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Acting Auditor General

June 28, 1990 P-971

Honorable Elihu M. Harris, Chairman
Members, Joint Legislative
Audit Committee
State Capitol, Room 2148
Sacramento, California 95814

Dear Mr. Chairman and Members:

We conducted a review of the Department of Transportation's (Caltrans) cost estimates for the Regional Measure One projects. Regional Measure One projects are improvement and construction projects authorized by the Legislature and the voters in seven counties to reduce traffic congestion in the San Francisco Bay Area.

Between October 1987 and March 1990, Caltrans' cost estimates for the Regional Measure One projects changed significantly. During these 30 months, Caltrans provided various entities with cost estimates on at least six occasions for each project. These entities included members of the Legislature and the Metropolitan Transportation Commission. In the four projects we reviewed, the October 1987 estimates for these projects were $447.1 million. By March 1990, Caltrans had changed the cost estimates to $595 million, an increase of $147.9 million (33 percent). Caltrans changed the cost estimates because it revised the project scopes, used more detailed procedures to estimate costs based on engineering studies, and because it used two methods to estimate costs.

Furthermore, when presenting cost estimates to the Legislature and other interested parties, Caltrans did not consistently incorporate all costs in the estimates, including the effects of inflation. Also, Caltrans did not include project support costs in its estimates. Project support costs comprise Caltrans' costs for project development and construction engineering, including construction inspection and administrative overhead costs. In its $933 million March 1990 estimates of construction costs, Caltrans did not include $181 million for project support costs and $430 million for inflation costs. The inclusion of these costs would have brought the total estimate for Regional Measure One projects to $1.544 billion.

Caltrans expects these estimates to change as each project's scope is further defined and developed. It also expects that inflation, schedule changes, scope changes, and environmental issues will affect the cost of the projects. Finally, it believes that a legislative mandate for a bicycle and pedestrian facility for a bridge will result in increased costs.

BACKGROUND

Under the California Toll Bridge Authority Act, Caltrans is responsible for the acquisition, construction, operation, and maintenance of the Bay Area toll bridges. In addition, Caltrans produces, monitors, and reviews cost estimates for each construction project. The California Transportation Commission is responsible for programming and allocating funds for specific highway, transit, and aviation purposes.

The toll bridges in the Bay Area under the jurisdiction of Caltrans are the Antioch, Benicia-Martinez, Carquinez, Richmond-San Rafael, Dumbarton, San Mateo-Hayward, and San Francisco-Oakland Bay bridges. In fiscal year 1989-90, these bridges collected approximately $116.9 million in toll revenues. In the next ten years, from fiscal year 1990-91 through fiscal year 2000-01, Caltrans estimates that toll revenues will total $1.354 billion.

Regional Measure One

In August 1988, the State enacted Chapter 406, Statutes of 1988, which authorized toll increases on the Bay Area toll bridges and a revenue bond program to finance improvements and construction to reduce traffic congestion. The legislation required the approval of the majority of voters in San Francisco, Alameda, Contra Costa, Marin, San Mateo, Santa Clara, and Solano counties. In November 1988, a majority of the voters in the counties approved the legislation, known as Regional Measure One.

The legislation established the Northern Bridge Unit, consisting of the Antioch, Benicia-Martinez, Carquinez, and Richmond-San Rafael bridges. The legislation also established the Southern Bridge Unit, consisting of the Dumbarton, San Mateo-Hayward, and the San Francisco-Oakland Bay bridges. For each of the bridge units, the legislation created a separate account in the State Transportation Fund into which the bridge toll revenues are deposited.

From each bridge unit, Caltrans may expend revenues on any bridge in that unit for safety and operational costs. Also, using the toll revenues, Caltrans pays the principal and interest on bonds issued for the construction and improvement of bridges in that unit. Furthermore, the legislation authorizes funding for major bridge projects from toll revenues for each bridge unit.

The Northern Bridge Unit projects are to widen the existing Benicia-Martinez Bridge; construct a new span parallel to the existing Benicia-Martinez Bridge; replace the existing western span of the Carquinez Bridge; and rehabilitate the Richmond-San Rafael Bridge and develop a new eastern approach between the toll plaza and Route 80 near Pinole. The Southern Bridge Unit projects are to improve the western approaches from Route 101 to the Dumbarton Bridge; construct the West Grand Avenue connector or develop an alternative project to reduce traffic on the eastern approach to the San Francisco-Oakland Bay Bridge; and widen the San Mateo-Hayward Bridge and improve the Route 92/Route 880 interchange.

Regional Measure One also authorizes the Metropolitan Transportation Commission to adopt a toll schedule for each of the toll bridges. The Metropolitan Transportation Commission is a public agency created in 1971 for regional transportation planning and coordination in the Bay Area counties. In 1989, the commission adopted a new toll schedule that increased tolls for the seven Bay Area toll bridges. Under the new schedule, the toll for all bridges increased to $1 for Class I vehicles.

Finally, Regional Measure One authorizes the California Transportation Commission to issue revenue bonds to finance any or all of the major projects authorized by the legislation. As of June 11, 1990, the commission has not authorized the issuance of any revenue bonds for the projects.

SCOPE AND METHODOLOGY

The purpose of the audit was to review the cost estimates for Regional Measure One projects. Specifically, we reviewed relevant statutes and regulations. In addition, we reviewed Caltrans' policy and procedures manual for estimating project costs. We also reviewed Caltrans' report to the Legislature on capital projects for the toll bridges, issued in October 1987. Caltrans prepared this report, entitled "Twenty-Year Traffic Demands and Ten-Year Capital Outlay for State-Owned Toll Bridges in the San Francisco Bay Region" (SR-46), in response to Senate Resolution 46, Statutes of 1986.

Also, to obtain information on each project, we interviewed responsible persons at Caltrans' headquarters in Sacramento, at Caltrans' District Four, and at the Metropolitan Transportation Commission. Caltrans' District Four, located in San Francisco, is responsible for developing the cost estimates for Regional Measure One projects.

In addition, we selected four Regional Measure One projects and reviewed the cost estimates prepared for these projects. The selected projects are the new span for the Benicia-Martinez Bridge, the widening of the San Mateo-Hayward Bridge, improvements to the western approach to the Dumbarton Bridge, and the Route 92/Route 880 interchange for the San Mateo-Hayward Bridge. We reviewed the scope of work for each of the four projects as of October 1987 and each subsequent scope change. Further, we reviewed the cost estimates of the four projects and changes in those estimates. However, we did not determine whether sufficient funding would be available to pay for the construction of the Regional Measure One projects.

In addition to determining the cost estimating methods Caltrans used for the Regional Measure One projects, we determined which method it used to provide estimates to entities outside of Caltrans, including members of the Legislature. We also determined whether Caltrans included project support costs and inflation costs in its estimates for these entities.

Finally, we requested Caltrans to provide estimates for project support costs and inflation costs for each Regional Measure One project. We also requested the estimated dates that construction will begin on the projects.

CALTRANS CHANGED THE COST ESTIMATES FOR THE REGIONAL MEASURE ONE PROJECTS

During the 30 months from October 1987 to March 1990, Caltrans provided various entities with cost estimates on at least six occasions for each Regional Measure One project. It provided cost estimates in its SR-46 report to the Legislature in October 1987, to members of the Legislature in April 1988 and September 1989, to the Department of Finance for Caltrans' budget change proposal in September 1989, and to the Metropolitan Transportation Commission in April 1989 and March 1990. Since October 1987, Caltrans changed the cost estimates significantly. Table 1 summarizes Caltrans' estimates for the first estimates Caltrans provided in October 1987 and its March 1990 estimates for the four projects we reviewed.

TABLE 1

**CALTRANS' COST ESTIMATES FOR FOUR PROJECTS
FUNDED BY REGIONAL MEASURE ONE
OCTOBER 1987 AND MARCH 1990**

Project Description	October 1987 Estimate	March 1990 Estimate	Increase (Decrease)	Percent Increase (Decrease)
Improvements to the western approach to Dumbarton Bridge	$ 3,000,000	$ 25,000,000	$ 22,000,000	733%
Widening the San Mateo-Hayward Bridge	84,600,000	150,000,000	65,400,000	77
Improvements to the Route 92/ Interstate 880 Interchange	110,000,000	60,000,000	(50,000,000)	(45)
New span for the Benicia-Martinez Bridge	249,500,000	360,000,000[a]	110,500,000	44
Total	$447,100,000	$595,000,000	$147,900,000	33

[a]This estimate of $360 million for the Benicia-Martinez Bridge represents $190 million of Regional Measure One funds and $170 million from other sources.

Reasons for Changes in Cost Estimates

The estimates shown in Table 1 changed because of a variety of reasons. For example, Caltrans revised the project scopes, leading to changes in cost estimates. Also, Caltrans used more detailed estimating procedures as projects were further defined and developed. For earlier estimates, it prepared preliminary cost estimates based on limited engineering information. After conducting engineering studies on the projects, Caltrans' later estimates were based on more detailed information. Finally, at various times, Caltrans' cost estimates differed because it used two methods to estimate costs: current and escalated construction costs.

Generally, Caltrans developed estimates using current costs, that is, the cost to construct a project as of a specific date and the cost of acquiring rights-of-way. Rights-of-way are real estate that Caltrans acquires for constructing and maintaining state highway projects. When

determining current costs, Caltrans does not consider the effects of inflation on future construction costs. Caltrans used current costs because, according to Caltrans' director, it was required to use current costs in its estimates for some agencies, such as the Federal Highway Administration. Also, Caltrans uses current costs to determine inflation costs. Further, it believes that current costs provide a point of reference for comparing projects. For example, Caltrans stated that it prioritizes projects on the basis of current costs combined with such improvements as reduction of congestion, traffic delays, and accidents. According to Caltrans, this gives Caltrans an indication of which projects should be developed and when the projects should be constructed.

For some estimates, Caltrans used escalated costs, which include the effects of inflation on future costs. Escalated costs are determined by applying the inflation factor to the current costs. In these instances, Caltrans included an inflation factor of 4.8 percent for fiscal year 1990-91, 4.6 percent for fiscal year 1991-92, and 4.8 percent in years after 1991-92. For right-of-way costs, Caltrans established a higher inflation factor ranging from 12 percent to 20 percent annually for Regional Measure One projects. Caltrans uses escalated costs for analyses such as determining if revenues will be sufficient to fund future construction. Also, Caltrans uses escalated costs for the State Transportation Improvement Program.

For each project, Caltrans provided cost estimates to various entities, including the Legislature and the Metropolitan Transportation Commission. Table 2 presents six of Caltrans' estimates for the four projects we reviewed. Following the table, we present an explanation of Caltrans' changes to its cost estimates for the projects shown in Table 2.

TABLE 2

CALTRANS' COST ESTIMATES FOR PROJECTS FUNDED BY REGIONAL MEASURE ONE FROM OCTOBER 1987 TO MARCH 1990

		Cost Estimates			
	Date	Improvement to the Western Approach to the Dumbarton Bridge	Widening the San Mateo-Hayward Bridge	Improvements to Route 92/ Interstate 880 Interchange	New Span at the Benicia-Martinez Bridge
SR-46 Report	October 1987	$ 3,000,000[a]	$ 84,600,000[b]	$110,000,000	$249,500,000[b]
Letter to a member of the Legislature	April 1988	3,000,000[b]	87,000,000[b]	140,000,000[b]	230,000,000[b]
Presentation to the Metropolitan Transportation Commission	April 1989	150,000,000	145,000,000	125,000,000	359,000,000
Letter to members of the Legislature	September 1989	25,000,000	150,000,000	60,000,000	360,000,000
Budget change proposal submitted to the Department of Finance	September 1989	25,000,000	150,000,000	60,000,000	360,000,000
Testimony to the Metropolitan Transportation Commission	March 1990	25,000,000	150,000,000	60,000,000	360,000,000

[a] In its SR-46 report, Caltrans indicated that this estimate was a current cost estimate. However, in its Adopted State Transportation Improvement Plan for 1988, Caltrans stated that the project current cost was $2.5 million and the escalated cost was $3 million.

[b] Escalated costs.

Changes in Cost Estimates
for the Dumbarton Bridge

The cost estimates for the Dumbarton Bridge changed because the project's scope changed. Also, Caltrans sometimes used current costs and sometimes used escalated construction costs when providing estimates to interested parties. For the October 1987 and April 1988 estimates, the project scope was to widen the existing western approach to the Dumbarton Bridge from two lanes to four lanes at a cost of $3 million.

According to Caltrans, in June 1988, it changed the project scope because the voters in San Mateo County enacted a sales tax measure to finance highway projects, including a new connection to the western approach to the Dumbarton Bridge. Also, Caltrans stated that this changed its planning assumptions and, thus, resulted in a change in the project scope. The April 1989 estimate of $150 million was for a substantially different project. The scope for this estimate included widening the approach to six lanes, building three interchanges, and adding a two-lane frontage road. Later, the September 1989 and March 1990 estimates were for a project to widen the western approach to six lanes. This change in scope resulted in a decrease to a current cost of $25 million.

Changes in Cost Estimates for
the San Mateo-Hayward Bridge

Caltrans changed the cost estimates for widening the San Mateo-Hayward Bridge because it changed the project scope, used more detailed estimating procedures, and varied between current and escalated costs. In the October 1987 estimate, the scope included adding only one shoulder to the bridge, expanding the toll booths, and widening existing eastern and western approaches to the bridge. At this time, Caltrans estimated the cost at $84.6 million based on escalated construction costs.

In the September 1989 estimate, Caltrans changed the current estimate to $150 million because it used more detailed estimating procedures and engineering studies. The September 1989 estimate also included $82 million for two shoulders and foundation work. Additionally, in this estimate, Caltrans increased the costs of expanding the toll booths to $11 million. It also increased the costs of widening the eastern approach to the bridge to $23 million and the western approach

to $10 million. Finally, costs to minimize environmental impact on the San Francisco Bay increased the estimate to $24 million. In March 1990, Caltrans provided the same cost estimate of $150 million as it had provided in September 1989.

Changes in Cost Estimates for the
Route 92/Interstate 880 Interchange

Caltrans changed cost estimates of the Route 92/Interstate 880 interchange because it changed the scope of the project. Also, the estimates varied because Caltrans used estimating procedures based on both current and escalated costs for this project. In October 1987, Caltrans estimated a current cost of $110 million for modifying three of the four existing connectors between Route 92 and Interstate 880. Later, for the April 1988 estimate, Caltrans escalated the current costs to $140 million to include the effects of inflation on the costs. Then, for its April 1989 estimate, Caltrans modified the scope by adding a high-occupancy-vehicle lane to the project, changing the estimate based on current costs to $125 million. For the September 1989 estimate, Caltrans again changed the scope. The new scope included modifications to only 2 of the existing 4 connectors between Route 92 and Interstate 880, and it eliminated the high-occupancy-vehicle lane. This reduced the estimated current costs to $60 million. In the March 1990 estimate, Caltrans used the September 1989 cost estimate of $60 million.

Changes in Cost Estimates for
the Benicia-Martinez Bridge

For constructing a new span parallel to the existing Benicia-Martinez Bridge, relocating the toll plaza, and reconstructing the Interstate 680/Interstate 780 interchange, Caltrans estimated the cost, including right-of-way costs, as $249.5 million in October 1987. It used escalated costs for this estimate. In April 1988, Caltrans estimated the cost of the new span to be $230 million, again using escalated costs. However, it did not include the right-of-way costs of $36 million in this estimate.

By September 1989, Caltrans had reported the estimate as $360 million, although it used current costs for this estimate, rather than escalated costs. The estimate of $360 million represents $190 million of Regional Measure One funds and $170 million from other sources. The cost estimate increased because Caltrans changed the scope of the project and used more detailed estimating procedures based on new

engineering studies. This estimate of $360 million includes several components, including $160 million for a fifth lane for the bridge span and $25 million for the toll plaza. In addition, after conducting engineering studies, Caltrans increased the estimate for the approaches to the bridge, adding $23 million to its estimate. Caltrans further increased its estimate to $67 million for the improvements to the interchange between Interstate 780 and Interstate 680, and it added another $42 million for improvements to the Marina Vista interchange, Interstate 680, and other connections. Finally, Caltrans increased the estimate to acquire the right-of-way for the project to $43 million.

INFLATION COSTS AND PROJECT SUPPORT COSTS NOT INCLUDED IN ESTIMATES

On at least six occasions, from October 1987 to March 1990, Caltrans provided various entities with estimates for each project. However, it did not always indicate whether it used current or escalated costs for its estimates. For the estimate provided in the SR-46 report issued in October 1987, Caltrans stated that it used current costs for some projects and escalated costs for the other projects. It used escalated costs for projects that are to be built before fiscal year 1992-93 and current costs for projects to be built after fiscal year 1992-93.

Since most of the projects will not be built for several years, it would be useful for Caltrans to provide escalated costs to give a realistic idea of what costs will be when construction actually begins. Also, escalated costs are used to determine if the bridge unit will have sufficient funds or the ability to borrow sufficient funds to pay for the projects. For example, the replacement of the existing western span of the Carquinez Bridge will not begin until fiscal year 1997-98. As of March 1990, the current construction cost for the new span is $210 million. However, when bridge construction begins in fiscal year 1997-98, construction costs, escalated for eight years of inflation costs, will be $340 million, including project support costs. Also, using escalated costs, Caltrans can determine if the bridge unit account will have sufficient funds or the ability to borrow funds to pay $340 million for the bridge construction.

In addition to not always including inflation costs in its estimates, Caltrans did not include project support costs in its estimates for any of the Regional Measure One projects. Project support costs include costs for project development and construction engineering, including construction inspections and administrative overhead costs incurred by

Caltrans. For example, in its March 1990 estimate of $210 million for replacing the western span of the Carquinez Bridge, Caltrans did not include estimated support costs of $32 million.

According to Caltrans' Project Development Procedures, if it does not include all costs in its estimates, it could impair the effective use of resources for staffing and budgeting decisions, and it may lose credibility. Further, Caltrans' relations with the California Transportation Commission, the Legislature, and the public may be adversely affected.

CALTRANS' MARCH 1990 COST ESTIMATES FOR REGIONAL MEASURE ONE PROJECTS

Table 3 presents Caltrans' estimates for Regional Measure One projects as of March 1990. Caltrans prepared this information in response to our recent request. The table shows when Caltrans expects construction to be started, the current costs as of March 1990, the estimated inflation costs, and the project support costs for the projects.

TABLE 3

CALTRANS' COST ESTIMATES FOR REGIONAL MEASURE ONE PROJECTS MARCH 1990

Project	Estimated Date of Construction	Current Costs	Inflation Costs	Project Support Costs	Total Costs
Improving the Route 92/ Interstate 880 interchange	1995-96	$ 60,000,000	$ 32,000,000	$ 15,000,000	$ 107,000,000
New Span for the Benicia-Martinez Bridge	1994-95	190,000,000	71,000,000	30,000,000	291,000,000
Improving the Interstate 680 connections to the Benicia-Martinez Bridge	1996-97	170,000,000	121,000,000	51,000,000	342,000,000[a]
Improving the western approach to the Dumbarton Bridge	1994-95	25,000,000	7,000,000	11,000,000	43,000,000
Widening the San Mateo-Hayward Bridge	1992-93	150,000,000	46,000,000	23,000,000	219,000,000
Replacing the western span of the Carquinez Bridge	1997-98	210,000,000	98,000,000	32,000,000	340,000,000
Improving the Interstate 80 connections to the Carquinez Bridge	1999-2000	35,000,000	36,000,000	6,000,000	77,000,000[b]
Constructing the West Grand Avenue approach to the San Francisco-Oakland Bay Bridge	1995-96	40,000,000	19,000,000	13,000,000	72,000,000
Rehabilitating the Richmond-San Rafael Bridge	1990-2000	14,000,000	not available	not available	14,000,000
Constructing a new eastern approach to the Richmond-San Rafael Bridge	not available	39,000,000	NA	NA	39,000,000[c]
Total		$933,000,000	$430,000,000	$181,000,000	$1,544,000,000

[a]This part of the Benicia-Martinez Bridge project will not be funded from Regional Measure One funds.

[b]This part of the Carquinez Bridge project will not be funded from Regional Measure One funds.

[c]This estimate is for a grant to local agencies who will develop the project.

Current costs represent 60.4 percent of the total cost of constructing the Regional Measure One projects. Inflation costs represent 27.8 percent, and project support costs represent 11.8 percent.

The estimates shown in Table 3 will change if Caltrans changes the scopes of the projects, revises its cost estimates, or changes the dates of construction. In a letter dated June 11, 1990, Caltrans' director believes the cost estimates will change before construction begins on the projects as they are further defined and developed. It also expects that inflation, schedule changes, scope changes, and environmental issues will affect the cost of the projects. Finally, Caltrans believes that a legislative mandate will result in cost increases. This legislation requires a bicycle and pedestrian facility for either the Benecia-Martinez Bridge or the Carquinez Bridge. The cost of the facility, ranging from $9 million to $34 million, has not been included in any of the estimates.

We conducted this review under the authority vested in the auditor general by Section 10500 et seq. of the California Government Code and according to generally accepted governmental auditing standards. We limited our review to those areas specified in the audit scope section of this letter.

Respectfully submitted,

KURT R. SJOBERG
Acting Auditor General

The Business, Transportation and Housing Agency's response to this letter

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June 22, 1990

Mr. Kurt R. Sjoberg
Acting Auditor General
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Dear Mr. Sjoberg:

On June 15, 1990, you transmitted to Business, Transportation and Housing Agency Secretary, John Geoghegan, your draft letter report regarding the audit of the Department of Transportation's cost estimates for Regional Measure One projects. Mr. Geoghegan has asked me to respond to your report.

The following comments are offered to keep the status of the Regional Measure One projects in perspective:

A. The report did not mention funding. To avoid any misunderstanding about whether the Regional Measure One projects can be funded, it is important to note that the projects at their current cost estimates plus inflation and support costs can be funded from the toll revenue generated by Measure One.

B. The report states that "Between October 1987 and March 1990 Caltrans' cost estimates for Regional Measure One projects changed significantly." That is correct. Project cost estimates can change upward or downward as the project proceeds through the environmental process. Project scope and costs are revised as alternatives and environmental mitigation measures are identified and refined. The potential for cost changes continues until the preferred alternative is selected at the conclusion of the environmental process.

C. The report also states, "When presenting cost estimates to the Legislature and other interested parties, Caltrans did not consistently incorporate all costs in the estimates, including the affects of inflation." This statement relates to the Department of Transportation's use of "current costs"

and "escalated costs" to communicate estimated project costs. The Department uses a consistent basis for cost estimating. "Current cost" is the base estimate for a project reflecting the project scope and today's cost of constructing the project. Current costs are used in two ways: (1) the basis for inflating project costs to the year of construction and (2) communicating project costs to interested parties when construction schedules have not been established.

"Escalated cost" is the estimated cost of constructing a project in a future year. The project's current cost is inflated to the year of construction by using the inflation rates adopted by the California Transportation Commission. There is no basis for using escalated costs unless the project construction schedule has been established.

In communicating with the Legislature and others on the Regional Measure One projects, the Department used escalated costs when the project had been scheduled for construction in the State Transportation Improvement Program (STIP) and used current cost estimates when construction schedules had not been established.(1)

Sincerely,

ROBERT K. BEST
Director

cc: JKGeoghegan

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(1)The Office of the Auditor General's comment: Caltrans is incorrect. For example, in a Caltrans' letter to a member of the Legislature, dated April 1988, Caltrans used escalated cost for all of the Regional Measure One projects even though several projects, including the new span for the Carquinez Bridge, the rehabilitation of the Richmond-San Rafael Bridge, and the improvements to the Route 92/Interstate 880 interchange, were not included in the 1988 adopted State Transportation Improvement Program. Further, Caltrans provided only current costs without escalation for all projects in April 1989, September 1989, and March 1990, although several projects were in the 1988 adopted State Transportation Improvement Program.