

Memorandum

To: CHAIR AND COMMISSIONERS
CALIFORNIA TRANSPORTATION COMMISSION

CTC Meeting: October 19-20, 2016

Reference No.: 2.5e.(4)
Information Item

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Chief Financial Officer

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Programming

Subject: **SUPPLEMENTAL FUNDS ALLOCATION FOR GERALD DESMOND BRIDGE
DESIGN-BUILD PROJECT RESOLUTION FA-16-07**

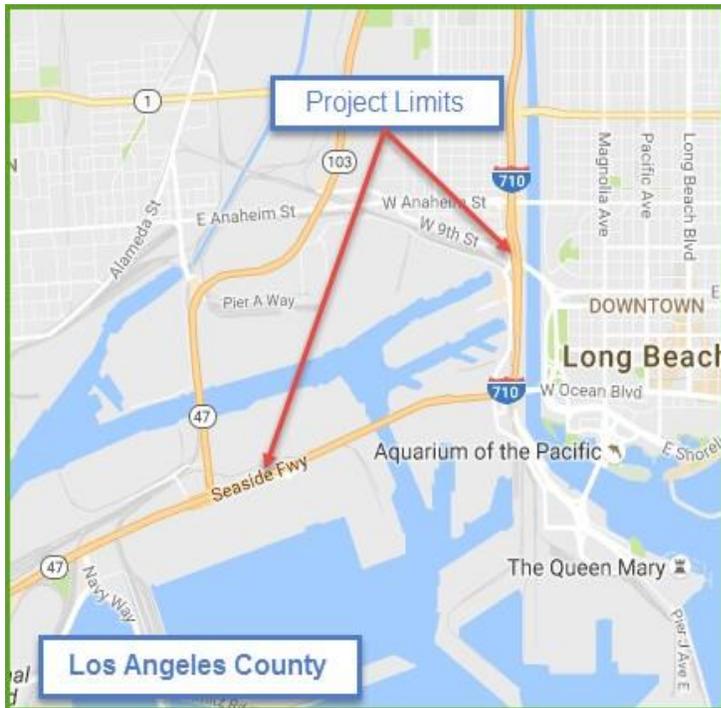
RECOMMENDATION

The California Department of Transportation (Department) recommends that the California Transportation Commission allocate an additional \$57,166,000 in State Highway Operation and Protection Program (SHOPP) funds to the project as specified below.

BACKGROUND

The project is located in Los Angeles County at the Port of Long Beach (Port), connecting the southern terminus of Interstate 710 to State Route 47. This project will replace the Port of Long Beach owned Gerald Desmond Bridge with a new cable-stayed bridge that will be incorporated into the State Highway System when completed. The existing bridge accommodates approximately 10 percent of all U.S. waterborne container volume, via the trucking of containers between the Ports of Long Beach and Los Angeles and the inland warehousing, transloading and distribution centers. This bridge is vital to the Southern California and State economies and it is a nationally important transportation asset. As the future owner-operator of the new bridge, the Department has critical interest and compelling responsibility to ensure that the new bridge is designed and constructed to be durable, resilient and able to withstand seismic events.

PROJECT LOCATION



FUNDING STATUS

The project is funded through Federal, State, and Port sources. The original cost estimate was based on 30 percent design (as of July 2008) at \$950,000,000. This includes a \$500,000,000 state contribution. The Port’s current project cost estimate is \$1,491,901,000 at a 70 percent confidence level.

The Commission took various actions with regard to the \$500,000,000 state contribution as outlined below:

<u>CTC Meeting</u>	<u>Fund Type</u>	<u>Amount</u>	<u>CTC Actions</u>
November 2010	none	none	Adopt New Bridge Alignment into SHS
June 2011	SHOPP	\$170,205,000	Allocation approved
June 2011	(TCIF)	\$299,795,000	Allocation approved
October 2012	SHOPP	(\$153,657,000)	Deallocation approved
October 2012	CMIA	\$153,657,000	Program Amendment and allocation approved
October 2012	SHOPP	\$30,000,000	Program Amendment approved
		\$500,000,000	TOTAL STATE CONTRIBUTION

BASIS FOR SUPPLEMENTAL FUNDS

The Department's share of the cost increase is \$57,166,000 for a total Department cost of \$557,166,000. This includes \$32,960,000 for construction capital and \$24,206,000 for capital outlay support for oversight.

The overall project cost for the Port's project has increased over 50 percent from \$950 million in 2010 to approximately \$1.5 billion today. The Department's \$57,166,000 increase is approximately 10 percent of the total cost increase of \$541,901,000 (\$1,491,901,000 - \$950,000,000).

REDESIGN - CONSTRUCTION CAPITAL

In early 2013, the Department had concerns with the design-builder's proposed design with regards to long-term durability and potential for failure of the hollow towers supporting the main span during a seismic event. It is a well-established design practice on highway bridges to limit the permanent axial load ratio to no more than 15 percent to achieve seismic design criteria ductility requirements. Caltrans seismic standards, and the primary national seismic standards and guidance are based on laboratory testing consistent with axial loads in this range. The design-builder's proposed tower cross-section design resulted in axial load ratio ranges from 24 percent to 34 percent. An in-depth review of hollow column research and details of other California bridges supported on hollow towers confirmed that the proposed axial load range and column aspect ratios were unprecedented in the tower design and were based upon mathematical models that had not been validated through any known seismic testing.

After consultation with internationally recognized seismic research experts and independent evaluations and analysis by Caltrans in-house experts and the Port's consulting engineer, the recommendation to redesign the tower was presented to the Caltrans Directorate. After lengthy internal discussions, involving the State Bridge Engineer, the Chief Engineer, the Director, consult with the American Association of State Highway and Transportation Officials (AASHTO), as well as discussions between the Department, the Port and the design-builder, both partners finally agreed to require the design-builder to redesign the tower with a lower axial load ratio with an acceptable level of ductility to ensure seismic safety and the long term structural integrity of the bridge.

The Department estimates the tower redesign cost at \$63,293,000, and hired an independent estimator to validate this number. The Department's initial contribution of \$500,000,000 was 52.07 percent of the original project budget of \$950,000,000. Using the original State contribution percentage, the Department is requesting 52.07 percent cost share of \$63,293,000, totaling \$32,960,000 in additional SHOPP funding for construction capital.

CAPITAL OUTLAY SUPPORT – OVERSIGHT

As this project is the first cable-stayed bridge of its size in California and the first bridge project of its size to be delivered via a design-build contract, there were a few uncertainties which have led to the need for additional funding for the project as follows:

- The project's Quality Management Plan did not foresee needed protocol and testing frequencies on many structural items required by the unique nature of this cable-stayed bridge.
- The design-builder proposed the use of products not on the Department's approved list of products requiring increased staff resources and testing by the Department.
- Nonstandard designs, innovations, new products and materials proposed by the design-builder, while beneficial and a major reason for using design-build, have and will continue to require higher levels of oversight.

This project was originally scheduled to open for use in under 4 years, meaning it would be open for traffic by now under the original schedule. Challenges encountered during the design and construction delayed the bridge completion. The design-builder's current schedule for completion has been delayed two-and-one-half years, with further delays possible. The lengthiest schedule delays are due to the Bent 15 Foundation (the structure that anchors the cable) redesign due to differing site condition and the tower redesign.

The Port of Long Beach utilized one of the Department's 10 design-build slots authorized under Senate Bill X2 4. The Department has learned throughout the design-build demonstration program that the level of resources required for oversight of a local design-build project in some cases may be greater than the levels required for traditional oversight of local design-bid-build projects for the following reasons:

- Dedicated Department staff are needed for the project in order to be responsive to the numerous design and shop drawing submittals. Staff are frequently co-located with the local agency and the design-builder to facilitate timely reviews and input on the design as required in the contract.
- The design development process is more iterative than on a traditional design-bid-build project as the design-builder attempts to develop the most cost-effective solution. This results in the need for frequent, often weekly, meetings to review and discuss design packages that are in progress.
- A high number of design submittal packages as the design is developed in multiple packages to accommodate the design-builder's desire to begin construction components at the earliest possible time. By comparison, under traditional design-bid-build, the design is submitted in a single package covering the entire scope of work.
- The need for adequate oversight (both testing and inspection) of the construction activities to ensure that both the local agency and the design-builder quality programs are implemented as approved.

This design-build project is unique because the project has two responsible owners, the Port (as the current owner representing the City of Long Beach and administering the contract) and the Department (as the future owner upon completion of the project, providing technical oversight and acceptance), requiring both agencies to have oversight responsibilities. The combined Port and Department oversight and quality assurance responsibilities (current and projected) total approximately \$170,000,000, which is close to other design-build projects of this cost and complexity.

The Department is requesting \$24,206,000 in SHOPP funding for capital outlay support for oversight over the next two-and-one-half years to complete the project.

DETERMINATION

The Department has determined that this request of \$57,166,000 (\$32,960,000 for construction capital plus \$24,206,000 for capital outlay support for oversight) is necessary to complete construction of a durable and resilient bridge designed to last 100 years and able to withstand seismic events.

FINANCIAL RESOLUTION

Resolved, that \$57,166,000 be allocated from Budget Act Item 2660-001-0890 and 2660-302-0890, to provide capital outlay support funds and construction capital funds to complete construction of the project.