.3</b>	<b>314.6</b>	<b>46.6</b>	<b>361.2</b>
<b>Existing Bridge Demolition</b>					
Capital Outlay Support	79.7	59.9	1.3	40.3	41.6
Capital Outlay	239.2	239.1	-	244.3	244.3
<b>Total</b>	<b>318.9</b>	<b>299.0</b>	<b>1.3</b>	<b>284.6</b>	<b>285.9</b>
<b>Antioch Bridge</b>					
Capital Outlay Support	-	31.0	14.5	14.0	28.5
Capital Outlay Support by BATA	-	-	6.2	-	6.2
Capital Outlay	-	70.0	25.7	25.5	51.2
<b>Total</b>	<b>-</b>	<b>101.0</b>	<b>46.4</b>	<b>39.5</b>	<b>85.9</b>
<b>Dumbarton Bridge</b>					
Capital Outlay Support	-	56.0	23.4	28.3	51.7
Capital Outlay Support by BATA	-	-	6.0	-	6.0
Capital Outlay	-	92.7	13.2	74.5	87.7
<b>Total</b>	<b>-</b>	<b>148.7</b>	<b>42.6</b>	<b>102.8</b>	<b>145.4</b>
<b>Miscellaneous Program Costs</b>	<b>30.0</b>	<b>30.0</b>	<b>25.5</b>	<b>4.5</b>	<b>30.0</b>
<b>Total Capital Outlay Support</b>	<b>1,463.2</b>	<b>1,758.7</b>	<b>1,532.6</b>	<b>330.3</b>	<b>1,862.9</b>
<b>Total Capital Outlay</b>	<b>6,321.8</b>	<b>7,015.5</b>	<b>5,720.6</b>	<b>1,320.7</b>	<b>7,041.3</b>
<b>Program Total <sup>1</sup></b>	<b>7,785.0</b>	<b>8,774.2</b>	<b>7,253.2</b>	<b>1,651.0</b>	<b>8,904.2</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 September 30, 2011 (\$ Millions)

Contract a	AB 144 / SB 66 Budget (07/2005) c	Approved Changes d	Current Approved Budget (09/2011) e = c + d	Cost to Date (09/2011) f	Cost Forecast (09/2011) g	At- Completion Variance h = g - e
<b>San Francisco-Oakland Bay Bridge East Span Replacement Project</b>						
<b>East Span - SAS Superstructure</b>						
Capital Outlay Support	214.6	160.9	375.5	343.4	474.4	98.9
Capital Outlay Construction	1,753.7	293.1	2,046.8	1,597.3	2,085.6	38.8
<b>Total</b>	<b>1,968.3</b>	<b>454.0</b>	<b>2,422.3</b>	<b>1,940.7</b>	<b>2,560.0</b>	<b>137.7</b>
<b>SAS W2 Foundations</b>						
Capital Outlay Support	10.0	(0.8)	9.2	9.2	9.2	-
Capital Outlay Construction	26.4	-	26.4	26.5	26.4	-
<b>Total</b>	<b>36.4</b>	<b>(0.8)</b>	<b>35.6</b>	<b>35.7</b>	<b>35.6</b>	<b>-</b>
<b>YBI South/South Detour</b>						
Capital Outlay Support	29.4	61.3	90.7	87.2	87.7	(3.0)
Capital Outlay Construction	131.9	360.9	492.8	465.9	482.8	(10.0)
<b>Total</b>	<b>161.3</b>	<b>422.2</b>	<b>583.5</b>	<b>553.1</b>	<b>570.5</b>	<b>(13.0)</b>
<b>East Span - Skyway</b>						
Capital Outlay Support	197.0	(15.8)	181.2	181.2	181.2	-
Capital Outlay Construction	1,293.0	(38.9)	1,254.1	1,237.1	1,245.2	(8.9)
<b>Total</b>	<b>1,490.0</b>	<b>(54.7)</b>	<b>1,435.3</b>	<b>1,418.3</b>	<b>1,426.4</b>	<b>(8.9)</b>
<b>East Span - SAS E2/T1 Foundations</b>						
Capital Outlay Support	52.5	(24.1)	28.4	28.4	28.4	-
Capital Outlay Construction	313.5	(32.6)	280.9	274.8	278.6	(2.3)
<b>Total</b>	<b>366.0</b>	<b>(56.7)</b>	<b>309.3</b>	<b>303.2</b>	<b>307.0</b>	<b>(2.3)</b>
<b>YBI Transition Structures (see notes below)</b>						
Capital Outlay Support	78.7	27.7	106.4	53.2	118.2	11.8
Capital Outlay Construction	299.3	(51.5)	247.8	60.9	308.4	60.6
<b>Total</b>	<b>378.0</b>	<b>(23.8)</b>	<b>354.2</b>	<b>114.1</b>	<b>426.6</b>	<b>72.4</b>
<b>* YBI- Transition Structures</b>						
Capital Outlay Support			16.4	16.4	16.4	-
Capital Outlay Construction			-	-	-	-
<b>Total</b>			<b>16.4</b>	<b>16.4</b>	<b>16.4</b>	<b>-</b>
<b>* YBI- Transition Structures Contract No. 1</b>						
Capital Outlay Support			57.0	27.9	68.3	11.3
Capital Outlay Construction			185.5	60.9	226.8	41.3
<b>Total</b>			<b>242.5</b>	<b>88.8</b>	<b>295.1</b>	<b>52.6</b>
<b>* YBI- Transition Structures Contract No. 2</b>						
Capital Outlay Support			32.0	8.9	32.5	0.5
Capital Outlay Construction			59.0	-	78.3	19.3
<b>Total</b>			<b>91.0</b>	<b>8.9</b>	<b>110.8</b>	<b>19.8</b>
<b>* YBI- Transition Structures Contract No. 3 Landscape</b>						
Capital Outlay Support			1.0	-	1.0	-
Capital Outlay Construction			3.3	-	3.3	-
<b>Total</b>			<b>4.3</b>	<b>-</b>	<b>4.3</b>	<b>-</b>

## Appendix B: TBSRP (SFOBB East Span Only) AB 144/SB 66 Baseline Budget, Forecasts and Expenditures through September 30, 2011 (\$ Millions) Cont.

Contract a	AB 144 / SB 66 Budget (07/2005) c	Approved Changes d	Current Approved Budget (09/2011) e = c + d	Cost to Date (09/2011) f	Cost Forecast (09/2011) g	At- Completion Variance h = g - e
<b>Oakland Touchdown (see notes below)</b>						
Capital Outlay Support	74.4	34.5	108.9	87.1	117.2	8.3
Capital Outlay Construction	283.8	55.2	339.0	208.7	333.9	(5.1)
<b>Total</b>	<b>358.2</b>	<b>89.7</b>	<b>447.9</b>	<b>295.8</b>	<b>451.1</b>	<b>3.2</b>
<b>* OTD Prior-to-Split Costs</b>						
Capital Outlay Support			21.7	20.0	21.7	-
Capital Outlay Construction			-	-	-	-
<b>Total</b>			<b>21.7</b>	<b>20.0</b>	<b>21.7</b>	<b>-</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	51.0	51.4	4.1
Capital Outlay Construction			212.0	202.9	203.3	(8.7)
<b>Total</b>			<b>259.3</b>	<b>253.9</b>	<b>254.7</b>	<b>(4.6)</b>
<b>* OTD No. 2 (Eastbound)</b>						
Capital Outlay Support			22.5	11.9	27.7	5.2
Capital Outlay Construction			62.0	-	58.1	(3.9)
<b>Total</b>			<b>84.5</b>	<b>11.9</b>	<b>85.8</b>	<b>1.3</b>
<b>* OTD Touchdown 2 Detour(2)</b>						
Capital Outlay Support			15.0	2.6	14.0	(1.0)
Capital Outlay Construction			51.0	-	58.5	7.5
<b>Total</b>			<b>66.0</b>	<b>2.6</b>	<b>72.5</b>	<b>6.5</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>5.9</b>	<b>0.8</b>	<b>5.9</b>	<b>-</b>
<b>Existing Bridge Demolition</b>						
Capital Outlay Support	79.7	(19.8)	59.9	1.0	41.6	(18.3)
Capital Outlay Construction	239.2	(0.1)	239.1	-	244.3	5.2
<b>Total</b>	<b>318.9</b>	<b>(19.9)</b>	<b>299.0</b>	<b>1.0</b>	<b>285.9</b>	<b>(13.1)</b>
<b>* Cantilever Section</b>						
Capital Outlay Support			-	-	15.0	
Capital Outlay Construction			-	-	61.4	
<b>Total</b>			<b>-</b>	<b>-</b>	<b>76.4</b>	
<b>* 504/288 Sections</b>						
Capital Outlay Support			-	1.0	26.6	
Capital Outlay Construction			-	-	182.9	
<b>Total</b>			<b>-</b>	<b>1.0</b>	<b>209.5</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 September 30, 2011 (\$ Millions) Cont.

Contract	AB 144 / SB 66 Budget (07/2005)	Approved Changes	Current Approved Budget (09/2011)	Cost to Date (09/2011)	Cost Forecast (09/2011)	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	-	9.3	9.2	9.3	-
<b>Total</b>	<b>11.1</b>	<b>-</b>	<b>11.1</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>						
<b>Environmental Phase</b>						
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>
<b>Subtotal Capital Outlay Support</b>	<b>959.3</b>	<b>218.0</b>	<b>1,177.3</b>	<b>998.8</b>	<b>1,275.1</b>	<b>97.8</b>
<b>Subtotal Capital Outlay Construction</b>	<b>4,492.2</b>	<b>589.4</b>	<b>5,081.6</b>	<b>4,003.1</b>	<b>5,167.9</b>	<b>86.3</b>
<b>Other Budgeted Capital</b>	<b>35.1</b>	<b>(3.3)</b>	<b>31.8</b>	<b>0.7</b>	<b>7.7</b>	<b>(24.1)</b>
<b>Total SFOBB East Span Replacement Project</b>	<b>5,486.6</b>	<b>804.1</b>	<b>6,290.7</b>	<b>5,002.6</b>	<b>6,450.7</b>	<b>160.0</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 66 Budget (07/2005)	Approved Changes	Current Approved Budget (09/2011)	Cost to Date (09/2011)	Cost Forecast (09/2011)	At- Completion 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	6.3	6.6	-
Subtotal	26.3	10.4	36.7	36.4	36.7	-
Capital Outlay Construction						
BATA Funding	54.7	26.9	81.6	77.1	81.6	-
Non-Bata Funding	21.6	-	21.6	21.7	21.7	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>135.2</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	9.6	10.5	-
Capital Outlay Construction	20.3	3.3	23.6	18.5	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>45.1</b>	<b>54.4</b>	<b>-</b>

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

Contract	AB 144 / SB 66 Budget (07/2005)	Approved Changes	Current Approved Budget (09/2011)	Cost to Date (09/2011)	Cost Forecast (09/2011)	At- Completion Variance
a	c	d	e = c + d	f	g	h = g - e
<b>New Benicia-Martinez Bridge Project continued...</b>						
Subtotal BATA Capital Outlay Support	155.7	30.9	186.6	185.5	186.6	-
Subtotal BATA Capital Outlay Construction	829.9	164.5	994.4	967.7	994.4	-
Subtotal Capital Outlay Right-of-Way	20.4	(0.1)	20.3	17.0	20.3	-
Subtotal Non-BATA Capital Outlay Support	1.4	6.2	7.6	7.2	7.6	-
Subtotal Non-BATA Capital Outlay Construction	31.7	9.5	41.2	31.8	41.3	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>1,209.2</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					
<b>Carquinez Bridge Replacement Project</b>						
<b>New Bridge</b>						
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>
<b>Crockett Interchange Reconstruction</b>						
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>
<b>Existing 1927 Bridge Demolition</b>						
Capital Outlay Support	16.1	(0.3)	15.8	15.8	15.8	-
Capital Outlay Construction	35.2	-	35.2	34.8	35.2	-
<b>Total</b>	<b>51.3</b>	<b>(0.3)</b>	<b>51.0</b>	<b>50.6</b>	<b>51.0</b>	<b>-</b>
<b>Other Contracts</b>						
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	9.9	10.4	-
<b>Total</b>	<b>45.1</b>	<b>(0.4)</b>	<b>44.7</b>	<b>42.8</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	379.0	380.8	-
Subtotal Capital Outlay Right-of-Way	10.5	(0.1)	10.4	9.9	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>513.3</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 66 Budget (07/2005)	Approved Changes	Current Approved Budget (09/2011)	Cost to Date (09/2011)	Cost Forecast (09/2011)	At- Completion 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	-
<b>Total</b>	<b>102.1</b>	<b>(5.0)</b>	<b>97.1</b>	<b>96.2</b>	<b>97.1</b>	<b>-</b>
<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	-
<b>Total</b>	<b>25.0</b>	<b>(5.0)</b>	<b>20.0</b>	<b>19.6</b>	<b>20.0</b>	<b>-</b>
<b>Richmond Parkway Project (RM 1 Share Only)</b>						
Capital Outlay Support	-	-	-	-	-	-
Capital Outlay Construction	5.9	-	5.9	4.3	5.9	-
<b>Total</b>	<b>5.9</b>	<b>-</b>	<b>5.9</b>	<b>4.3</b>	<b>5.9</b>	<b>-</b>
<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	0.5	0.6	-
Project Reserves	1.5	(0.5)	1.0	-	1.0	-
<b>Total</b>	<b>217.8</b>	<b>(8.0)</b>	<b>209.8</b>	<b>208.7</b>	<b>209.8</b>	<b>-</b>
<b>I-880/SR-92 Interchange Reconstruction</b>						
Capital Outlay Support	28.8	35.8	64.6	60.9	64.6	-
Capital Outlay Construction						
BATA Funding	85.2	68.4	153.6	145.3	153.6	-
Non-BATA Funding	9.6	-	9.6	-	9.6	-
Subtotal	94.8	68.4	163.2	145.3	163.2	-
Capital Outlay Right-of-Way	9.9	7.3	17.2	14.6	17.2	-
Project Reserves	0.3	(0.3)	-	-	-	-
<b>Total</b>	<b>133.8</b>	<b>111.2</b>	<b>245.0</b>	<b>220.8</b>	<b>245.0</b>	<b>-</b>
<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	-
<b>Total</b>	<b>36.1</b>	<b>(2.0)</b>	<b>34.1</b>	<b>33.5</b>	<b>34.1</b>	<b>-</b>

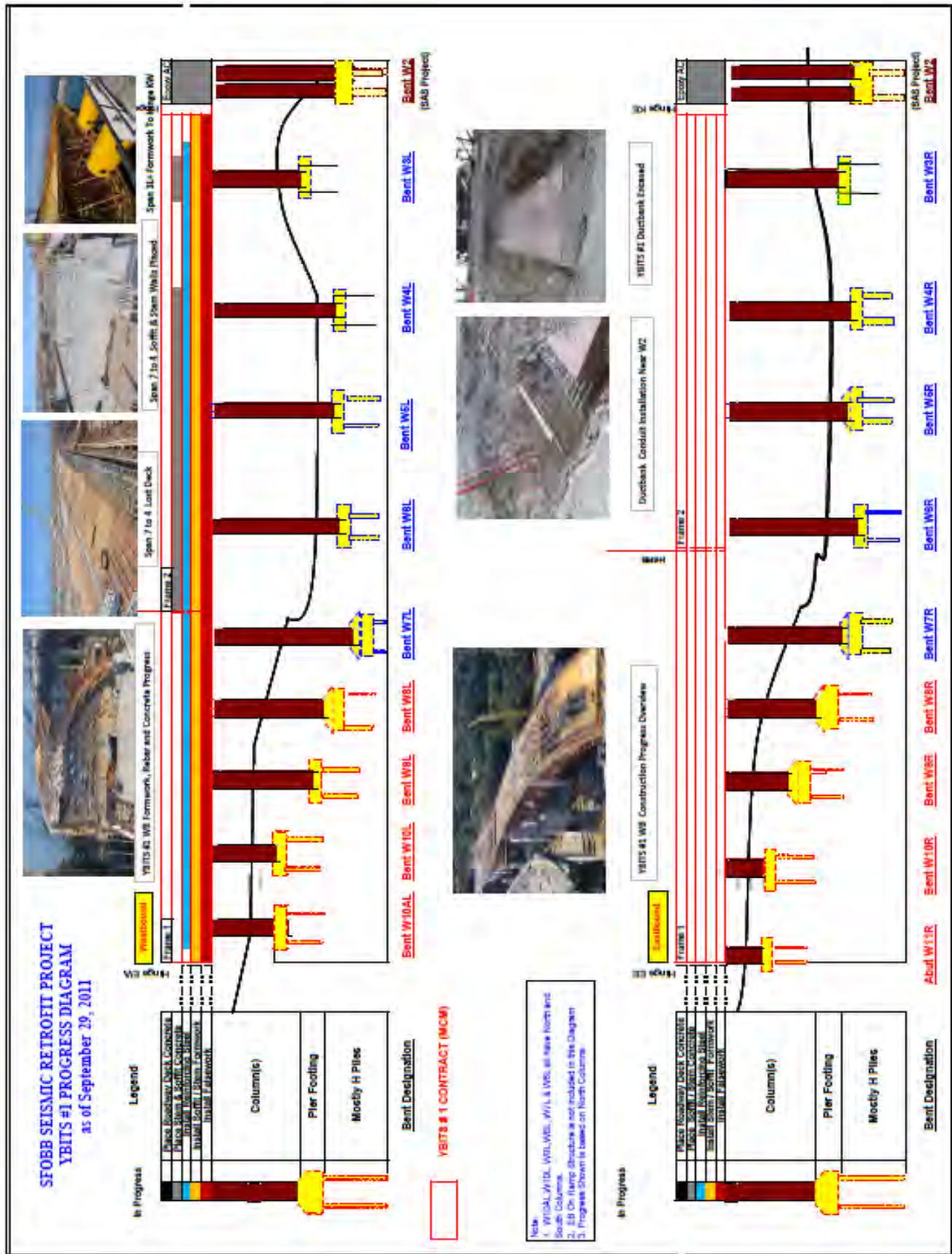
## Appendix C: Regional Measure 1 Program Cost Detail (\$ Millions) Cont.

Contract	AB 144 / SB 66 Budget (07/2005)	Approved Changes	Current Approved Budget (09/2011)	Cost to Date (09/2011)	Cost Forecast (09/2011)	At- Completion Variance
a	c	d	e = c + d	f	g	h = g - e
<b>US 101/University Avenue Interchange Modification</b>						
Capital Outlay Support	-	-	-	-	-	-
Capital Outlay Construction	3.8	-	3.8	3.7	3.8	-
<b>Total</b>	<b>3.8</b>	<b>-</b>	<b>3.8</b>	<b>3.7</b>	<b>3.8</b>	<b>-</b>
<b>Subtotal BATA Capital Outlay Support</b>	<b>358.3</b>	<b>64.7</b>	<b>423.0</b>	<b>418.0</b>	<b>423.0</b>	<b>-</b>
<b>Subtotal BATA Capital Outlay Construction</b>	<b>1,569.8</b>	<b>217.5</b>	<b>1,787.3</b>	<b>1,748.6</b>	<b>1,787.3</b>	<b>-</b>
<b>Subtotal Capital Outlay Right-of-Way</b>	<b>42.5</b>	<b>6.2</b>	<b>48.7</b>	<b>42.2</b>	<b>48.7</b>	<b>-</b>
<b>Subtotal Non-BATA Capital Outlay Support</b>	<b>14.0</b>	<b>4.0</b>	<b>18.0</b>	<b>17.6</b>	<b>18.0</b>	<b>-</b>
<b>Subtotal Non-BATA Capital Outlay Construction</b>	<b>92.4</b>	<b>9.5</b>	<b>101.9</b>	<b>82.9</b>	<b>102.0</b>	<b>0.1</b>
<b>Project Reserves</b>	<b>35.6</b>	<b>(8.1)</b>	<b>27.5</b>	<b>-</b>	<b>27.4</b>	<b>(0.1)</b>
<b>Total RM1 Program</b>	<b>2,112.6</b>	<b>293.8</b>	<b>2,406.4</b>	<b>2,309.3</b>	<b>2,406.4</b>	<b>-</b>
<b>Notes:</b>	<p>1 Richmond-San Rafael Bridge Trestle, Fender, and Deck Joint Rehabilitation Includes Non-TBSRP Expenses for EA 0438U_ and 04157_</p> <p>2 San Mateo-Hayward Bridge Widening includes EAs 00305_,04501_,04503_,04504_,04504_,04505_,04506_,04507_,04508_,04509_,27740_,27790_,04860_</p>					

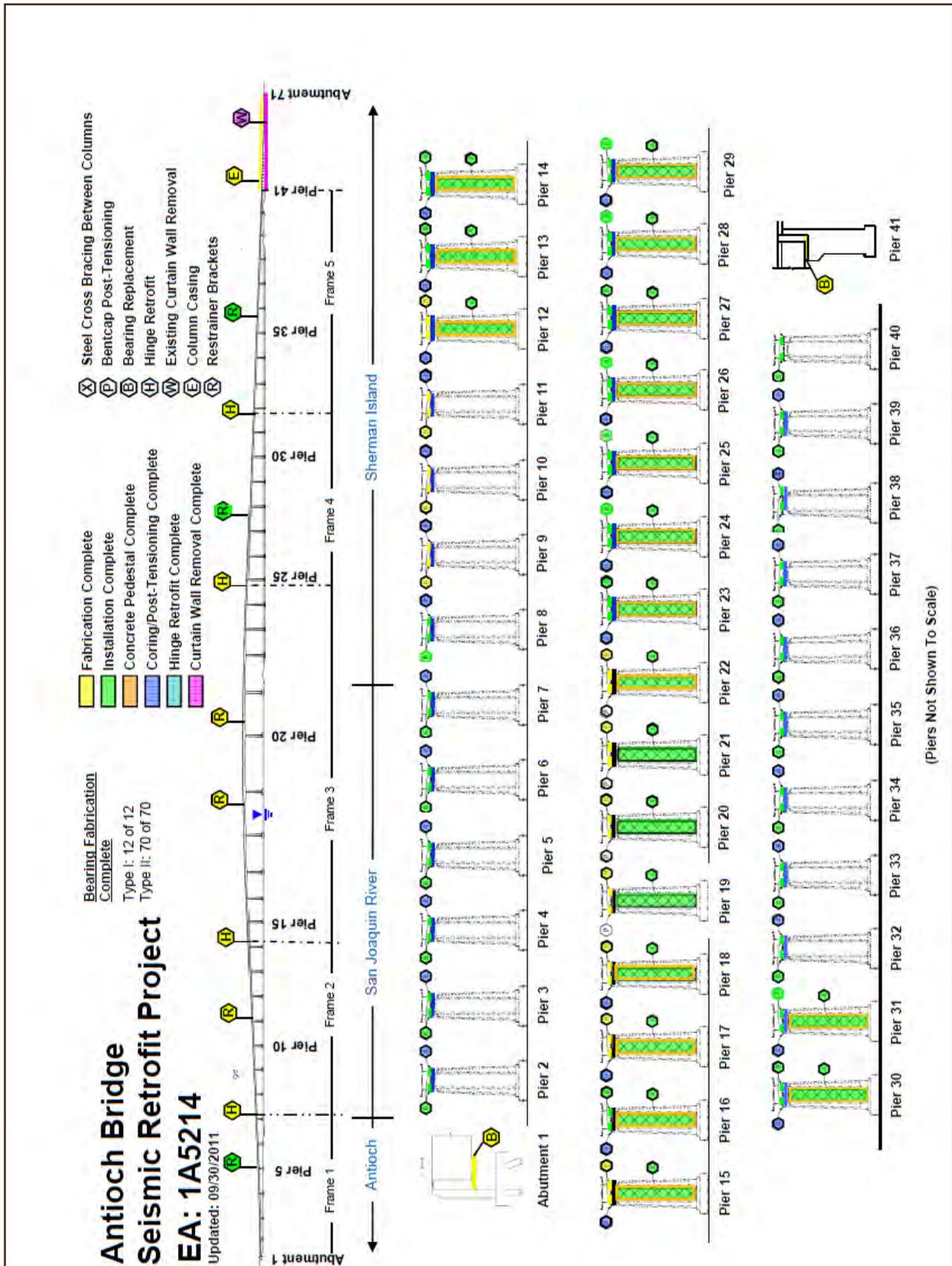


The Self-Anchored  
Suspension Bridge Tower  
Catwalk in the San Francisco  
Fog

# Appendix D: Progress Diagrams Yerba Buena Island Transition Structures



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

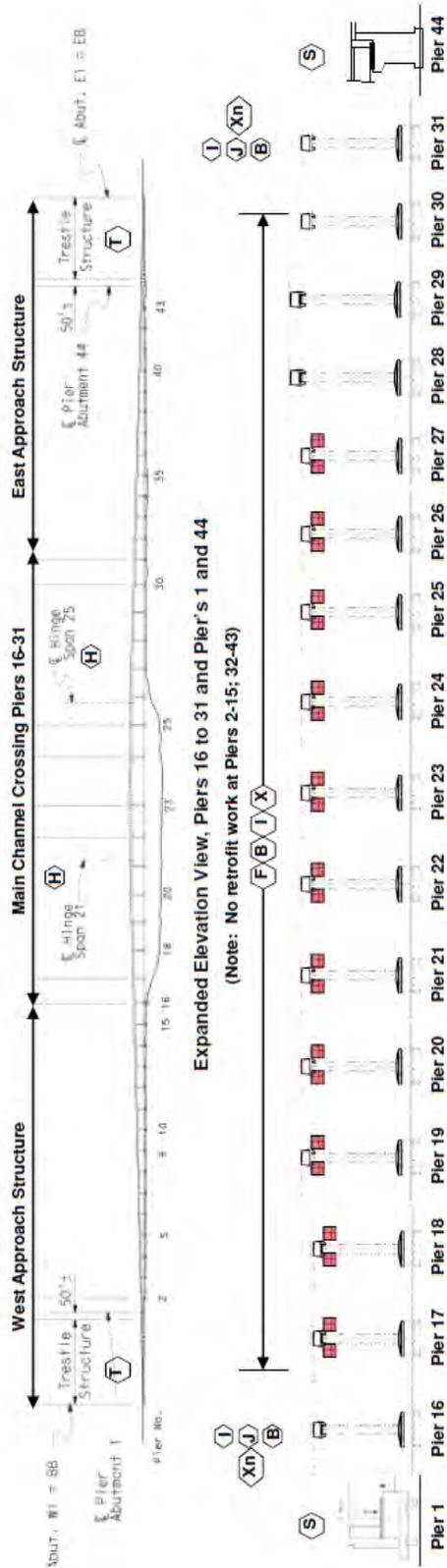


# Appendix D: Progress Diagrams Dumbarton Bridge

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

Updated: 6/3/2011

- Abutment Retrofit Complete
  - Trestle Piles Complete
  - Backwall Seat Retrofit
  - Footing Overlay Complete
  - Trestle Bent Caps Complete
  - Trestle Retrofit
  - Pier Cap Retrofit Complete
  - Trestle Columns Complete
  - Pier Cap Retrofit
  - Temp Platforms Installed
  - Hinge Retrofit Complete
  - Isolation Bearing Complete
  - Steel Cross Frame Complete
  - Bearing Fabrication Status
  - Steel Cross Frame Retrofit
  - Hinge Retrofit
  - Seismic Joint
- Bearings: 0 of 96

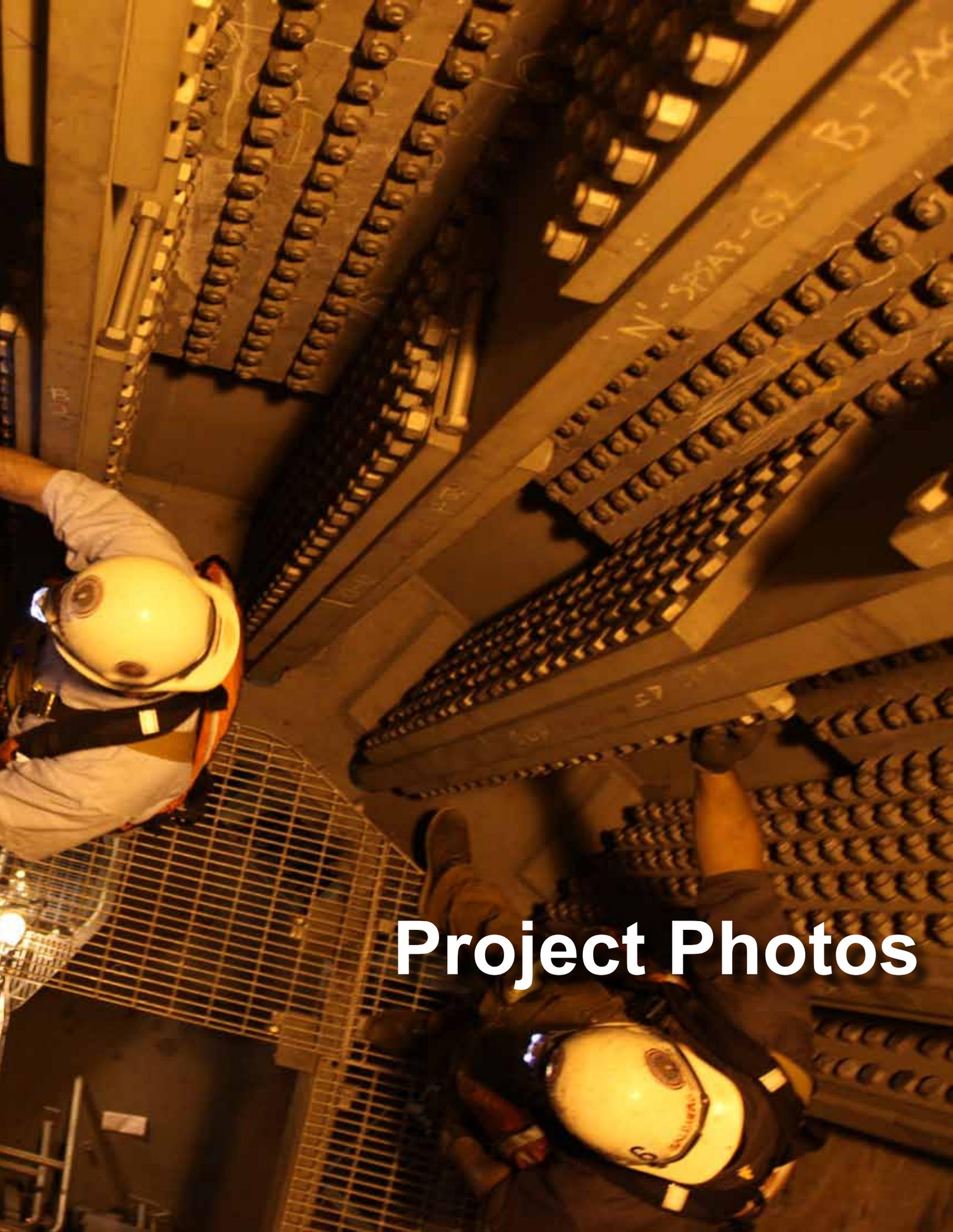


(Piers Not Shown To Scale)

Overview of Yerba Buena Island Transition Structure #1  
Westbound Construction in Progress







# Project Photos

## Appendix E: Project Progress Photographs

### Self-Anchored Suspension Bridge Field Work



Drilling Holes at I-Beam for Support at the Tower Grillage



PWS Test Cable Strand Bundle Being Rolled above and around the West Deviation Saddle



Conduits Installation on Eastbound Roadway Barrier



Grinding the Edge of Floorbeam Plate

Torquing E2W Bearings underneath the Roadway Deck of the Self-Anchored Suspension Bridge





## Appendix E: Project Progress Photographs

### 92/880 Interchange



Aerial of Recently Completed 92/880 Interchange Looking East



Aerial of Recently Completed 92/880 Interchange Nearing Completion Looking West



Aerial of Recently Completed SR 92/880 Interchange Looking West



Aerial of Recently Completed SR 92/880 Interchange Looking South

## Appendix E: Project Progress Photographs

### Antioch Bridge



Painting Cross Frames



Superstructure Lowered onto New Isolation Bearing at Pier 15



Pier 13 Concrete Removal is Necessary for Installation of the New Isolation Bearing

## Appendix E: Project Progress Photographs Dumbarton Bridge



Dumbarton Bridge - Core Drilling of Bent Caps for Addition of Reinforcing Steel



Dumbarton Bridge - Wall Being Cast for Pump Station

## Appendix E: Project Progress Photographs

### Westbound Oakland Detour



Foundation Footings for Pier Wall



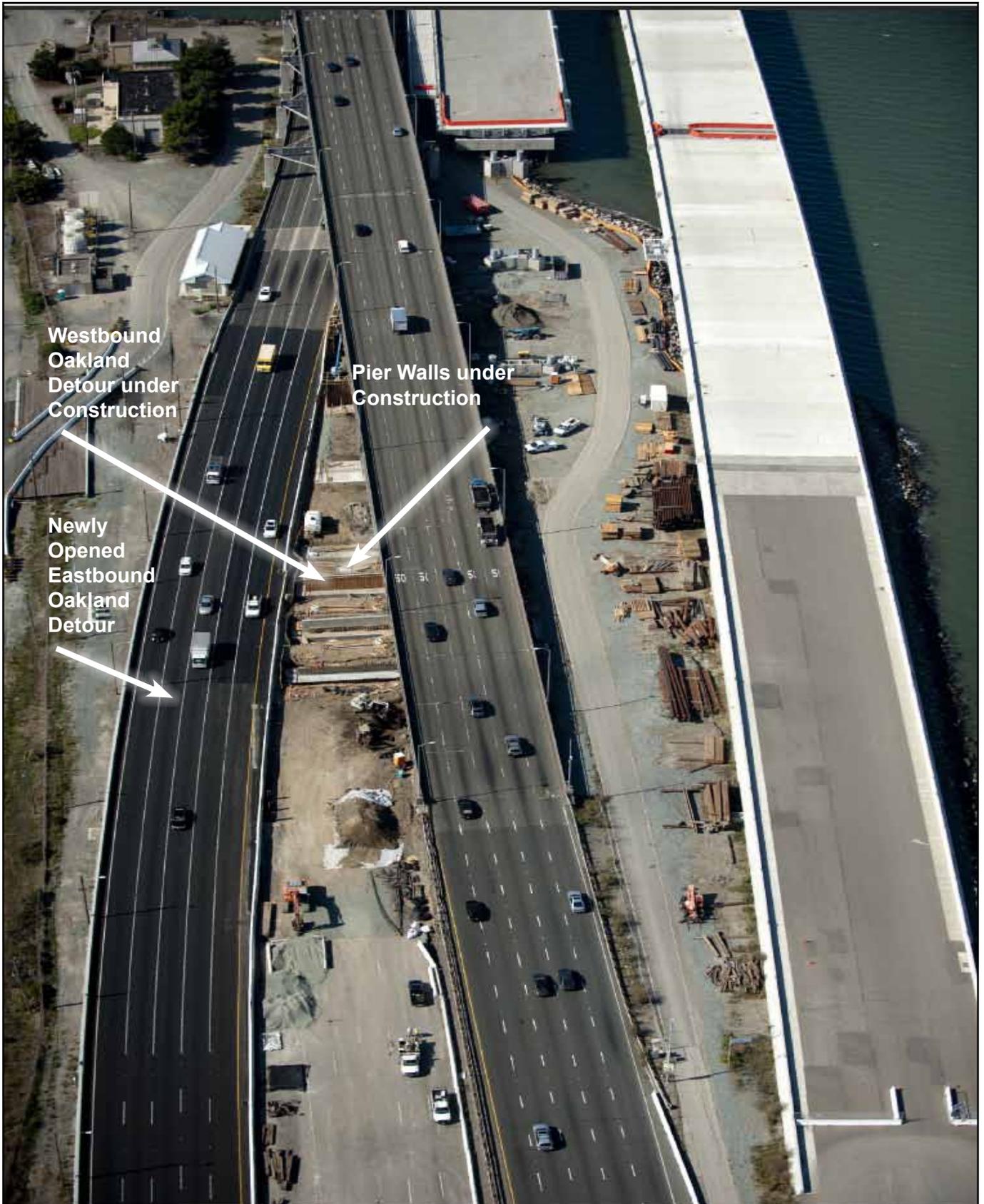
Straddle Wall Drainage



Pier Wall



Foundation Pier Wall



Westbound Oakland Touchdown Detour Construction Progress

## Appendix E: Project Progress Photographs

### Yerba Buena Island Transition Structure #1 Westbound



First Westbound Roadway Deck Formwork Installed between Bent 4 and Pier Cap 7



YBITS #1 Westbound Span Rebar Installation



Overview of the Yerba Buena Island Westbound Transition Structure on left and Yerba Buena Island Temporary Detour on right

## Appendix F: Glossary of Terms

### Glossary of Terms

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

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

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

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

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

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

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

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

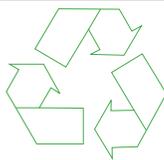
**BATA PROJECT COMPLETE BASELINE:** The planned completion date for the Regional Measure 1 Program or subordinate projects or contracts.

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

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

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

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



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

The San Francisco-Oakland Bay Bridge's Self-Anchored Suspension Bridge with Shear-Leg Crane Barge Hoisting the Second to Last Roadway Box to Complete the Self-Anched Suspension Bridge Roadway





