(Right:) The Gerald Desmond Bridge today. The bridge was not designed to handle today’s typical daily traffic of 58,000 to 68,000 vehicles. The replacement bridge is projected to carry 30 million vehicle trips per year.

Bridging Long Beach into the Future
Planning, Financing, and Building a Transportation Megaproject
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The Gerald Desmond Bridge is a critical piece in the trade and commerce infrastructure of the United States—nearly 15 percent of the nation’s waterborne cargo passes beneath its span. Locally, the bridge is a major commuter thoroughfare, carrying 58,000 to 68,000 vehicle trips a day.

The bridge, however, is old and out-of-date. The State of California is replacing the steel-arch structure over the main channel of the Port of Long Beach with the state’s first cable-stayed bridge. The new bridge not only will provide an effective infrastructure solution for today’s traffic...
demand but will stand as a beautiful addition to the city's skyline. After a decade of preparation, construction began in 2013, with completion scheduled for 2016–2017.

**Vital Connector**

When the Gerald Desmond Bridge opened in 1968, few could have imagined the surge in Transpacific trade that would make the Port of Long Beach and the Port of Los Angeles the two busiest seaports in North America, handling 40 percent of all container trade into the United States. With the region's rapid urban growth, the Gerald Desmond Bridge became a vital connector for the ports, the City of Long Beach, Southern California, and the nation. The U.S. Congress designated the bridge as a National Highway System Intermodal Connector Route and as part of the Federal Strategic Highway Network.

The Port of Long Beach—that is, the City of Long Beach Harbor Department—owns and maintains the current Gerald Desmond Bridge (see map, Figure 1, above right). At completion of the new bridge, the State of California will assume ownership of the structure and connectors, which will be maintained by the California Department of Transportation (Caltrans).

The new bridge, designed primarily to ease traffic congestion and improve safety, will be constructed adjacent to the current span, and the old bridge will be demolished after the new structure opens for traffic. The project is a joint effort of Caltrans and the Port of Long Beach, with additional funding from the U.S. Department of Transportation (DOT) and the Los Angeles County Metropolitan Transportation Authority (Metro).

**Investment Program**

In 2010, the Port of Long Beach launched a $4.5 billion capital improvement program—the most extensive in the port's 102-year history—to be implemented over the next decade. The investment is the largest by any seaport in the country and will help Long Beach remain competitive as a gateway of choice in Transpacific trade, will improve efficiency, and will maintain environmental stewardship. The Gerald Desmond Bridge Replacement Project is one...
of the major elements of the investment program, which includes the $1 billion Middle Harbor Redevelopment Project and other improvements.\(^1\)

In August 2010, the port’s Board of Harbor Commissioners unanimously approved the environmental impact report for the project. In November 2010, the California Transportation Commission approved the funding and building plans by the Port of Long Beach, clearing the way for the port and Caltrans to seek bids for design and construction of the new bridge.

**Design–Build Procurement**

The Gerald Desmond Bridge Replacement Project was the eighth project that the California Transportation Commission authorized under the state’s design–build legislation SBX2 4, signed into law in 2009. The legislation created a transportation design–build demonstration program that authorizes best-value procurements for a limited number of projects. The method combines design and construction into one contract to expedite the project and—through time savings—reduce costs.

The port issued a request for qualifications to the international engineering and construction community on November 5, 2010. By March 2011, four of the seven teams that submitted qualifications were selected to continue in the procurement process. In September 2011, the port issued an extensive request for proposals to the four teams. Three teams submitted proposals in late February 2012; one chose not to pursue the project.

**Evaluating Proposals**

The proposal evaluation was conducted in three distinct approaches, because of the technical complexity and the multijurisdictional procurement requirements:

- The Tier 3 Technical Expert Panel (TEP) analyzed the technical parameters in each proposal. The TEP developed consensus comments only and did not rank, score, or compare proposals.
- The Tier 2 Pass–Fail Subcommittee analyzed each proposal in terms of the pass-or-fail criteria and developed a consolidated set of recommendations for each proposal.
- The Tier 2 Technical Scoring Subcommittee assigned adjectival scores for each evaluation criterion.
- The Tier 1 Project Selection Committee oversaw the entire evaluation and selected the best-value proposal.


**Expected Benefits**

The new bridge will provide many benefits. Three lanes in each direction and emergency lanes on both sides will greatly improve traffic flow and reduce delays from safety hazards such as accidents and vehicle breakdowns. The current bridge has two lanes in each direction, plus a merger lane, but no emergency lanes. The new span also will include

\(^1\) For more details, www.newgdbridge.com.
bicycle and pedestrian paths, as well as three observation decks.

The vertical clearance will increase from 155 to 205 feet, allowing today’s larger, greener ships to access the inner harbor shipping terminals. The new design offers shallower grades, so that drivers will not have to accelerate as much, reducing pollutant emissions. Construction will incorporate state-of-the-art, green technology and the latest in seismic engineering.

Interstate 710 (I-710), the Long Beach Freeway, is the main thruway for trucks coming in and out of the port complex. When the reconstruction of the Terminal Island East Interchange and the I-710–Gerald Desmond Bridge Interchange, along with the improvements to the State Route 47–Interstate 110 connector, are completed in 2018, traffic will flow more safely and smoothly through the port complex.

For each of the four years of construction for the new bridge and demolition of the current Gerald Desmond Bridge, the project is expected to generate nearly 3,000 construction-related jobs. According to an analysis by the Los Angeles Economic Development Corporation, the $1 billion in spending will sustain economic activity of more than $2 billion in Southern California.

Financial Plan
Securing funding for this massive project has been a primary challenge. A combination of federal and state funds, as well as port revenues, will finance the new bridge (see Figure 2, above right).

The federal government historically has financed the majority of projects that improve access to major transportation facilities, such as roads, waterways, and bridges to seaports or airports. The port, however, had funded and maintained projects within the Long Beach harbor district, such as on-dock rail and interchanges, with its own revenues. The arrangement made sense, because the facilities directly connected to port operations.

The Port of Long Beach has agreed to contribute significant funds for the replacement of the aging Gerald Desmond Bridge and to fund the operations and maintenance costs for 30 years after the state takes ownership of the new bridge. In Fiscal Year 2012, the port applied for a Transportation Infrastructure Finance and Innovation Act (TIFIA) loan; the process is expected to be completed later this year. The TIFIA loan and additional revenue bonds issued by the port will be the primary sources of local funds.

Toll Options
Although locally owned, the Gerald Desmond Bridge is a nationally significant transportation link, and its replacement costs far exceed the port’s financial resources. The port and its project partners considered alternative funding options, including user tolls. During the project development phase, a series of economic analyses and traffic simulations on several tolling scenarios revealed that nominal toll revenues could be collected to help fund the replacement cost.

Nevertheless, tolls would have an adverse effect on neighboring communities. According to the analysis, even a passenger vehicle toll of less than $2 would cause significant diversions, with drivers opting for local streets and freeways such as I-405, I-110, and State Route 91, to avoid the toll. The approved environmental report clearly described the tolling option as not feasible.

![Artist’s rendering of bicycle lanes and pedestrian access on the new bridge.](Image: Port of Long Beach)

**FIGURE 2** Port of Long Beach Gerald Desmond Bridge project funding plan for a total $960.2 million as of November 2011 (contributions in $ millions). (SAFETEA-LU = Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.)
Cargo Fees
In 2007, the ports of Long Beach and Los Angeles considered assessing an infrastructure cargo fee (ICF) on container and bulk cargo moving through the ports. The revenue raised from the goods movement industry would pay for approximately half of the costs of an approved list of highway and rail improvements, including replacement of the Gerald Desmond Bridge.

The ports would levy the ICF on import or export cargo moving by truck or rail through the terminals. Revenue from the fees would be matched by local, state, and federal funds to help pay for the projects. The ICF would sunset after all the projects on the list were completed and paid for.

The proposed fee would begin at $15 per loaded 20-foot-equivalent unit (TEU) container and would range between $10 and $18 per TEU over a seven-year period. The economic recession that hit the United States in 2008 and later the rest of the world reduced trade volumes by as much as 30 percent from the peak in 2007. Charging additional fees to an industry already recording massive losses did not make business sense, and both ports postponed the ICF for a few years.

In late 2013, both ports decided to remove the ICF from their tariffs, to maintain price competitiveness with other U.S. ports. Although the new bridge will provide significant benefits to cargo to and from both ports, only the Port of Long Beach is contributing to the funding gap.

Building over an Oil Field
The new 1.5-mile-long bridge is being built atop the nation’s third-largest oil field, discovered in 1932. Twenty-three active and idle wells lie in the path of the new bridge (see Figure 3, left). The port must relocate or abandon the wells to clear the way for the contractor to drive 300 piles deeper than 200 feet into the ground for the bridge foundation.

Because of legacy agreements between the City of Long Beach and oil field operators, the design–build contract solicitation could not include the relocation of the oil wells. If the relocation had been included, the contractors likely would have built-in significant contingency to cover the risks. As is, the related oil field costs have increased to $239.3 million, far exceeding the initial estimate of $105 million.

Challenges Moving Forward
As with any large infrastructure project, particularly with design–build delivery, the challenges are to manage interrelated tasks involving multiple regulatory and permitting entities and to identify areas for streamlining. The most effective solutions, however, often do not become obvious until the project is mature and under way. A project of this complexity and magnitude takes a considerable amount of time to develop; the port began scoping the replacement bridge and preparing the environmental assessment in 2000.

The project had a funding gap of nearly $300 million until mid-2008. Without the leadership of many elected officials and the determined teamwork of many agencies, the project could not have achieved the full funding commitment or completed the extremely compressed procurement process in 2011.

The bridge construction began in early 2013 in the midst of an active, operating port complex, with cargo volumes slowly returning to prerecession levels. Managing traffic safely around the active construction zones and minimizing the delays to port trucks is as great a challenge as building the bridge itself.

Model for Problem Solving
Institutionally, the Port of Long Beach, Caltrans, and U.S. DOT continue to work closely together to address issues throughout the project and to define roles and relationships. Alternative technical concepts often demand special consideration beyond standards and manuals, and decisions often require buy-in from partnering agencies and proactive legal support. Coordination, collaboration, and cooperation among all stakeholders are essential to complete this historic and nationally significant project.

With all of the ins and outs of planning, funding, permitting, designing, and constructing this transportation megaproject, the Gerald Desmond Bridge Replacement will yield many lessons and serve as a model for subsequent large-scale problem solving.