Toll Bridge Asset Management Plan

January 2026

BAY AREA TOLL AUTHORITY

Caltrans

This plan is dedicated to Peter Lee, whose steady leadership, passion for bridges and unwavering commitment were instrumental in shaping the Toll Bridge Program and bringing the Toll Bridge Asset Management Plan to completion.

Contents

Acronyms

AB – Assembly Bill

BATA – Bay Area Toll Authority

BLCCA Tool – Bridge Life Cycle Cost Analyzer 2 tool

Caltrans – California Department of Transportation

CIP – Capital Improvement Plan

DSGR – Desired State of Good Repair

FHWA – Federal Highway Administration

LCCA – Life Cycle Cost Analysis

MCA – Master Cooperative Agreement

MEP – Mechanical, Electrical, and Piping

MTC – Metropolitan Transportation Commission

NBIS- National Bridge Inspection Standards

NCHRP – National Cooperative Highway Research Program

O&M – Operations and Maintenance

RSR – Richmond-San Rafael Bridge

SB – Senate Bill

SFOBB-East – San Francisco-Oakland Bay Bridge East Span

SFOBB-West – San Francisco-Oakland Bay Bridge West Span

SMH – San Mateo-Hayward Bridge

SM&I – Structure Maintenance and Investigation

SR – State Route

The Bridge System – Refers to the seven state-owned toll bridges in the San Francisco Bay Area: the Antioch Bridge, the Benicia-Martinez Bridge, the Carquinez Bridge, the Dumbarton Bridge, the Richmond-San Rafael Bridge, the San Francisco-Oakland Bay Bridge and the San Mateo-Hayward Bridge

USDOT – United States Department of Transportation

Executive Summary

The Toll Bridge Asset Management Plan is a collaboration between the Bay Area Toll Authority (BATA) and the California Department of Transportation (Caltrans) to ensure the long-term preservation, safety and performance of the seven state-owned toll bridges in the San Francisco Bay Area. These long-span transbay structures are critical to regional mobility and economic vitality, and their unique characteristics require specialized asset management strategies.

The Toll Bridge Asset Management Plan builds upon Caltrans' Transportation Asset Management Plan, a statewide asset management document required by the FHWA, by providing bridge-specific analysis, performance targets and investment strategies tailored to the toll bridge system. The Toll Bridge Asset Management Plan documents current bridge conditions, considers the impacts of different investment strategies, and provides asset performance measures to support BATA's and Caltrans' short- and long-term objectives.

The primary goals of the Toll Bridge Asset Management Plan are to guide smart investments that maintain the toll bridges in a state of good repair and to capture detailed, bridge-specific data that complement the broader statewide Transportation Asset Management Plan. It establishes a 50-year horizon for performance management, life cycle cost analysis, and financial planning, ensuring that today's decisions support the structural integrity and operational reliability of the bridge system for decades.

A major focus of the Toll Bridge Asset Management Plan is preserving structural steel through proactive painting and corrosion protection. Steel painting alone accounts for approximately 29% of total investment needs over the next 50 years, highlighting its importance in maintaining bridge health. The Richmond–San Rafael Bridge (RSR) and the San Francisco–Oakland Bay Bridge West Span (SFOBB-West) are especially significant, representing nearly 65% of total maintenance costs due to their age, size, and steel-intensive design. These structures require additional projects and maintenance to extend service life.

The plan also identifies future deck and substructure needs, with particular attention to the San Mateo–Hayward Bridge (SMH), currently rated in poor condition. While the bridge remains safe for public use, its substructure requires substantial rehabilitation. BATA

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and Caltrans plan to invest hundreds of millions in rehabilitation to restore the SMH to fair condition by 2031. These efforts are part of a broader strategy to maintain all toll bridges in fair or better condition throughout the 50-year planning horizon.

To achieve these goals, the Toll Bridge Asset Management Plan recommends the Preservation Performance scenario (also known as the Reduce Backlog scenario) studied in the Life Cycle Cost Analysis (LCCA), which balances cost-effectiveness with performance outcomes. This scenario prioritizes timely rehabilitation and preservation treatments without over-investing for an acceptable life of the bridge components. By investing in maintenance before deterioration accelerates like in the Spot Repair scenario, a balanced approach between bridge performance and costs is achieved. The Toll Bridge Asset Management Plan does not identify a need to replace any of the Bay Area's toll bridges. Instead, it shows that cost-effective and technically sound rehabilitation strategies can maintain these structures in a state of good repair throughout the 50-year horizon. While replacement may be considered in the future due to evolving user needs, seismic vulnerabilities, or other policy-driven factors, the current analysis supports continued preservation as the most fiscally responsible and effective path forward. Financial planning under the Toll Bridge Asset Management Plan anticipates an average of $397 million per year in bridge rehabilitation funding through 2029, supported by toll revenues and bond financing.

The Toll Bridge Asset Management Plan is the result of years of detailed inspections, analysis and planning to make sure the Bay Area's toll bridges remain safe, reliable, and well-maintained for the long haul. It demonstrates that through timely rehabilitation and preservation, these vital structures can be maintained in a state of good repair at lower life cycle costs. The work outlined in this plan often involves components and systems that are not visible to the traveling public – such as substructures, mechanical systems, and corrosion protection – that are essential to safely transporting people and goods across the region. Continued public and commissioner support is critical to ensure these behind-the-scenes investments are made consistently and strategically. Decisions made today will shape the condition, cost and reliability of the bridge system for generations. Alignment of policy, funding and organizational priorities with the Toll Bridge Asset Management Plan's goals is essential to achieving a resilient, efficient and well-maintained transportation network.

1. Introduction

The California Department of Transportation (Caltrans) owns and maintains the seven long-span toll bridges in the San Francisco Bay Area shown in the map below. These structures vary in age, ranging from 13 to 87 years old. They also cover multiple structure types including suspension, steel truss, and concrete segmental bridges. Caltrans is responsible for the day-to-day operation and maintenance, inspection, and the planning and development of rehabilitation projects. BATA manages the toll revenues from the Bay Area's seven state-owned bridges. BATA also manages the region's FasTrak® electronic toll payment system.

BATA and Caltrans recognize the importance of asset management in maintaining and preserving the integrity of the toll bridges and guiding investment decisions. Caltrans has developed the California Transportation Asset Management Plan, which provides a broad framework for bridges and other assets across the State Highway System. In the spring of 2021, BATA and Caltrans joined efforts to develop a Toll Bridge Asset Management Plan specifically tailored to the unique characteristics of the Bay Area's long-span toll bridge structures. This Toll Bridge Asset Management Plan documents current bridge conditions, considers the impacts of different investment strategies, and provides asset performance measures to support BATA's and Caltrans' short- and long-term objectives and to define future investments. BATA and Caltrans remain committed to incorporating asset management into their organizational structures.

BATA and Caltrans maintain a Master Cooperative Agreement (MCA) that facilitates efficient project delivery by establishing clear roles and responsibilities and fostering collaboration. The MCA is updated and re-adopted approximately every five years. The next iteration is planned for June 2026.

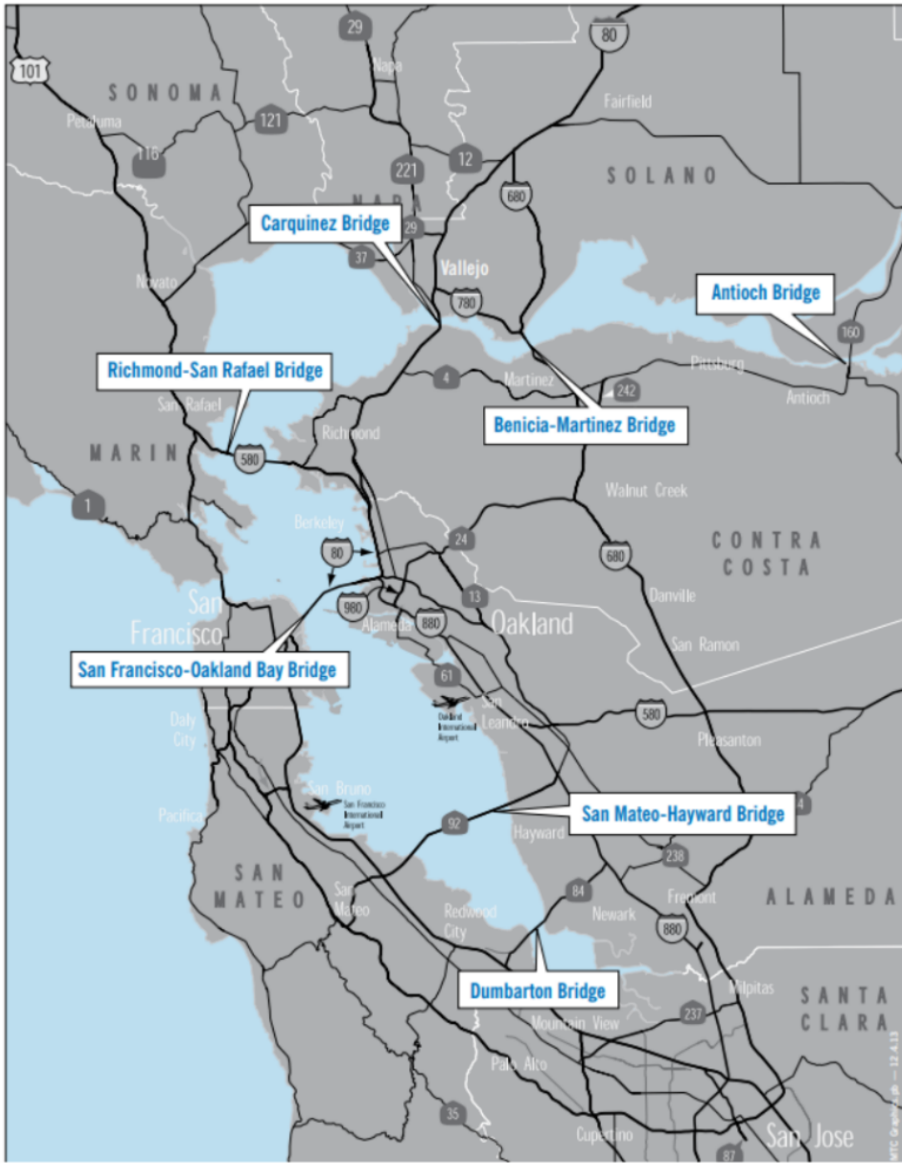
The limits of this Toll Bridge Asset Management Plan cover the toll bridge structures and do not extend to the approaches. Future updates will include detailed inventory and attributes for the approach structures including life cycle costs. Updates are intended to be implemented in future years (e.g., the northbound Benicia-Martinez Bridge extends from abutment to abutment and excludes the connector between Interstate 780 and Interstate 680, as well as pavement beyond the bridge structure).

Administration buildings, gantry structures, and toll bridge maintenance facilities are not yet individually included. The LCCA includes facilities being modified as part of the Open Road Tolling Project, which will remove the existing toll booths and upgrade the toll system at all seven state-owned bridges. The LCCA also includes estimates for tolling infrastructure needs over the next 50 years.

Unless mentioned otherwise in this report, all dollars are reported in 2023 dollars discounted at 3%.

BATA Context

BATA has a responsibility to its customers, residents, and all Bay Area stakeholders to provide safe and reliable services in a fiscally responsible manner. In January 2024, BATA adopted the Toll Bridge Asset Management Policy and Objectives, which communicates organizational commitment to asset management. This policy is informed by international standards and best practices as well as by regional policies and priorities identified in Plan Bay Area 2050 and BATA's Long Range Plan.[i] The policy follows four key principles for toll bridge asset management, as defined below:



Map of State-Owned Toll Bridges in the San Francisco Bay Area

Toll Bridge Asset Management Policy

Focusing on People and Safety (Customers, Partner Agencies & Staff)

- Be responsive to our customers and Bay Area resident needs and safety.
- Support robust, repeatable and defendable decision-making.
- Utilize a formal but scalable, consistent and repeatable approach to manage infrastructure assets - enabling services to be provided in the most efficient and cost-effective manner.
- Integrate Asset Planning and Management with corporate and business plans, budgetary and reporting processes.

Addressing Life Cycle Cost

- Develop and deploy a life cycle cost approach within current and future financial capacity.
- Consider the combined impact of all aspects of the asset life cycle (acquire, operate, maintain, renew and retire assets).
- Base Asset Management decisions on evaluations of alternatives that consider full life cycle costs, benefits, and risks of assets.
- Consider innovative delivery approaches and alternative funding options such as federal grants for infrastructure improvements.

Adopting a Quantifiable Approach

- Adopt a quantifiable and risk-based approach to inform Asset Management decision making.
- Understand the implications of deferred asset interventions.
- Direct resources, expenditures, and priorities to achieve the desired service outcomes and benefits - at an acceptable level of risk.

Promoting Sustainability & Ongoing Enhancement

- Adopt a dynamic approach to Asset Management considering changes in operating conditions.
- Stay educated on industry trends and update processes and practices to maintain an effective Asset Management program.
- Regularly update both strategic and tactical asset management plans to ensure alignment with organizational priorities and asset needs.
- Incorporate sustainability in investment planning and decision-making to help reduce climate emissions.
- Cultivate an Asset Management culture and develop agency workforce.
- Provide economic opportunity for skilled workers through funding bridge projects.

The policy and principles for toll bridges asset management form the foundation for asset management objectives. These objectives identify measurable goals specific to the toll bridges and ways in which asset management will help achieve the overall organizational goals.

Toll Bridge Asset Management Objectives

Guided by the asset management principles, the following are measurable goals specific to the toll bridges.

Support Capital and O&M Efforts

- Develop a risk-based decision-making approach for considering safety, performance targets and life cycle costs for capital investments and O&M projects for all bridges by 2027.

Maintain Desired Asset Condition

- All bridges receive overall NBIS bridge rating 'Fair' or above, by 2025; if not, in an active remediation status.

Improve Funding Effectiveness

- Seek alternative funding for capital projects such as federal grants for infrastructure improvements when available.

Increase Engagement

- Develop public-facing, quantifiable 10-year capital improvement plan to the Board by 2025.

Strengthen Asset Management Program

- Demonstrate alignment with asset management industry standards (e.g., ISO 55001) by 2030.
- Update BATA/Caltrans MCA reflecting asset management responsibilities and shared risks by 2026.
- Develop asset performance measures (e.g., delays, disruptions) and performance targets by end of 2028.
- Define asset data requirements and develop implementation plan for bridge management software by 2027.

Caltrans Context

Caltrans and its partner agencies have a responsibility to support safe and efficient travel on California's transportation network, including maintenance and preservation of this infrastructure. The system includes assets for which Caltrans shares responsibilities with local entities under various agreements, such as regional transportation agencies, cities and BATA. Caltrans and its partners understand that limited resources can be optimized by understanding the condition of all assets on the system. Caltrans uses a strategic and systematic process of operating, maintaining, upgrading and expanding physical assets effectively throughout their service life. This Transportation Asset Management process involves a combination of business and engineering practices to improve decision-making using quality information and well-defined objectives.

Caltrans follows both federal and state requirements for Transportation Asset Management. State law requires developing a system needs assessment with performance targets to estimate current needs and the development of performance measures for tracking. Federal requirements include the completion of a Transportation Asset Management Plan for pavement, bridges and other transportation assets throughout the state. This plan inventories and tracks the current condition, desired future condition, and likely actual conditions given funding scenarios. The Transportation Asset Management Plan includes short-term two- and four-year performance targets as well as 10-year performance targets for long-range monitoring. As a living document, the Transportation Asset Management Plan is regularly reviewed and updated, including a full update every four years.

Given the unique nature and overall importance of the Bay Area's seven long-span toll bridges, Caltrans and BATA have partnered in the development of this Toll Bridge Asset Management Plan to document the robust asset management process for these specific structures.

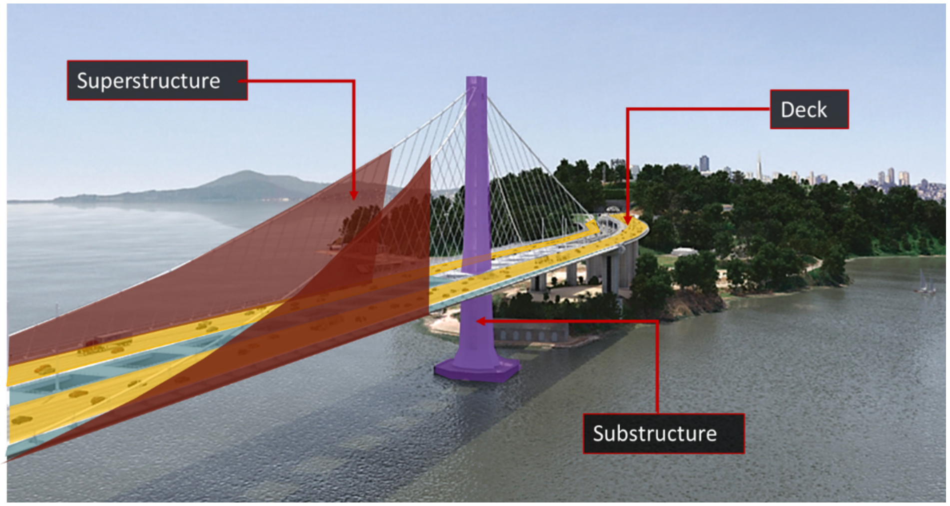
2. Asset Inventory and Conditions

Monitoring toll bridge conditions is vital to assessing performance, anticipating future needs, and enabling effective capital planning. The process of inspecting bridges and measuring bridge performance sets the stage for asset management. This section provides information on the type of structure, number of lanes, year of opening, traffic count, bridge condition, bridge length, and estimated asset value of the seven toll bridges. The Toll Bridge Program Report[ii] provides more detailed information on bridge inspection procedures and information on current and planned construction projects for each bridge.

Bridge Inspection Process

Caltrans' Structure Maintenance and Investigation (SM&I) unit is responsible for managing the bridge inspection program for the Bay Area's seven state-owned toll bridges. This unit leads the effort for inspecting bridges, recording inventory and condition data, and performing load rating analysis. The SM&I unit performs routine, in-depth, and specialty inspections according to state and federal guidelines.

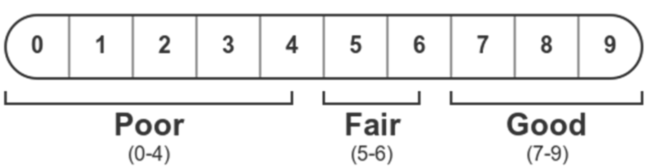
SM&I's comprehensive routine inspection and reporting process spans a two-year cycle to ensure thorough evaluation and complete documentation of structural conditions, in the form of final bridge inspection reports. This inspection covers all bridge elements as defined by the National Bridge Inspection Standards (NBIS) as well as Caltrans, and rates the general condition of the three main bridge components: deck, superstructure and substructure (illustrated in the figure below). Inspection results are documented in a formal Caltrans Bridge Inspection Report that is archived and maintained in Caltrans' Bridge Management System.



The Three Main Bridge Components

Performance Measures

Performance ratings are based on the results in the Bridge Inspection Reports. Ratings are recorded on a scale from zero (worst condition) to nine (best condition) for each of the three main bridge components (deck, superstructure and substructure). The lowest of these ratings determines the overall structure condition (good, fair or poor). Performance ratings do not measure safety. Safety determinations are made by engineers responsible for monitoring the bridges. Any identified deficiency is rated for urgency and addressed promptly after discovery. The figure below illustrates the mapping of performance ratings into overall conditions.



Condition Ratings for Bay Area State-Owned Toll Bridges

The following table lists the overall rating and condition for the individual structures of the seven toll bridges. Additional details can be found in the Toll Bridge Program Report.[ii]

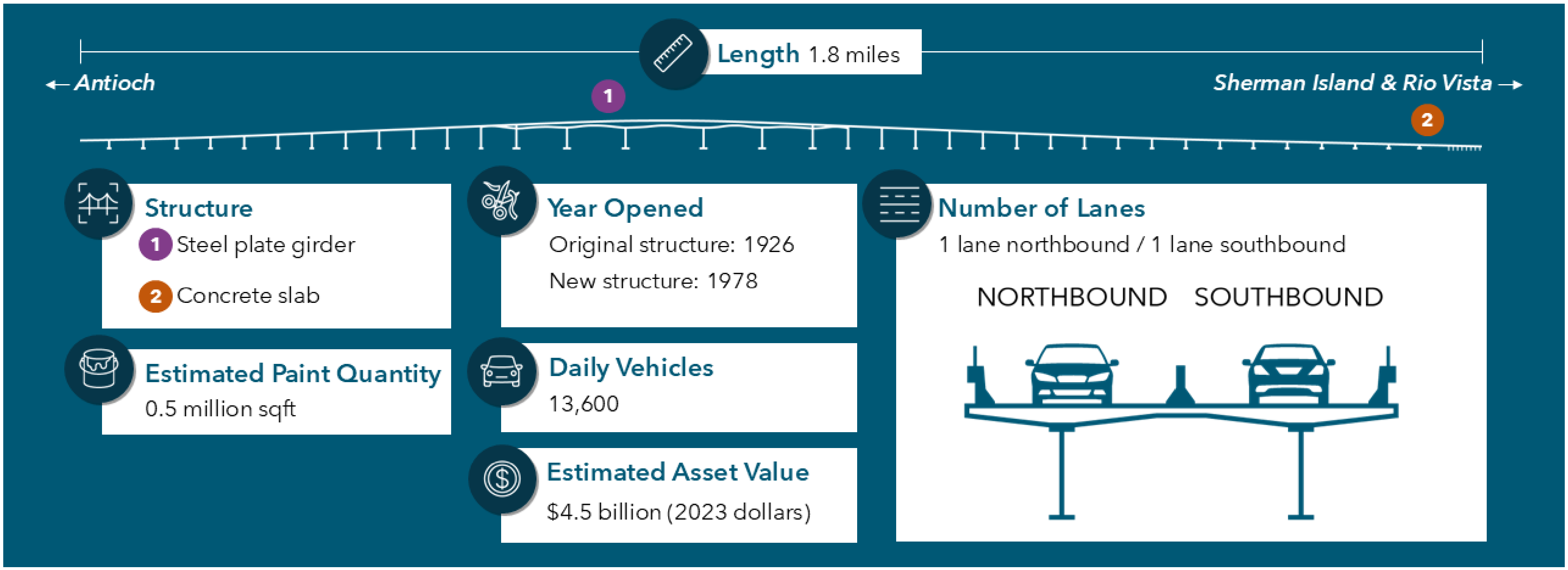
National Bridge Inventory Ratings for Bridge Condition

Bridge	Overall Rating	Bridge Condition
Antioch Bridge	7	Good
Benicia-Martinez Bridge – 2007 (Northbound)	7	Good
Benicia-Martinez Bridge – 1962 (Southbound)	5	Fair
Carquinez Bridge – 1958 (Eastbound)	5	Fair
Carquinez Bridge – 2003 (Westbound)	5	Fair
Dumbarton Bridge	6	Fair
Richmond-San Rafael Bridge	5	Fair
San Francisco-Oakland Bay Bridge – East Span	7	Good
San Francisco-Oakland Bay Bridge – West Span	5	Fair
San Mateo-Hayward Bridge	4	Poor *

** Substructure deterioration is consistent with the age of the structure and its marine environment. Repairs to concrete on the trestle are underway and expected to improve the condition*

Antioch Bridge

The Antioch Bridge carries State Route (SR) 160 for 1.8 miles over the San Joaquin River, connecting northeastern Contra Costa County with Sacramento County. Originally opened in 1926 and replaced in 1978, the bridge features a concrete slab deck on a steel plate girder system. The estimated paint quantity required for this bridge area is approximately 0.5 million square feet. Carrying one traffic lane in each direction, northbound and southbound, the Antioch Bridge serves approximately 13,600 daily vehicles (per National Bridge Inventory data). The overall condition of the Antioch Bridge is good; the deck, superstructure and substructure are all in good condition. The estimated asset value for the structure, calculated as the cost of reconstruction, is $4.5 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.

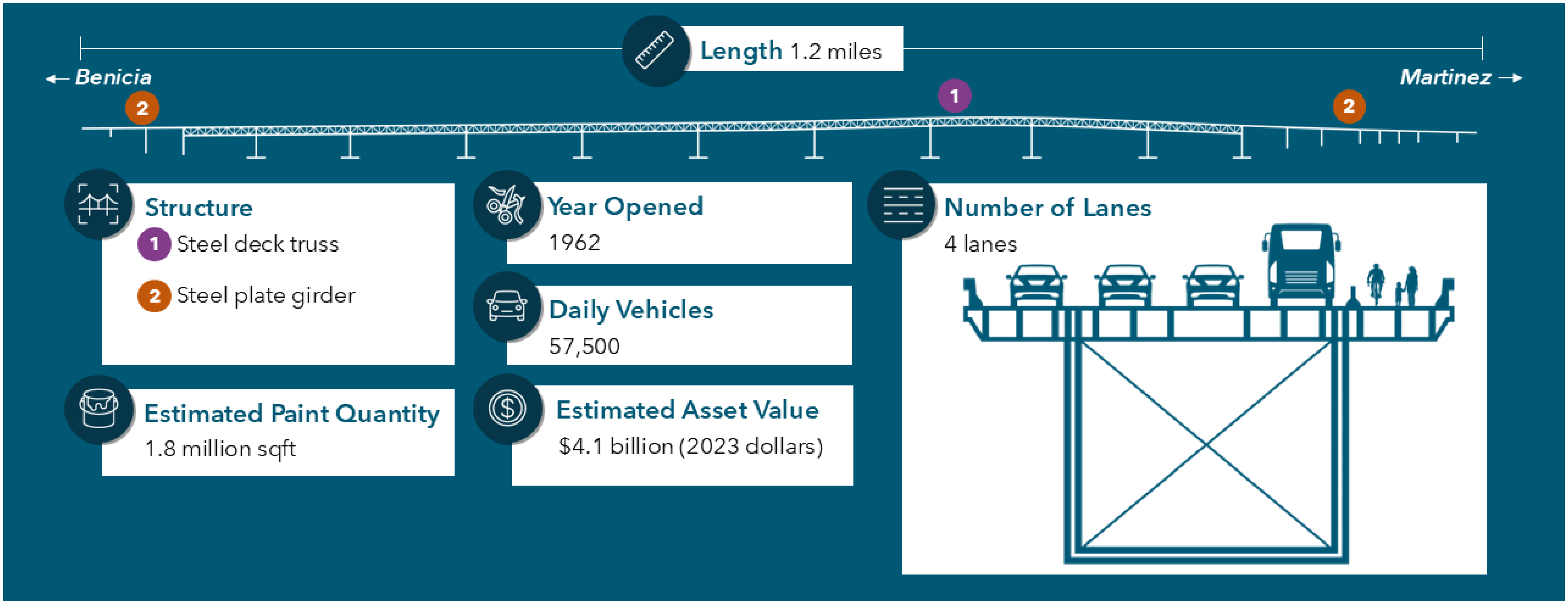


Overview of Antioch Bridge

Benicia-Martinez Bridge

Benicia-Martinez Bridge – 1962 (Southbound)

The Benicia-Martinez Bridge traverses the Carquinez Strait, carrying Interstate 680 between Solano and Contra Costa counties. The bridge consists of two independent structures, one for traffic traveling southbound and the other northbound. The original 1.2-mile-long southbound structure was built in 1962. The bridge includes a steel deck truss with steel plate girder approaches. The bridge requires approximately 1.8 million square feet of paint given the steel deck truss and plate girder structure. The southbound bridge carries an average of 57,500 vehicles daily across four lanes of traffic (per National Bridge Inventory data) plus a multi-use bike and pedestrian path. The deck and substructure are in good condition. Because the superstructure condition is rated as fair, the overall bridge condition is fair. The estimated asset value, calculated as the cost of reconstruction, for the structure is $4.1 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.

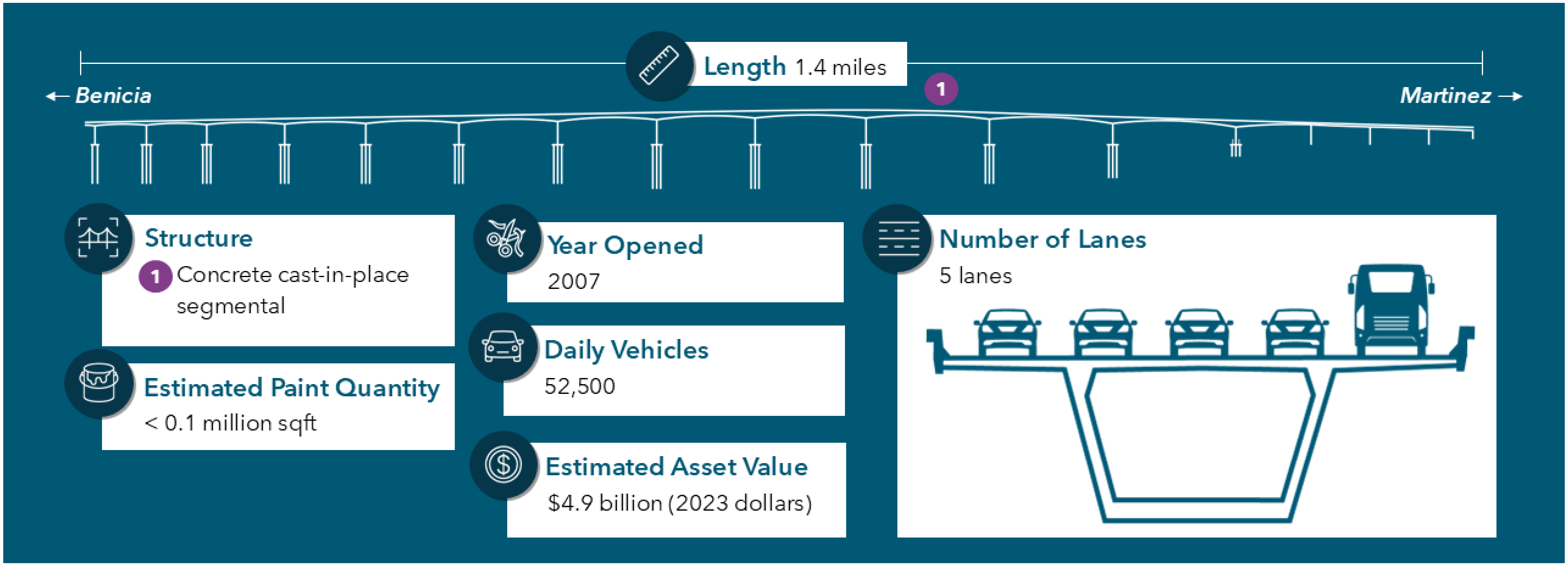


Overview of Southbound Benicia-Martinez Bridge – 1962 (Southbound)

Benicia-Martinez Bridge – 2007 (Northbound)

The 1.4-mile-long northbound concrete cast-in-place segmental structure was constructed in 2007, parallel to the original structure. The structure requires less than 0.1 million square feet of paint given the concrete superstructure. This bridge has five lanes and carries an average of 52,500 daily vehicles (per National Bridge Inventory data).

The overall bridge condition is good, with the deck, superstructure and substructure all in good condition. The estimated asset value, calculated as the cost of reconstruction, is $4.9 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.

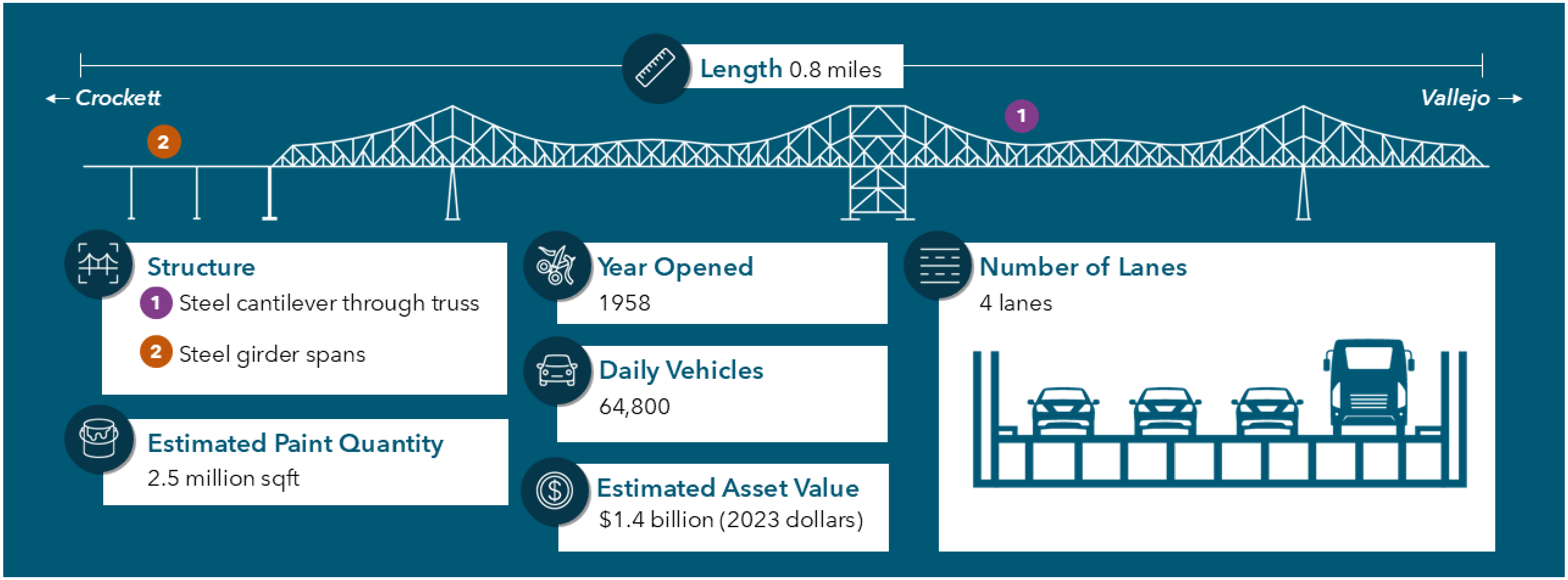


Overview of Northbound Benicia-Martinez Bridge - 2007 (Northbound)

Carquinez Bridge

Carquinez Bridge – 1958 (Eastbound)

The Carquinez Bridge is a two-structure system carrying traffic on Interstate 80 between Contra Costa and Solano counties. The original structure opened in 1927, and a parallel structure opened in 1958 for eastbound traffic due to increased traffic flow. The 0.8-mile steel cantilever through truss structure with steel girder spans carries four lanes of eastbound traffic and approximately 64,800 daily vehicles (per National Bridge Inventory data). The estimated paint quantity required is approximately 2.5 million square feet. The overall bridge condition is fair, due to the fair condition of the deck and substructure. The superstructure is in good condition. The estimated asset value, calculated as the cost of reconstruction, is $1.4 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.

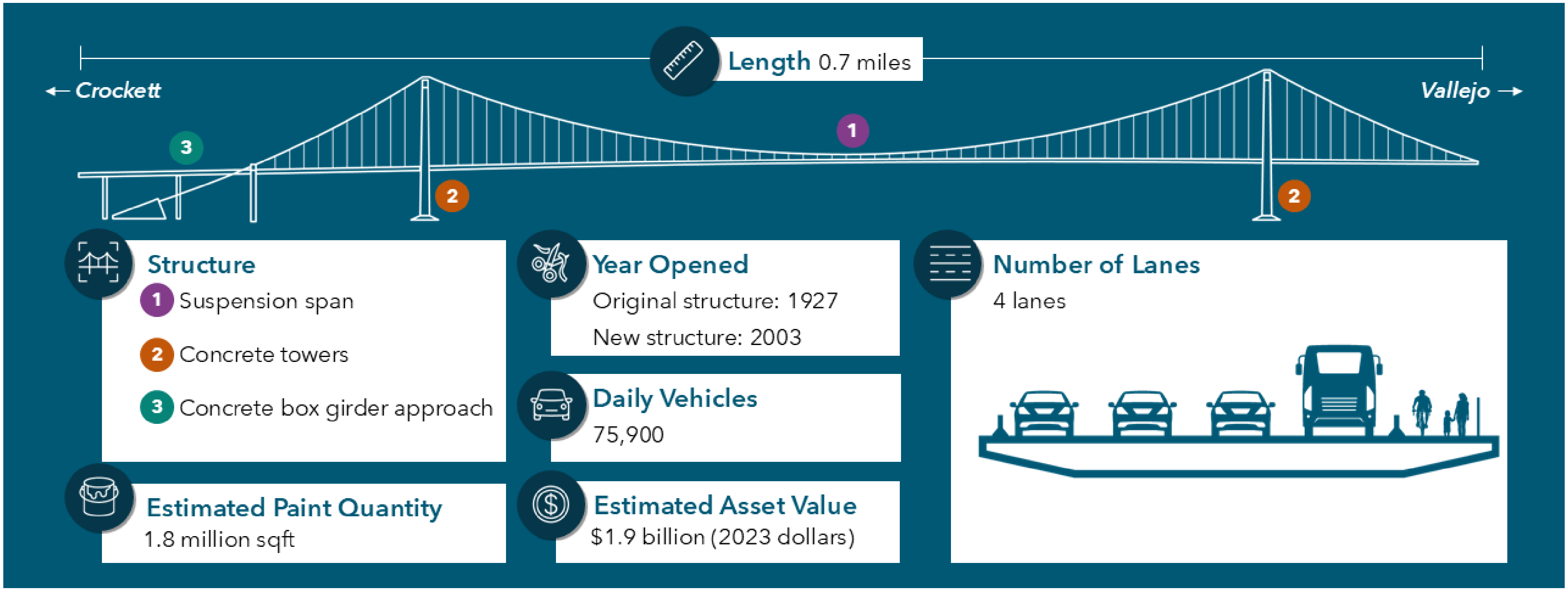


Overview of Eastbound Carquinez Bridge - 1958

Carquinez Bridge – 2003 (Westbound)

The original 1927 westbound span was replaced in 2003 with a 0.7-mile-long, four-lane suspension span with concrete towers and a concrete box girder approach section. The structure requires approximately 1.8 million square feet of paint. The westbound bridge carries around 75,900 daily vehicles (per National Bridge Inventory data). The bridge also includes a multi-use bike and pedestrian path.

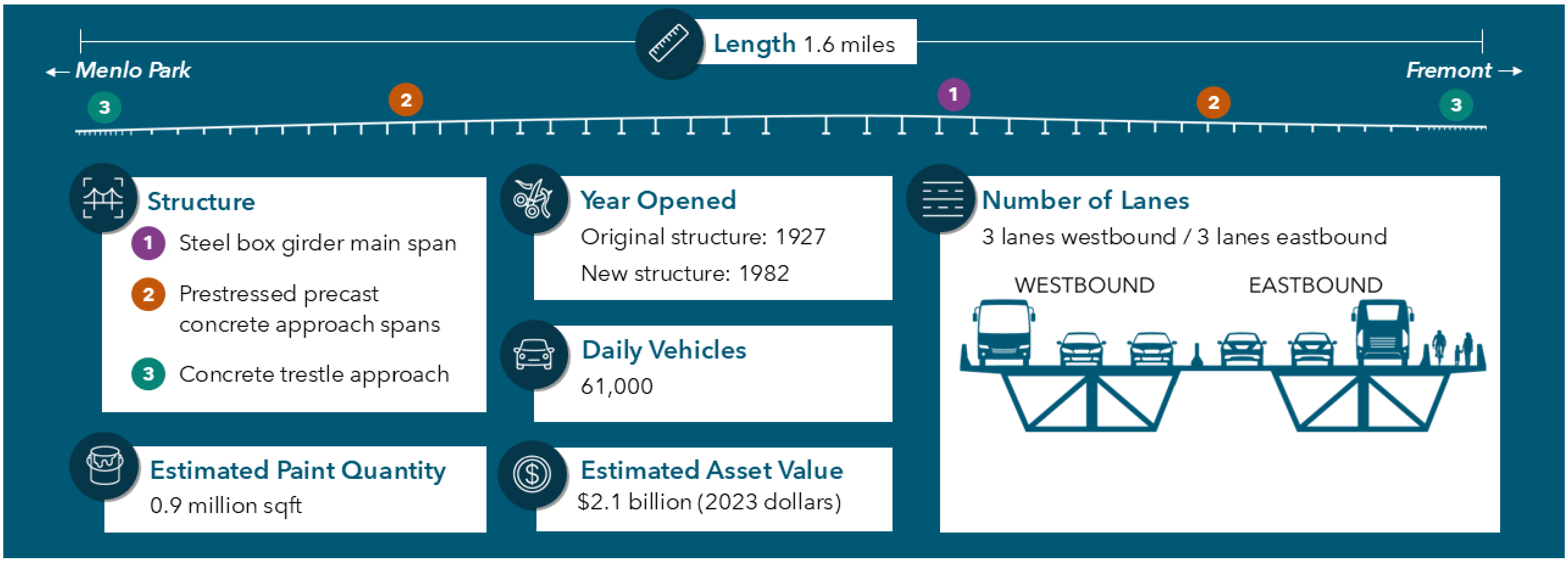
The overall bridge condition for the westbound bridge is fair due to the substructure condition; the deck and superstructure both are in good condition. The estimated asset value, calculated as the cost of reconstruction, is $1.9 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.



Overview of Westbound Carquinez Bridge - 2003

Dumbarton Bridge

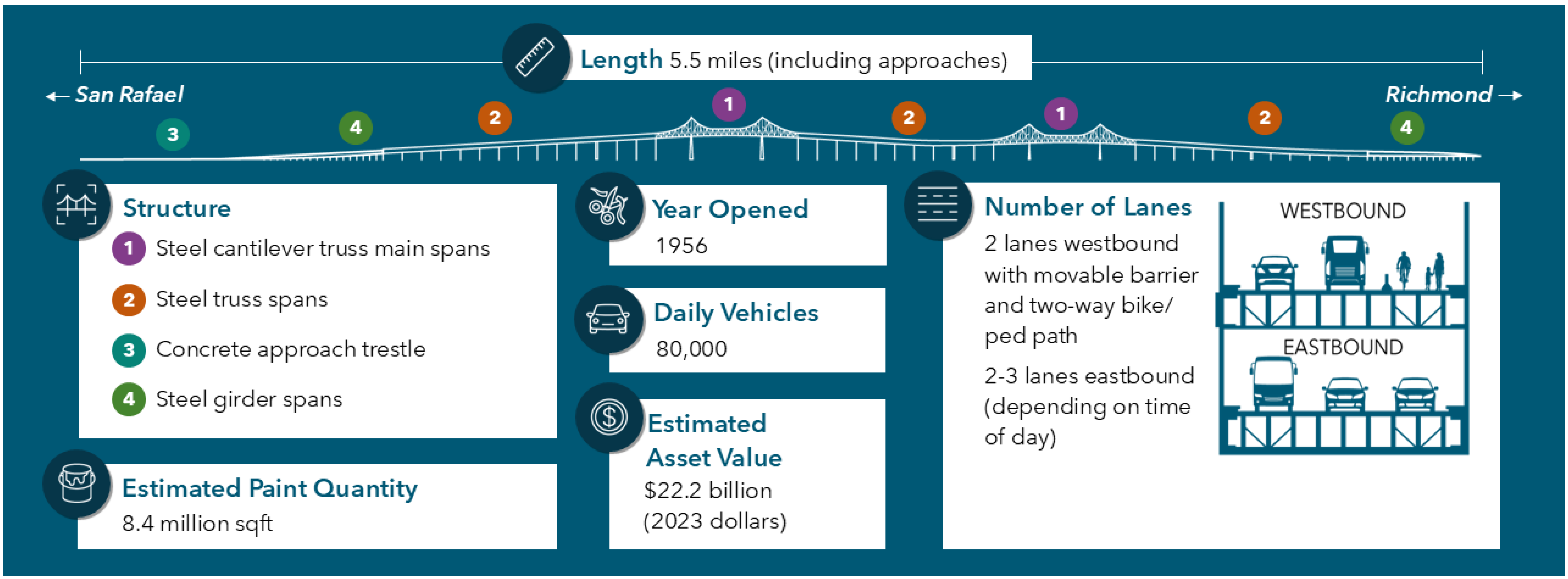
The Dumbarton Bridge carries State Route 84 between San Mateo and Alameda counties, with an eastern touchdown in Alameda County and a western landing in San Mateo County. The original structure was built in 1927 and replaced in 1982. The 1.6-mile-long Dumbarton Bridge carries three lanes of traffic in each direction, serving approximately 61,000 daily vehicles (per National Bridge Inventory data), and includes a multi-use bike and pedestrian path. The bridge has a steel box girder main span, prestressed concrete approach spans and concrete trestle approaches. The bridge requires approximately 0.9 million square feet of paint. The overall bridge condition is fair due to the superstructure being rated in fair condition. The deck and substructure both are in good condition. The estimated asset value, calculated as the cost of reconstruction, for the bridge is $2.1 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.



Overview of Dumbarton Bridge

Richmond-San Rafael Bridge

The 5.5-mile-long Richmond-San Rafael Bridge includes one double deck structure that carries Interstate 580 traffic between Contra Costa and Marin counties. The structure consists of two steel cantilever truss main spans, steel truss spans adjacent to the main spans, steel girder spans, and a concrete approach trestle at the western end. This bridge requires one of the largest paint quantities among the Bay Area toll bridges, totaling about 8.4 million square feet. Opened in 1956, the bridge carries approximately 80,000 daily vehicles (per National Bridge Inventory data) with two westbound lanes on the upper deck and two to three eastbound lanes on the lower deck, depending on time of day. The shoulder of the westbound lanes was converted to a multi-use path on a pilot basis on the weekends (2 p.m. Thursday to 11 p.m. Sunday). The overall bridge condition is fair due to fair ratings for both the superstructure and substructure. The deck is in good condition. The estimated asset value, calculated as the cost of reconstruction, is $22.2 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.



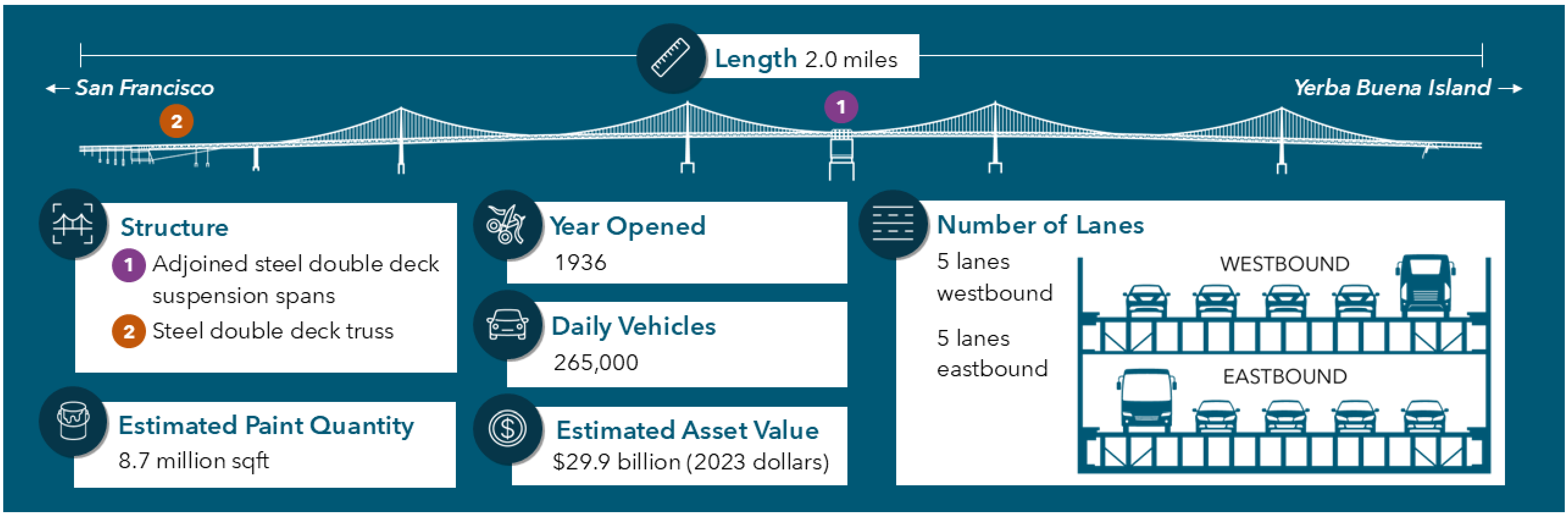
Overview of Richmond-San Rafael Bridge

San Francisco-Oakland Bay Bridge

San Francisco-Oakland Bay Bridge – West Span

The San Francisco-Oakland Bay Bridge is the region's workhorse bridge, carrying 265,000 vehicles each day – more than a third of the total traffic on the Bay Area's seven state-owned toll bridges (traffic per National Bridge Inventory data). The bridge carries Interstate 80 between San Francisco and East Bay counties. The bridge includes two independent structures, the West Span and the East Span, connected by a tunnel structure that carries traffic through Yerba Buena Island.

Opened in 1936, the 2.0-mile-long West Span is adjoined steel double deck suspension spans with a steel truss that carries five lanes of westbound traffic on the upper deck and five lanes of eastbound traffic on the lower deck. The West Span requires the largest paint quantity of all the Bay Area toll bridges, totaling about 8.7 million square feet. The overall bridge condition is fair due to the fair condition of the superstructure. The deck and substructure both are in good condition. Estimated asset value for the West Span, calculated as the cost of reconstruction, is $29.9 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.

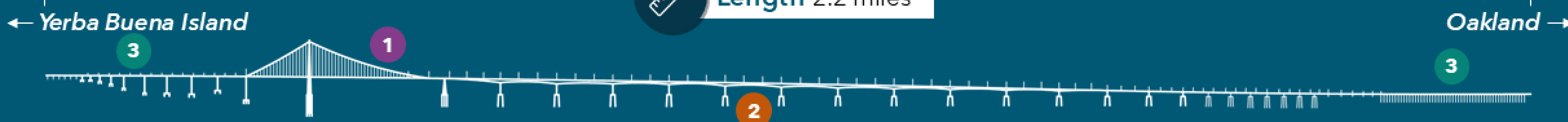


Overview of San Francisco-Oakland Bay Bridge – West Span

San Francisco-Oakland Bay Bridge – East Span

Opened in 2013, the 2.2-mile long East Span carries five lanes of traffic in each direction and a multi-use bike and pedestrian path. The structure is a parallel steel self-anchored span with a concrete precast segmental approach and prestressed concrete box girders. The structure requires approximately 2.1 million square feet of paint. The overall bridge condition is good, with all elements in good condition. The estimated asset value, calculated as the cost of reconstruction, for the East Span is $14.6 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.

Length 2.2 miles



Structure

1. Parallel steel self-anchored span
2. Concrete precast segmental approach
3. Prestressed concrete box girders

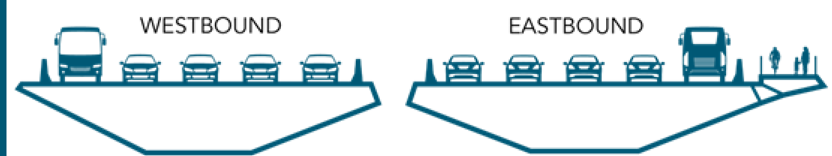
Estimated Paint Quantity
2.1 million sqft

Year Opened
2013

Daily Vehicles
265,000

Estimated Asset Value
$14.6 billion (2023 dollars)

Number of Lanes
5 lanes westbound / 5 lanes eastbound



Overview of San Francisco-Oakland Bay Bridge - East Span

Yerba Buena Crossing Tunnel

The Yerba Buena Crossing Tunnel is a separate 0.18-mile structure that connects the east and west spans of the San Francisco-Oakland Bay Bridge across Yerba Buena Island. Initial construction of the tunnel was completed in 1936. The tunnel is constructed of reinforced concrete with a horseshoe-shaped tunnel liner. The upper deck, carrying five lanes of westbound traffic, is supported by precast, prestressed double "T" concrete girders. The lower deck, carrying five lanes of eastbound traffic, is slab-on-grade. The tunnel features narrow shoulders (3 to 4 feet) in both directions. The tunnel is in fair condition.

Structure

1. Tunnel: Reinforced concrete, horseshoe-shaped tunnel liner
2. Upper deck: Precast prestressed concrete girders
3. Lower deck: Slab-on-grade

Year Opened

1936

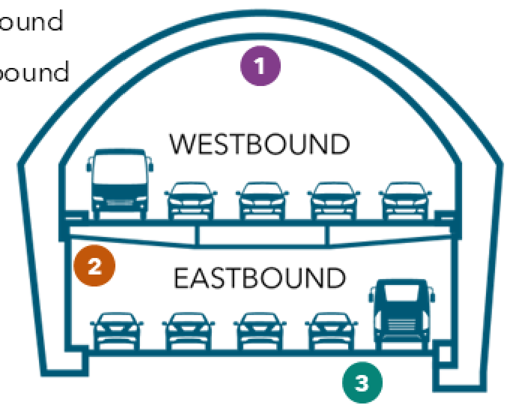
Daily Vehicles

265,000

Number of Lanes

5 lanes eastbound

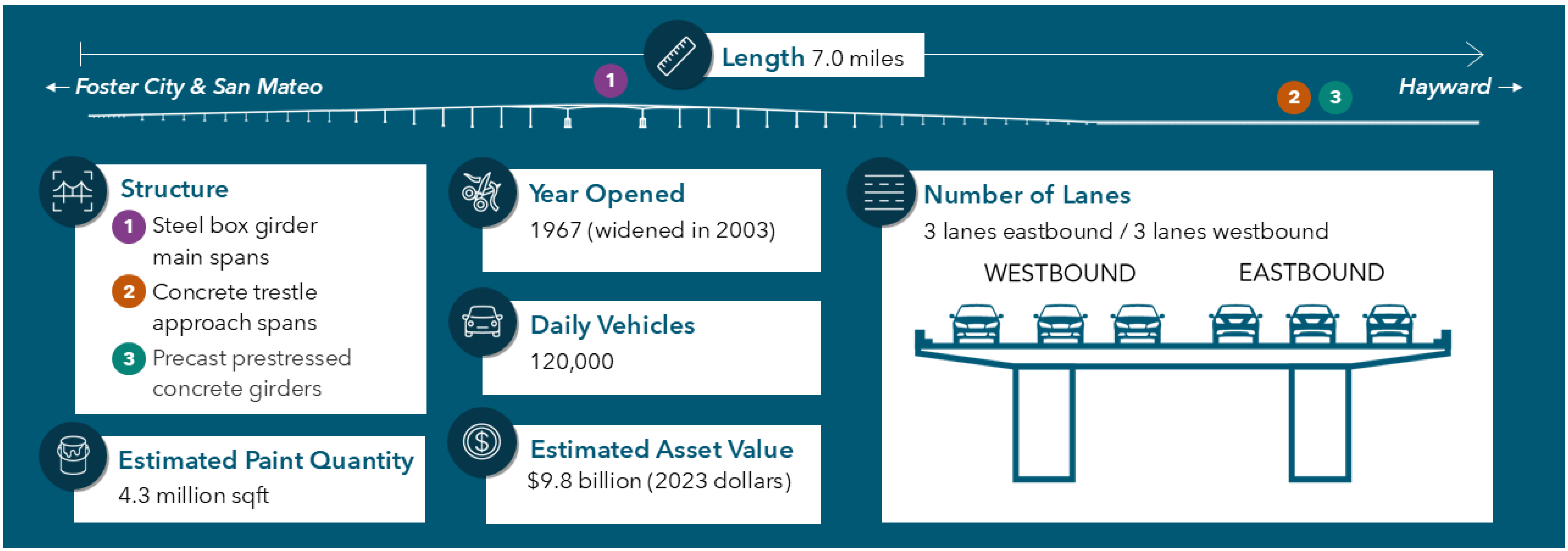
5 lanes westbound



Overview of Yerba Buena Crossing Tunnel

San Mateo-Hayward Bridge

The San Mateo-Hayward Bridge carries State Route 92 traffic between San Mateo and Alameda counties. Opened in 1967, the structure is 7.0 miles long, consisting of a 1.9-mile high-rise section and a 5.1-mile low-rise section. The bridge has steel box girder main spans and concrete trestle approach spans. The estimated paint quantity required for the bridge area is approximately 4.3 million square feet. Widened in 2003 to carry three lanes of traffic in each direction, the San Mateo-Hayward Bridge carries approximately 120,000 daily vehicles (per National Bridge Inventory data). The overall bridge condition is poor due to the poor condition of the original substructure, which is consistent with its age. This does not mean the bridge is unsafe for vehicle use as there were no conditions identified that pose a safety risk. The deck and superstructure are in good condition. Over one hundred million in planned repairs to the substructure are expected to improve the overall condition. The estimated asset value, calculated as the cost of reconstruction, is $9.8 billion in 2023 dollars. Reconstruction keeps operational capacity with standard design features. Approach modifications are not included in this estimate.



Overview of San Mateo-Hayward Bridge

3. Asset Performance Targets

As part of the development of the Toll Bridge Asset Management Plan, BATA and Caltrans defined a Desired State of Good Repair (DSGR) as a long-term performance target aligned with regional, state and national goals. The DSGR serves as a benchmark for assessing both current and long-term toll bridge conditions over the next 50 years, with the goal of maintaining this DSGR throughout each bridge's service life.

The DSGR is defined by four key categories, detailed further on the following page:

- Asset Condition and Stewardship
- Safety and Mobility
- System Operation
- Sustainability and Equity

Desired State of Good Repair

Guided by the asset management principles, the following are measurable goals specific to the toll bridges.

Asset Condition and Stewardship

- For the next 50 years, preserve all toll bridges in overall Fair or better condition.
- If a bridge transitions into Poor condition, recommended actions to restore it to Fair or better shall be identified and prioritized.
- Monitor Director Orders to reduce emergency repairs when possible.

Safety and Mobility

- Preserve traffic flow on bridges with minimal interruption.
- Immediately mitigate incidents on toll bridges that impact public safety.

- All safety barriers and bridge rails shall meet FHWA testing standards at the time of design with supporting elements maintained in Fair or better condition.
- Bicycle and pedestrian paths shall be maintained, functional and open to the public unless an event mandates otherwise.

System Operation

- All toll collection equipment shall be in a functioning state.
- Navigational lights and warning systems shall be in a functioning state and as required by the Coast Guard.
- Mechanical, Electrical and Plumbing (MEP) items shall be in a functioning state that, at minimum, does not impact regular operation and maintenance activities.
- Security systems on the bridge shall be in a functioning state.

Sustainability and Equity

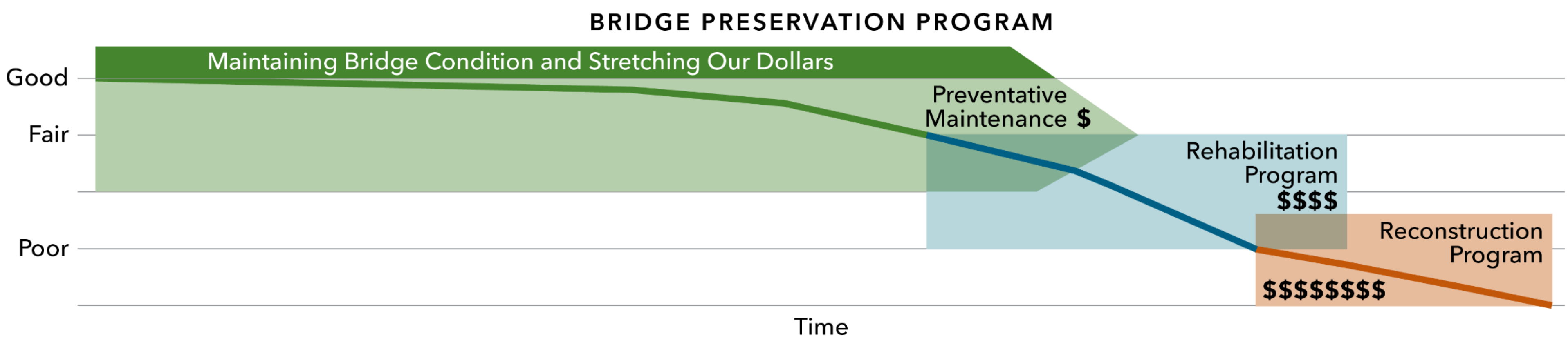
- All toll bridges shall meet seismic design criteria at the time of design, with all seismic supporting elements maintained in Fair or better condition.
- Protective elements such as wearing surfaces and fenders shall be maintained in Fair or better condition.
- Structural steel paint shall be preserved in a condition where a significant section loss is prevented.
- Reducing environmental impacts and promoting sustainability measures shall be considered when planning future projects on the toll bridges.

4. Life Cycle Planning

Life Cycle Cost Analysis (LCCA) is a technique used to compare the total, long-term costs of various capital and maintenance investment scenarios for preserving the asset. These investment scenarios often have tradeoffs in cost and performance. The figure below illustrates a bridge's condition over time. When a bridge is in good or fair condition, less costly preventive maintenance work can be used to extend the bridge service life, allowing additional time before more expensive rehabilitation work or replacement is required.

Defer Costly Repairs for Lower Life Cycle Cost

Bridge Preservation Maximizes Our Dollars



Impacts of Deferring Costs

The Toll Bridge Asset Management Plan LCCA follows guidance from National Cooperative Highway Research Program (NCHRP) Report 483[iii] and the United States Department of Transportation (USDOT) Life-Cycle Cost Analysis Primer.[iv] The LCCA considers the complete costs over the life of an asset, including capital costs, operating and maintenance costs or rehabilitation costs, and costs to users during construction (see LCCA Overall Process graphic). The LCCA is also in line with Caltrans practices.

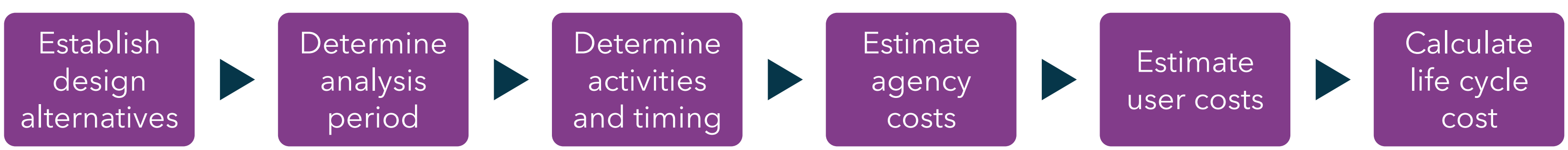
Deterioration curves are used in the analysis to estimate changes in bridge conditions over time, and other models are used to simulate the impacts of investing in various treatments to improve bridge conditions. The analysis covered a 50-year period to capture two full cycles of steel structure repainting, which is crucial to preserving the toll bridges in a marine environment. Additionally, a long analysis horizon is necessary for long-span bridges as they generally rely on bond financing.

Three different scenarios were evaluated in this LCCA as defined below. All scenarios assume bridge rehabilitation at the end of the analysis period to estimate the future backlog, which is defined as the remaining work at the end of the 50-year analysis period.

- **Spot Repair**: No planned work, only fix elements near failure that risk the bridge falling into poor condition.
- **Preservation Performance**: Fix bridge elements as needed to sustain fair condition.
- **Accelerated Rehab**: Fix bridge elements as needed to increase time in good condition.

The LCCA used a modified version of the Bridge Life Cycle Cost Analyzer 2 tool (the "BLCCA Tool"), which was developed by FHWA in 2013 based on an earlier tool documented in NCHRP Report 483. The tool models deterioration and treatment costs at an element level and considers the effects of deterioration and applied treatments to predict the overall bridge condition (Good, Fair or Poor). Like most state agencies with extensive bridge networks, Caltrans tracks asset conditions at the component level rather than the element level. Therefore, an element level analysis required the use of other tools. The FHWA National Bridge Investment Analysis System models were selected for use after a review of relevant national deterioration models. National Bridge Investment Analysis System deterioration rates were tailored to climate zones applicable to the Bay Area.

The treatment costs modeled in the BLCCA tool are called "agency costs" in the analysis. Agency cost data was derived from FHWA's National Bridge Investment Analysis System model, historical records, and the California Transportation Asset Management Plan. These costs were adjusted as needed to fit the California context and to account for other factors that tend to increase costs, such as construction on long-span bridges over water or on interstates that need to remain open to traffic. A supplemental analysis was performed to determine adjustments necessary to account for factors specific to the toll bridges.



LCCA Overall Process

Additional "vulnerability costs" were estimated and included in the analysis to address bridge-specific risks as needed. Costs associated with potential fatigue issues were incorporated into the analysis. Vessel collision risks were considered and costs for fender replacement were incorporated. Seismic transmission unit costs were also incorporated as appropriate. Costs for additional dehumidification studies, specifically for cable suspension bridges, were included in the analysis. Costs were taken from the Caltrans Toll Bridge Rehabilitation 20-Year Plan ("Caltrans 10/20 Year Plan") and based on SM&I engineer recommendations. An independent analysis was performed to estimate fatigue-related costs.

Intensive field inspections were conducted to assess the Mechanical, Electrical and Plumbing (MEP) items on the toll bridges. These inspections resulted in comprehensive condition reports, service life estimates, and replacement costs. Examples of MEP costs include switchgears and transformers, power transfer schemes and synchronization systems, roadway lighting, air compressors/air lines, and substation security systems.

In addition, the LCCA accounts for "user costs" borne by road users due to construction disruptions and bridge conditions. User costs occur under two different scenarios:

- **Lane closures**: this restricts use of some lanes, which results in reduced travel speeds and increased vehicle operating costs due to queueing and delays.
- **Full bridge closures**: this causes detours for all vehicles, leading to longer travel distances. User costs are the additional travel time and vehicle operating costs associated with the longer detour route.

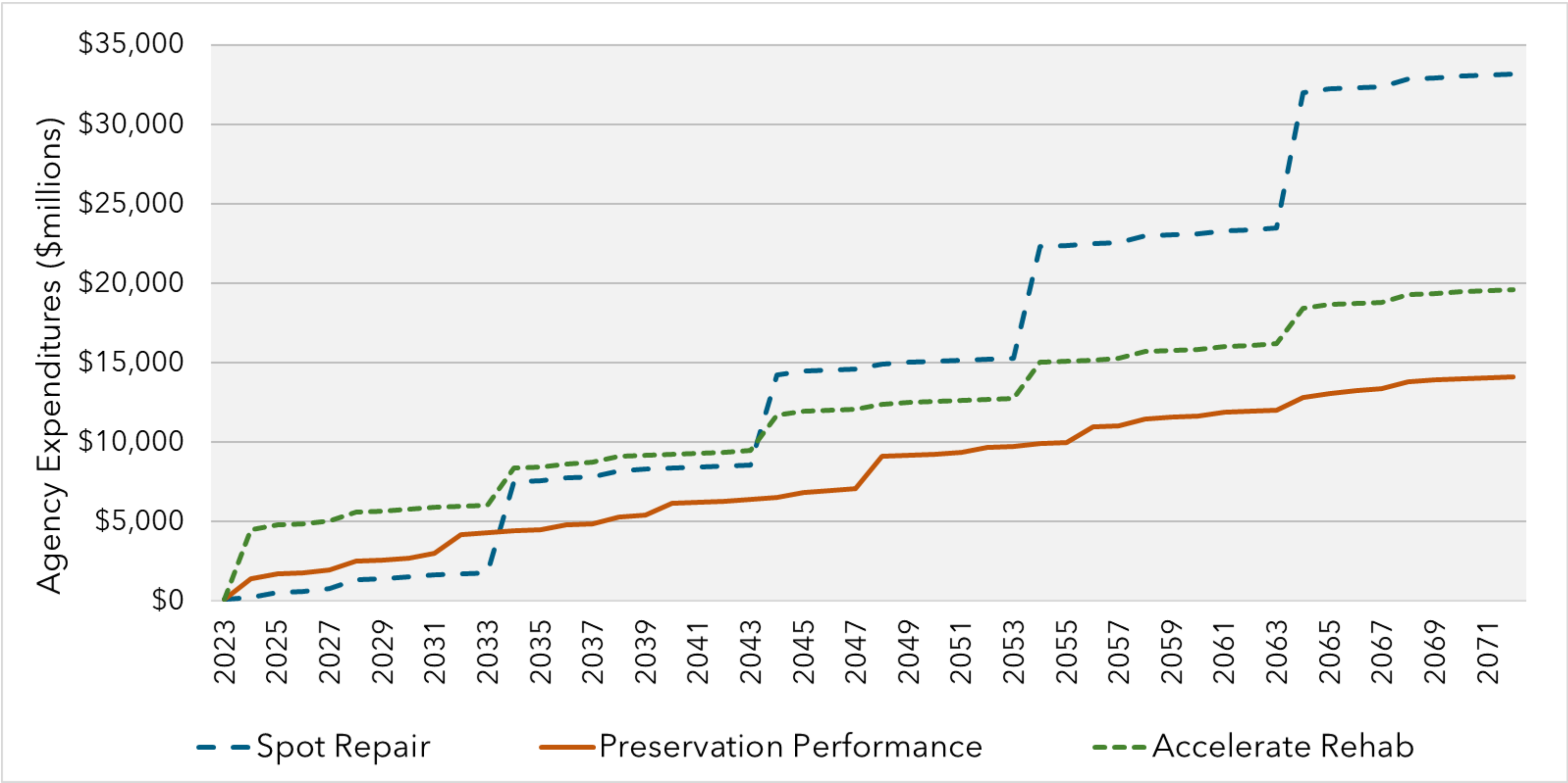
User costs were calculated by a methodology detailed by FHWA and utilized by Caltrans. The impact of user costs varies depending on work type, traffic volumes, work zone characteristics (including number of days, time of day, and length of the work zone), and the availability of alternative routes.

5. Performance Scenarios

The performance outcomes of the toll bridges demonstrate how varying funding levels and management strategies influence bridge conditions and the ability to meet performance targets. Given that agency costs account for most of the life cycle costs, ranging from 76% to 92% of the total present value, this summary focuses on these results. Vulnerability costs, user costs, and projected backlog represent a comparatively minor portion of the overall cost profile. The LCCA demonstrates that the Preservation Performance scenario represents the most cost-effective approach for managing toll bridges in the Bay Area. This strategy provides a balanced maintenance strategy that preserves bridge conditions and extends service life while optimizing financial resources. Because toll bridges are intricate structures with unique elements that respond differently to maintenance interventions and external factors, each bridge performs differently under a given scenario. Key overall findings are summarized by the three graphs below. Findings for each individual bridge follow.

Cumulative Agency Expenditures

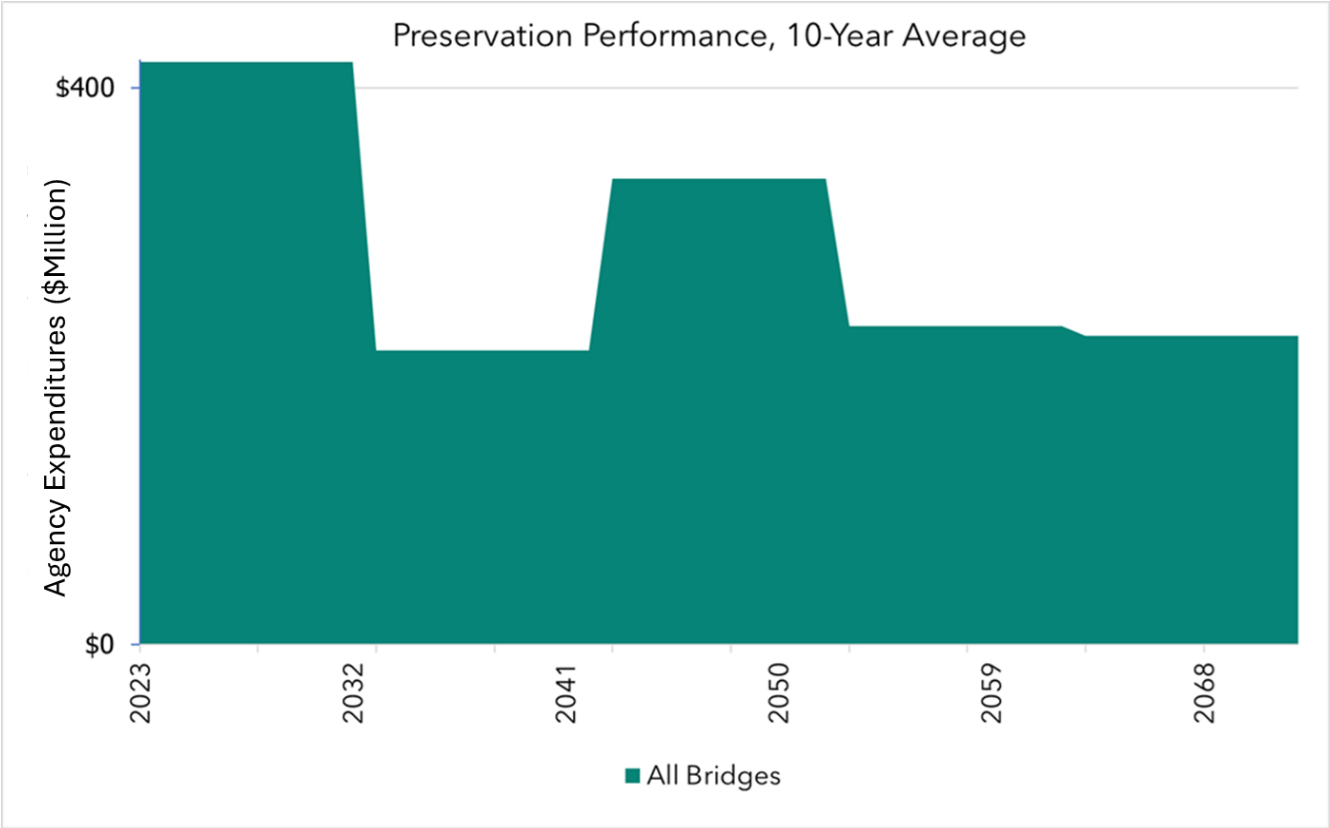
The cumulative agency expenditures graph compares costs across scenarios for all bridges. While Spot Repair begins as a low-cost option, it becomes the highest cost option over time due to deferred repairs. Accelerate Rehab is the second most expensive long-term scenario and demonstrates that higher expenditures do not necessarily translate to proportionally better bridge performance over the analysis period. There is a diminishing return on increased investment. Preservation Performance remains the most cost-effective option for most of the analysis period.



Estimated Cumulative Agency Expenditures for All Bridges (2023 $)

10-Year Annual Preservation Performance

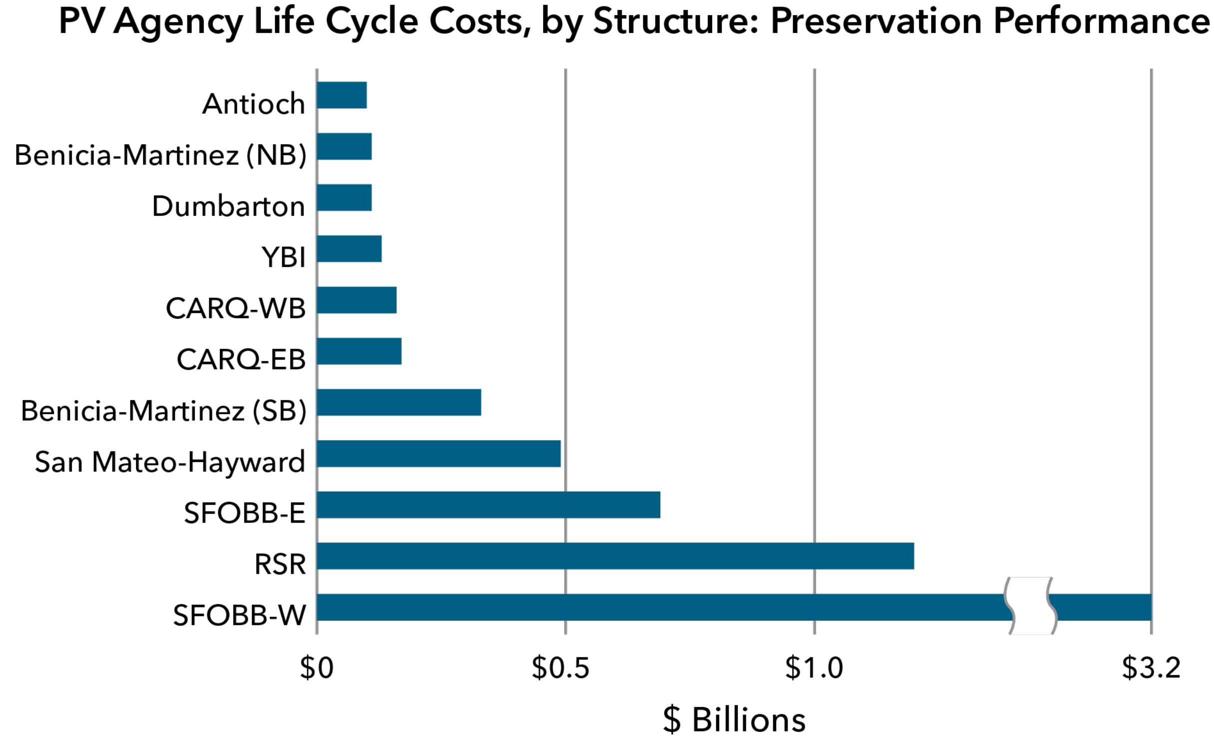
The 10-year average Preservation Performance graph estimates program costs over 50 years, for toll bridge preservation capital projects as well as CT regular annual O&M. Maintaining all bridges under this scenario requires about $420 million annually for the first 10 years to address the current backlog of bridge preservation projects and $250 million per year for subsequent years. Adjusting the timing of some expenditures will change the spread of costs over time. These estimates also include the costs of projects to ensure functionality of tolling infrastructure.



10-Year Annual Estimated Cost for Preservation Performance Scenario, All Bridges (2023 $)

Present Value Agency Costs

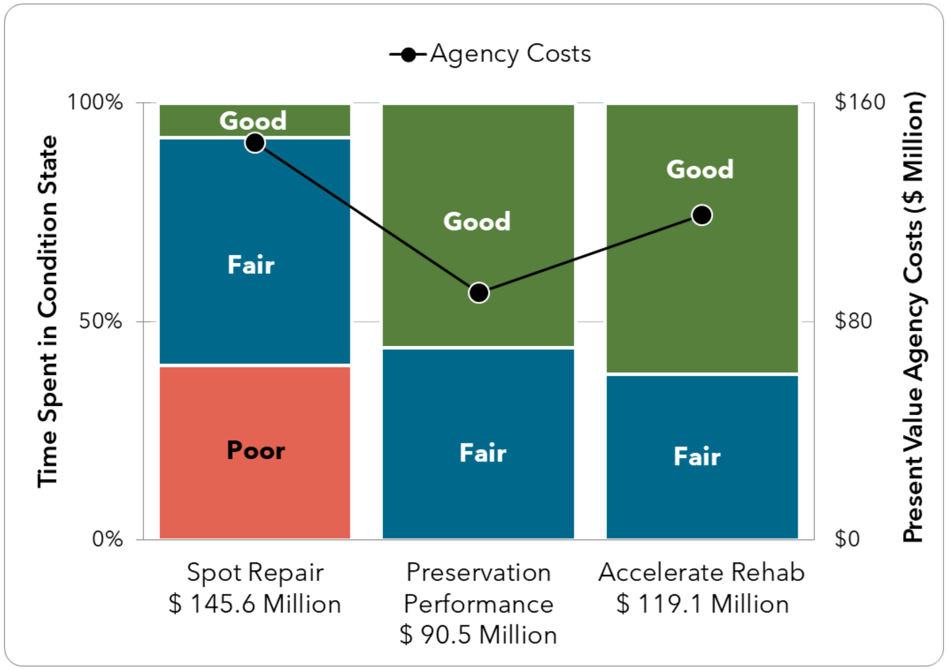
The present value analysis of agency costs was evaluated in 2023 dollars and indicates the Richmond–San Rafael Bridge (RSR) and the San Francisco–Oakland Bay Bridge West Span (SFOBB-West) together account for approximately 65% of the total estimated costs. This is consistent with the bridges' ages and other characteristics – detailed in the bridge-specific analyses later in this plan – which drive higher maintenance and rehabilitation needs. Costs are shown in present value terms to allow comparisons of expenditures over the long-life cycle of the assets.



Present Value of Estimated Agency Costs, Comparison by Bridge

Antioch Bridge

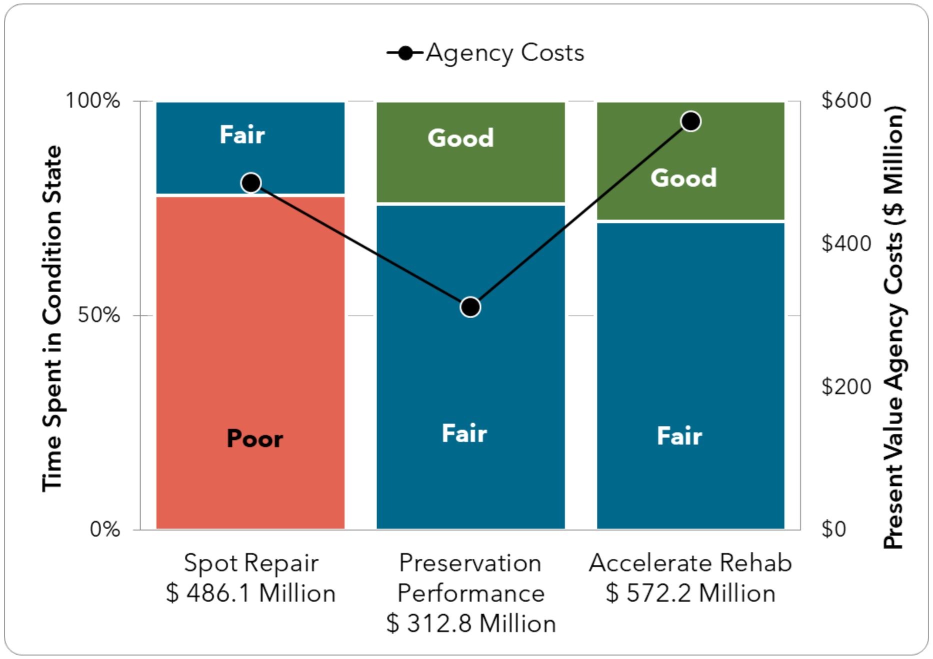
The Antioch Bridge has among the lowest agency costs of any Bay Area toll bridge. This is driven by the bridge's small size and relatively recent construction. In addition, the Antioch Bridge was built using weathering steel that does not require paint for maintenance. The bridge geometrics (single lane in each direction) and the lack of nearby alternatives lead to higher user costs, thus making work zone planning particularly important.



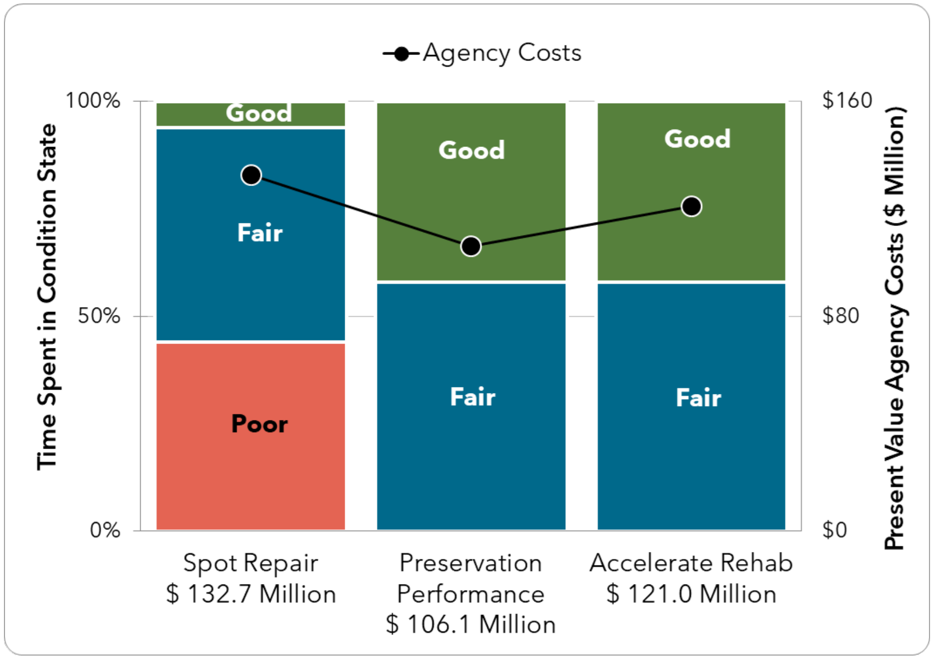
Antioch Bridge Performance by Scenario

Benicia-Martinez Bridge

The Benicia-Martinez Bridge maintenance costs vary significantly by structure. The southbound structure is approximately 45 years older than the northbound structure, thus contributing to more costly repairs. Additionally, the southbound structure includes steel, which requires additional paint coating activities not needed for the concrete northbound structure.



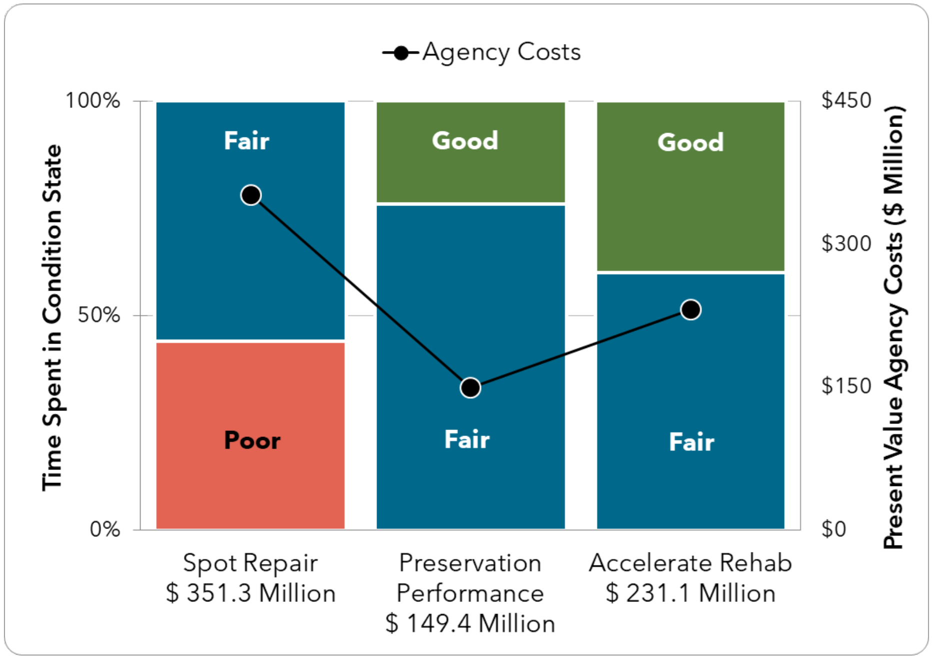
Benicia-Martinez – 1962 (Southbound) Performance by Scenario



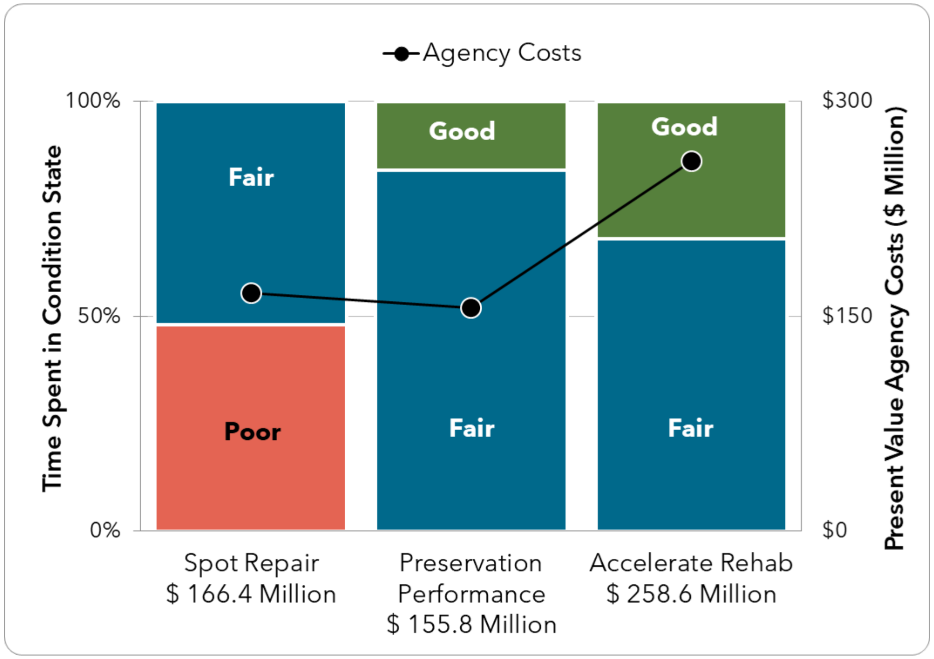
Benicia-Martinez – 2007 (Northbound) Performance by Scenario

Carquinez Bridge

Maintenance costs for the Carquinez Bridge's westbound and eastbound structures generally are in line with those of other Bay Area toll bridges. Life cycle costs for the eastbound structure are expected to be slightly higher than the westbound structure due to the older age of the structure and the larger volume of paint required to maintain the steel material.



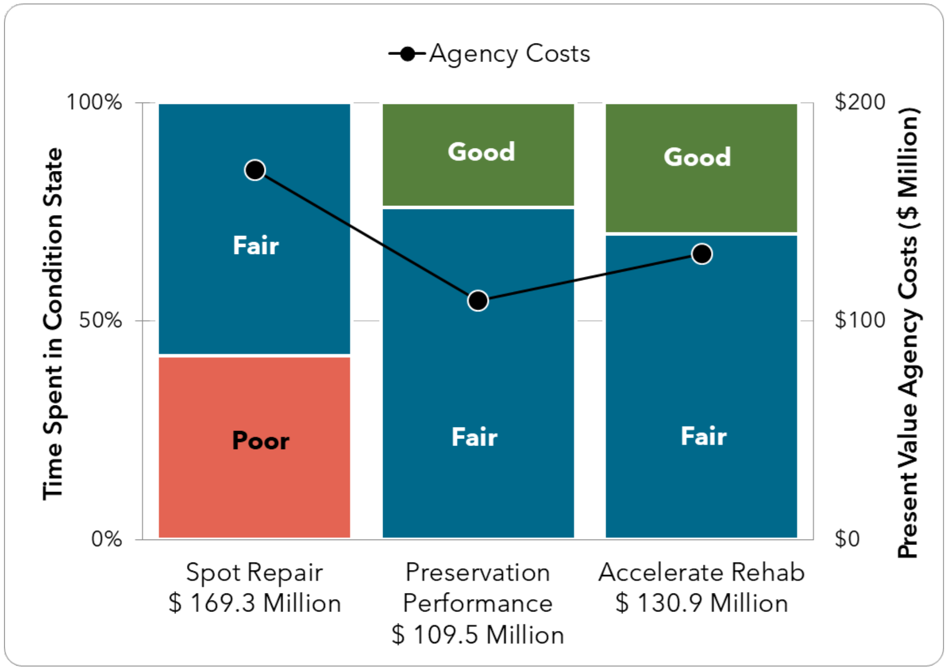
Carquinez Bridge - 2003 (Westbound) Performance by Scenario



Carquinez Bridge - 1958 (Eastbound) Performance by Scenario

Dumbarton Bridge

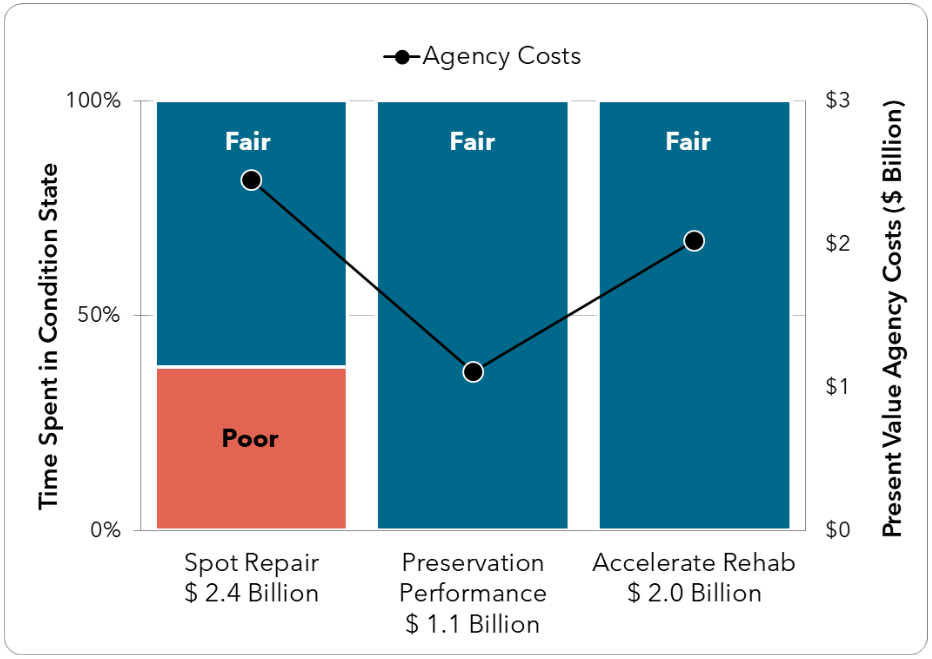
Agency costs to maintain the Dumbarton Bridge are lower than most other Bay Area toll bridges. This primarily is due to the bridge's relatively recent construction and its predominantly concrete design, which minimizes the need for routine painting. While user impacts are relatively low in the Preservation Performance scenario, a full bridge closure would result in long traffic detours and therefore should be considered during work zone planning.



Dumbarton Bridge Performance by Scenario

Richmond-San Rafael Bridge

The Richmond-San Rafael Bridge requires more significant maintenance investments than most other Bay Area toll bridges. Total costs for this bridge represent approximately 15% to 30% of the costs to maintain all the toll bridges, depending on the scenario modeled. These high costs reflect the age and the large size of the structure. The cost of painting this bridge is substantial due to its large steel structure.



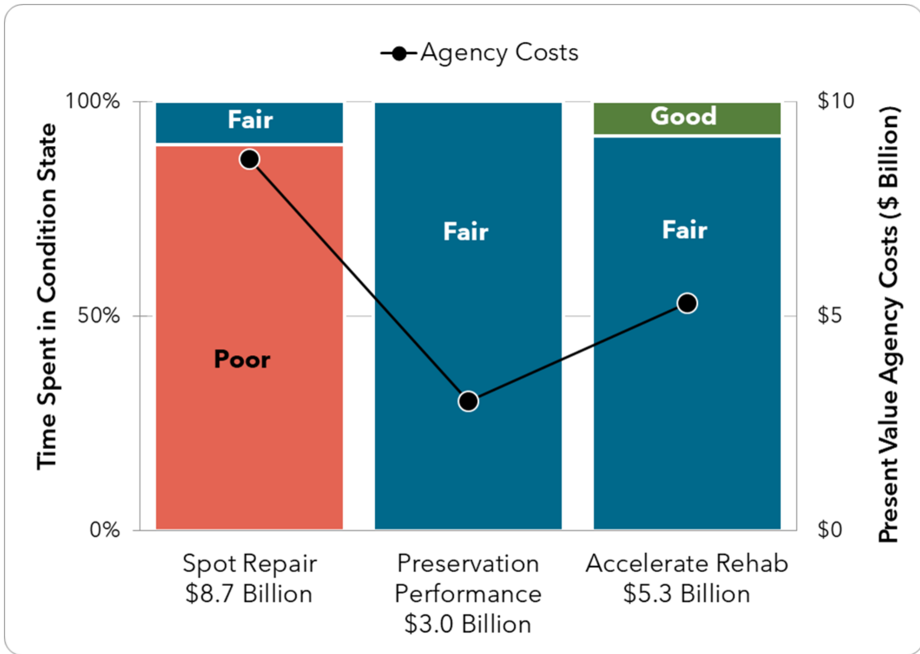
Richmond-San Rafael Bridge Performance by Scenario

San Francisco-Oakland Bay Bridge

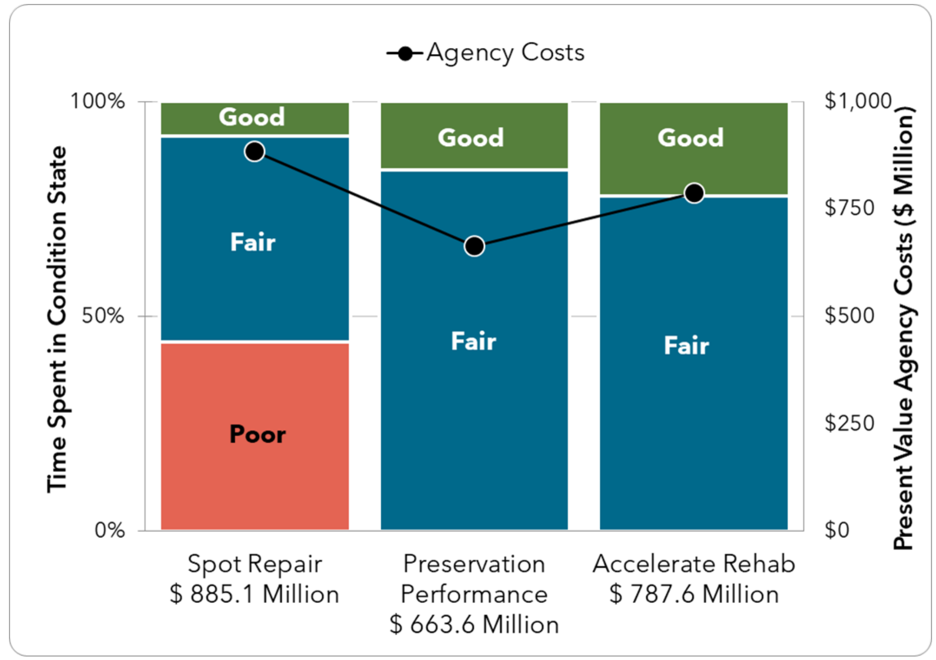
The San Francisco-Oakland Bay Bridge requires the most significant maintenance investments of any of the Bay Area's state-owned toll bridges. Total costs to maintain the West Span alone account for about half of the total costs for all seven bridges. These elevated costs are primarily attributed to the structure's age, its considerable size, and the high volume of traffic it supports. The west span requires more paint than any other toll bridge structure, largely due to its extensive steel truss surface area.

Opened to traffic in 2013, the Bay Bridge East Span is the newest Bay Area toll bridge structure. Costs to maintain the East Span reflect its large size, high traffic volumes, and wide multi-modal bicycle and pedestrian path.

While the Yerba Buena Crossing tunnel is an older structure, it has relatively low costs compared to the toll bridges due to its concrete construction and short length.



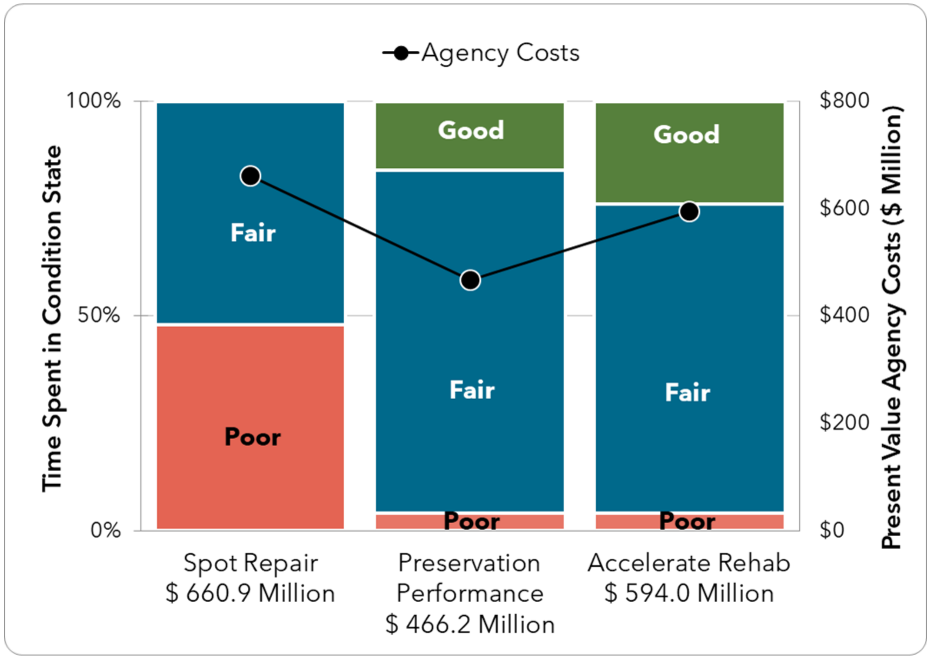
San Francisco-Oakland Bay Bridge West Span



San Francisco-Oakland Bay Bridge East Span

San Mateo-Hayward Bridge

While the San Mateo-Hayward Bridge has a superstructure and deck in good condition, the poor condition of the substructure results in a poor overall condition for the bridge. This does not mean the bridge is unsafe for the traveling public. Deterioration on the substructure is consistent with the age of the bridge and its marine environment. Repairs to concrete on the trestle are underway and expected to improve the condition. The costs to maintain this bridge are average compared to the other toll bridges.



San Mateo-Hayward Bridge Performance by Scenario

6. Financial Plan

The financial plan is a critical component of the asset management process, which aims to ensure the long-term sustainability of the Bay Area's seven toll bridges, collectively the "Bridge System. The next subsection outlines how toll revenues and bonds secured by toll revenues are and will be used to fund the safe and efficient operation of the Bridge System. It also serves as a roadmap for current and future investment opportunities to achieve the Toll Bridge Asset Management Plan's goals.

Funding Sources and Uses

Tolls collected on the seven state-owned bridges in the San Francisco Bay Area constitute the primary source of funding for BATA. The tolls are used to fund operations, pay-as-you-go projects, and debt service on outstanding bridge toll revenue debt. [v]As described below, three regional measures were enacted by the legislative assembly and subsequently approved by voters, increasing bridge tolls and establishing specific operating transfers and capital funding obligations, including for off-bridge projects.

BATA manages the FasTrak electronic toll collection system and administers all toll revenue from the Bridge System. California law authorizes BATA to increase the toll rates, specified in its adopted toll schedule, to provide funds for the planning, design, construction, operation, maintenance, repair, replacement, rehabilitation, and seismic retrofit of the bridges. Caltrans is responsible for maintaining the Bridge System in a state of good repair and condition, and BATA is responsible for paying all the costs of operating and maintaining the Bridge System. The table on the following page shows the current board approved toll rate schedule.

These tolls reflect actions of the California legislature that directed regional measures to be placed on the ballot for voter approval as follows:

- **Regional Measure 1 (RM1)** – Assembly Bill (AB) 610 was enacted in 1987, which was subsequently approved by Bay Area voters in 1988, establishing a uniform $1 base toll rate to support bridge and roadway improvements all around the Bay Area. While all RM1 projects are now complete, RM1 revenue is used to service debt.
- **Regional Measure 2 (RM2)** – Senate Bill (SB) 916 was enacted in 2004, and was subsequently approved by Bay Area voters in March 2004, increasing toll rates by $1 to finance transit expansion and congestion relief projects in the region.
- **Regional Measure 3 (RM3)** – SB 595 was enacted in 2017, authorizing the ballot measure that was put to Bay Area voters and approved in 2018 to fund highway and transit capital improvements in the toll bridge corridors and their approach routes. RM3 increased tolls by $1 on January 1 in each of 2019, 2022, and 2025, for a total $3 toll increase. RM3 also provides for an inflation adjustment with board approval.

Bridge System Toll Rates

		Effective as of January 1				
Vehicle Class	**Payment Method**	**2026[1]**	**2027[1]**	**2028[1]**	**2029[1]**	**2030[1]**
Carpool Vehicles		$4.25[2]	$4.50[2]	$4.75[2]	$5.00[2]	$5.25[2]
2-Axle	FasTrak®	8.50	9.00	9.50	10.00	10.50
	License Plate	8.50	9.25	9.75	10.25	10.75
	Invoice	8.50	10.00	10.50	11.00	11.50
3-Axle	FasTrak®	19.50	21.00	22.50	24.00	25.50
	License Plate	19.50	21.25	22.75	24.25	25.75
	Invoice	19.50	22.00	23.50	25.00	26.50
4-Axle	FasTrak®	25.00	27.00	29.00	31.00	33.00
	License Plate	25.00	27.25	29.25	31.25	33.25
	Invoice	25.00	28.00	30.00	32.00	34.00
5-Axle	FasTrak®	30.50	33.00	35.50	38.00	40.50
	License Plate	30.50	33.25	35.75	38.25	40.75
	Invoice	30.50	34.00	36.50	39.00	41.50
6-Axle	FasTrak®	36.00	39.00	42.00	45.00	48.00
	License Plate	36.00	39.25	42.25	45.25	48.25
	Invoice	36.00	40.00	43.00	46.00	49.00
7-Axle and more	FasTrak®	41.50	45.00	48.50	52.00	55.50
	License Plate	41.50	45.25	48.75	52.25	55.75
	Invoice	41.50	46.00	49.50	53.00	56.50

(1) Effective January 1, 2026, tolls as established under BATA Resolution No. 184, Attachment A – Authority Toll Schedule for Toll Bridges (Effective January 1, 2026) ("Resolution 184"). See also "LEGISLATION, INITIATIVE AND REFERENDA MATTERS – Legislation and Related Matters" herein.

(2) See Resolution 184 for requirements to qualify for reduced toll rate effective January 1, 2026 and thereafter.

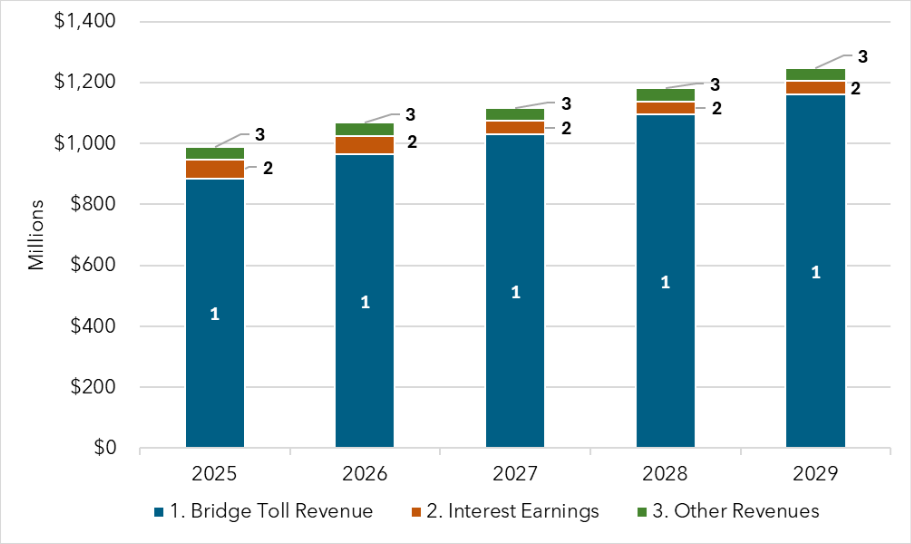
Source: The Authority

In addition to the regional measures, in 1998 a seismic surcharge was imposed by California law to fund part of the cost of the Seismic Retrofit Program for the Bridge System. The seismic surcharge was increased by an additional $1 in 2007 and 2010 for a total seismic surcharge of $3. Along with the toll increase in 2010, BATA introduced a carpool discount as well as congestion pricing on the San Francisco-Oakland Bay Bridge; however, congestion pricing has been suspended since 2020. In December 2024, BATA's board approved additional toll increases, phased in over time as shown in the chart above, to maintain the bridges in a state of good repair.

BATA relies on issuance of bonds as a key tool in financing major bridge improvements and transportation projects. Many of these projects require large amounts of money upfront, rendering pay-as-you-go funding impractical. Instead, BATA issues toll bridge revenue bonds, which are secured by and repaid from toll revenues over time.

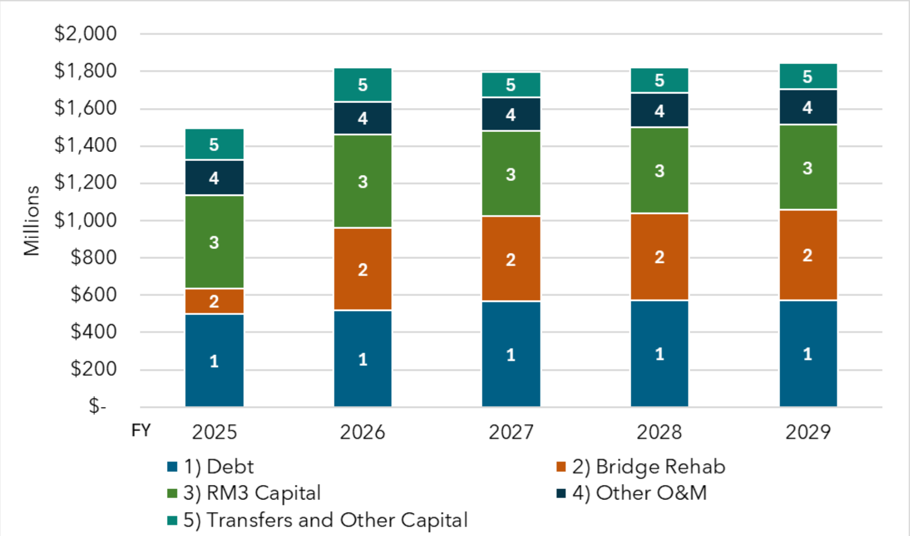
As of the date of this report, BATA has approximately $10 billion in toll bridge revenue bonds outstanding, the majority of which were originally issued to fund the Bridge System seismic retrofit program. The official statement delivered in connection with each bond issuance provides information on BATA's finances and operations, outstanding debt, the Bridge System, and the projects financed. Most of BATA's outstanding bonds require BATA to provide certain continuing disclosure information, including a requirement to publish an annual continuing disclosure report. In addition, the Metropolitan Transportation Commission (MTC) publishes an Annual Comprehensive Financial Report that includes financial information for BATA. These documents ensure transparency, fulfill certain legal and investor disclosure requirements, and support sound financial management. These materials are available in the downloads section of BATA's investor relations website.[vi]

The figure on the right shows BATA pro forma revenue for the next five years as provided in the 2025 Official Statement. While toll revenue is BATA's primary source of funds, the agency also generates revenue from investment earnings on fund balances, toll violations, and reimbursements from other agencies. Current BATA annual revenue is approximately $1 billion and is estimated to grow to approximately $1.2 billion over the next five years. Dollar values in the figure below are presented in year of expenditure dollars.



BATA Pro Forma Revenue through 2029

The figure below shows BATA pro forma operating and capital expenses for the next five years. The largest component of BATA's operating expenses is debt service payments on outstanding bonds that were issued to finance capital improvement projects, including the seismic retrofit program. "Other operation and maintenance" expenses (O&M) include, among other things, payments to Caltrans and direct BATA expenses. The "transfers and other capital" include RM2 and RM3 transfers to MTC which MTC provides to transit operators based on formulas in the respective expenditure plans. This category also includes "transfers out", which are administrative transfers to MTC and other programmatic transfers. "Transfers and other capital" also includes both transfers required by AB 1171 and expenses for core capacity projects. "Bridge rehab" represents funds that are expected to be available for toll bridge asset management and keeping the bridges in a state of good repair. Currently, funds for toll bridge asset management in the pro forma average approximately $397 million per year through 2029. For purposes of the pro forma, the 2023 dollars presented in the Needs Assessment subsection below have been escalated to year of expenditure dollars assuming a 3% annual rate of increase. "RM3 capital" includes the $4.45 billion in off-bridge projects directed in the RM3 expenditure plan. The RM3 capital expenditures in the pro forma average approximately $475 million per year through 2029.

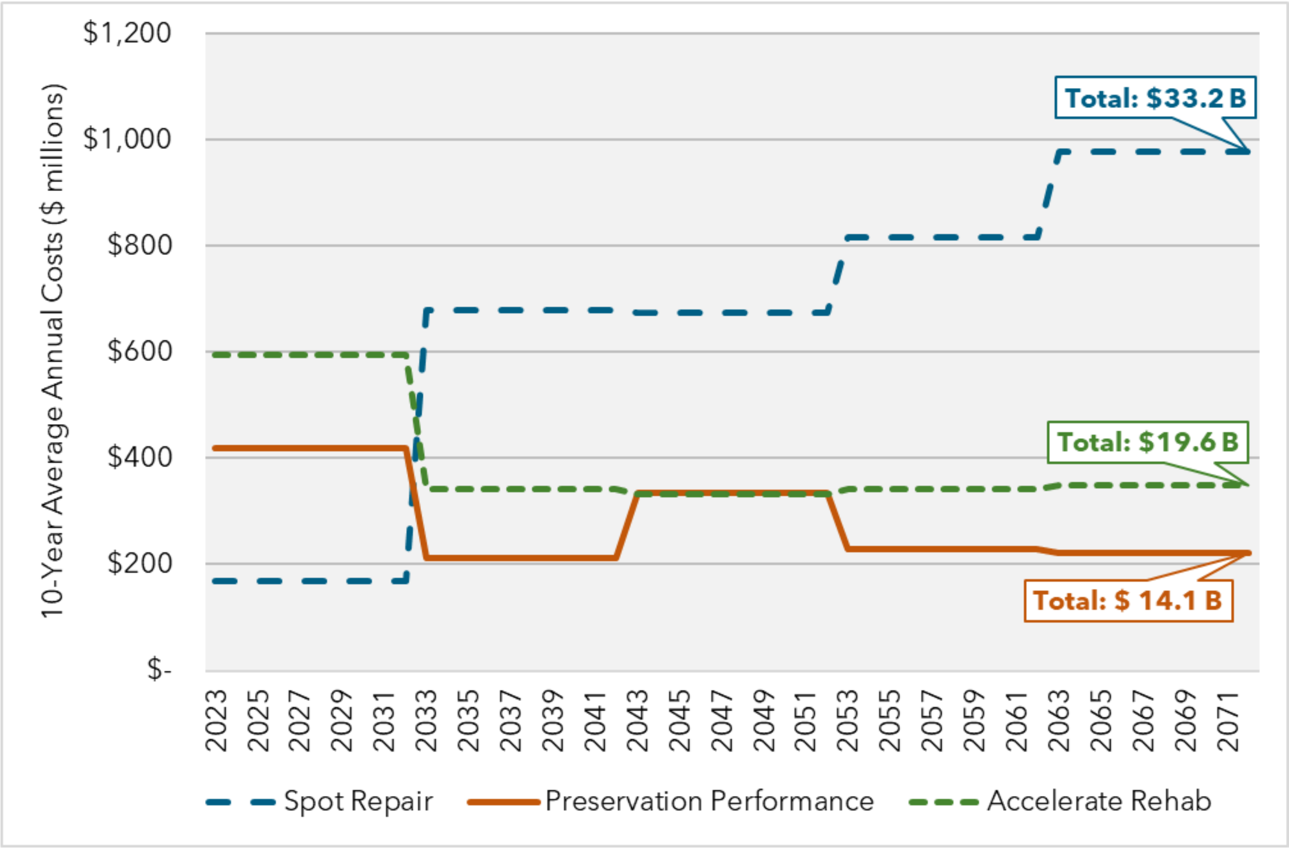


BATA Pro Forma Operating and Capital Expenses through 2029

BATA's financial planning is complicated due to multiple funding demands and uncertainty around timing of actual cash expenditures. Both BATA pro forma figures show that pro forma annual operating and capital expenditures exceed the amount of revenues generated by the current toll rates, requiring bond financing to meet total expenditure needs. For example, the RM3 project capital expenditures are reimbursed to the project sponsors after the fact, and BATA does not exercise any control over the timing of such expenditures. In addition, bridge projects have historically received budget allocations well before actual cash expenditures, requiring flexibility from BATA in terms of timing of actual cash outlay. These factors make it difficult for BATA to specify a set amount of dollars available for bridge projects within a given timeframe. Instead, BATA is committed to funding bridge projects through a combination of pay-as-you-go toll revenues (including toll increases) and bond proceeds, as needed to keep the Bridge System in a state of good repair. Dollar values in the figure on the left are presented in year of expenditure dollars.

Needs Assessment

The following figure illustrates the estimated Bridge System maintenance and rehabilitation needs by year based on the different performance scenarios over the analysis period. These scenarios include projected costs for tolling infrastructure projects to ensure the continued functionality of the tolling system. Each scenario represents a distinct approach to investment and maintenance, impacting long-term costs and bridge conditions differently. The projected impacts on bridge conditions and the tradeoffs among the different investment scenarios were presented in more detail in the Performance Scenarios section.



Estimated Toll Bridge Rehabilitation Needs in 2023 $ (Includes Tolling Infrastructure Projects)

- **Spot Repair** defers significant investments to later years, starting with a low investment of $170 million per year. However, as bridge conditions deteriorate, annual funding requirements rise to $680 million in the mid-period (2040s) and further increase to $980 million per year at the end of the analysis period. While this approach minimizes early expenditures, it results in escalating future costs to restore failing bridge elements, emergency repairs, and keeping all bridges in service. The total estimated investment for this scenario is around $33.2 billion over 50 years. This highlights the financial risks associated with delaying necessary repairs.
- **Preservation Performance** maintains a steady investment strategy aimed at keeping current bridge conditions stable over time. With an initial investment of $420 million per year, this approach helps prevent excessive deterioration while avoiding sudden cost spikes in the future. Later, the estimated investment drops to around $250 million per year to maintain conditions. The total estimated investment for this scenario is around $14.1 billion over 50 years.
- **Accelerated Rehabilitation** involves a high initial investment of approximately $595 million per year for the first 10 years, targeting more time in good condition early on. After this initial phase, annual costs drop to around $340 million, reflecting reduced maintenance needs due to the early interventions. This strategy results in more time in good condition for all bridges while reducing the need for major future rehabilitation needs. The total estimated investment for this scenario is around $19.6 billion over 50 years.

Overall, the different investment scenarios highlight the trade-offs between upfront investments and long-term maintenance costs. Proactive strategies can lead to cost savings and improved bridge conditions over time, while deferred investment strategies may result in higher long-term expenses and deteriorating bridge conditions. However, increased spending does not always guarantee significantly better conditions or a more effective strategy. Accordingly, the most balanced investment strategy appears to be the Preservation Performance scenario, as it provides cost-effective investments to maintain the toll bridges in a state of good repair. Hence, it is recommended for implementation in this asset management plan.

Gap Analysis

BATA is committed to funding maintenance and rehabilitation projects across the Bridge System to maintain the system in a state of good repair and in accordance with the BATA-Caltrans MCA. BATA ensures funding for all maintenance and rehabilitation requirements as needed to meet bridge condition obligations, utilizing a combination of pay-as-you-go funding and bond issuance. California law authorizes BATA to increase toll rates specified in its adopted toll schedule to provide funds for the planning, design, construction, operating, maintenance, repair, replacement, rehabilitation, and seismic retrofit of the bridges. Currently, BATA and Caltrans anticipate investing over $100 million in in rehab projects to close the condition gap at the San Mateo-Hayward Bridge and to improve the bridge to Fair condition.

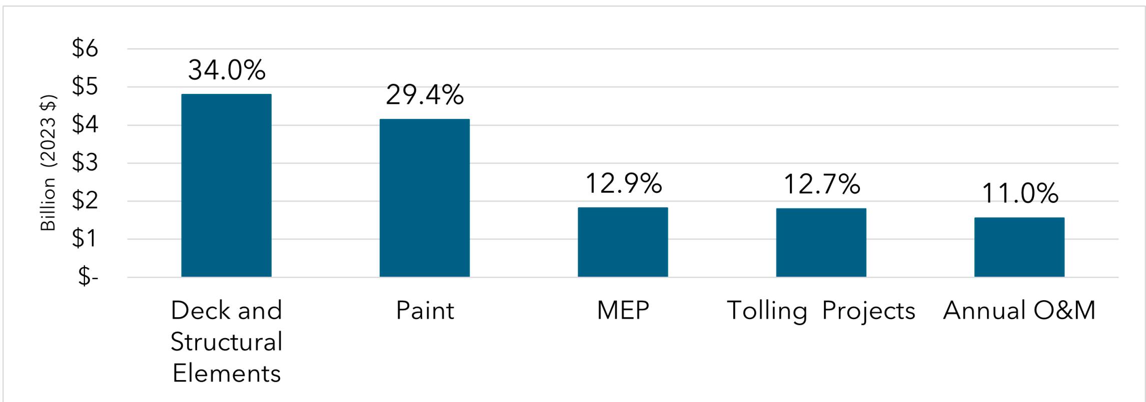
Investment Strategy

BATA and Caltrans collaborate to develop a 10-Year Toll Bridge Capital Improvement Plan (CIP), a fiscally constrained plan that identifies and prioritizes the projects needed to maintain the structural integrity of the toll bridges and their approaches, to secure and update bridge facilities, and to ensure continued efficient operation of the toll collection system.

The CIP is informed by Caltrans' 20-year rehabilitation plan and serves as the guiding investment framework for toll bridge system preservation and enhancement. The CIP is revised every two years for major updates to reflect current bridge conditions, new cost estimates, and evolving system needs. The most recent CIP was adopted in January 2025. Minor administrative updates occur on an annual basis. In addition to the CIP, BATA, in collaboration with Caltrans, establishes annual toll bridge capital rehabilitation and operations budgets that fund specific projects with detailed scope and schedule and budget cost estimate requests, ensuring alignment between strategic planning and annual budgeting. The following chart illustrates the recommended toll bridge system investments by work category under the Preservation Performance scenario. Over the next 50 years, this investment strategy requires an estimated $14.1 billion in capital funding, with allocation prioritized as follows:

- **Deck and Structural Elements:** With $4.8 billion (or 34% of total estimated needs), most investments are for maintenance and rehabilitation activities designed to preserve existing deck systems and other structural elements for the toll bridges.
- **Steel Painting and Corrosion Protection:** Steel painting represents the second largest work category, accounting for 29% of total estimated needs ($4.2 billion), reflecting the strategy's emphasis on preventative maintenance.
- **MEP works:** This is around $1.8 billion (or 13% of total estimated needs) in upgrading and maintaining various MEP systems such as switchgears, transformers, roadway lighting, security and navigational systems.
- **Tolling Infrastructure Projects:** This is around $1.8 billion (or 13% of total estimated needs) to ensure the functionality of tolling infrastructure.
- **Annual O&M**: This is approximately $1.6 billion (or 11% of total estimated needs) to ensure the maintenance and operation of toll bridges.

Bridge age and current condition significantly influence resource allocation. The Richmond-San Rafael Bridge (RSR) and the San Francisco-Oakland Bay Bridge West Span (SFOBB-West) together account for approximately $6 billion of the estimated needs for the next 50 years. The San Mateo-Hayward Bridge (SMH) requires substantial structural work compared to other bridges due to its currently poor condition, with interventions prioritized to address this condition gap within the next five years.



Proposed Bridge Investments (2023 $ Billion) by Work Category based on the Preservation Performance Scenario

7. Risk Management

The size and operation of the toll bridges can significantly influence the long-term costs and risks associated with the state's overall transportation network. Caltrans has an established process that follows all applicable statutes and relevant procedures to meet federal rules requiring the implementation of a risk management process. Since the toll bridges are part of the state highway system, the BATA and CT toll bridge asset management team uses a scalable risk management policy that is consistent with Caltrans risk management guidelines.[vii] The graphic below, adapted from the California Transportation Asset Management Plan, shows the process applied for the toll bridges. BATA and Caltrans invest significant resources in maintaining these bridges and planning/addressing risks. Establishing a robust risk management framework is crucial for both agencies, enabling proactive responses to potential risks rather than reactive measures. This approach prevents a crisis-driven management style and enables the direction of funds toward more efficient and strategic investments.

Risk Management Process

Adapted from California Transportation Asset Management Plan

According to the final report of NCHRP Project 08-93, Managing Risk Across Enterprise: A Guidebook for State Departments of Transportation,[viii] there are multiple levels of risk for an agency: Enterprise, Program, Project and Activity. Caltrans established seven major risk categories that span these four risk levels. BATA and Caltrans incorporated these categories into the toll bridges' risk management process. These risk categories are shown below.

Caltrans Asset Management Risk Categories
Adapted from California Transportation Asset Management Plan

The joint BATA and CT toll bridge asset management team developed a comprehensive toll bridge risk register identifying various risks associated with the toll bridges. This risk register is a matrix that captures risks at the bridge and network levels; and estimates their likelihood, impact, mitigation and monitoring strategies. Risks were identified by category and developed into risk statements (Cause-Risk-Event) in the risk register. The risks were then classified and scored based on the likelihood and consequence of the risk occurring (see table below).

$$\textbf{\textit{Risk Score}} = \textbf{\textit{Impact Score}} \times \textbf{\textit{Likelihood Score}}$$

Risk scores were calculated by multiplying the impact score by the likelihood score. Risks were then ranked in descending order to identify the most significant risks to the asset management of toll bridges.

After the identification and scoring, treatment strategies were identified based on the "5T's" process: treat (mitigate), tolerate (accept), terminate (avoid), transfer (change owner), and take advantage (opportunity). The general approach for managing risks on toll bridges is to conduct vulnerability assessments, with the team of stakeholders then identifying high-priority risks and developing effective project solutions and resources. An example from the risk register is shown below. This risk register will be reviewed and updated periodically as part of the asset management plan update process.

Risk Score Matrix

Likelihood					
	Certain (4)	40	120	280	400
	Probable (3)	30	90	210	300
	Possible (2)	20	60	140	200
	Unlikely (1)	10	30	70	100
		Insignificant (10)	Minor (30)	Moderate (70)	Major (100)
	Impact				

Risk Register Table Example

Category	Project and Program Management
Risk "if" Statement"	Project low estimates
Consequences or Impact	Delay project delivery, create conflicts with contracts and ultimately may impact bridge performance
Probability of Occurrence	Certain
Impact of Occurrence	Moderate
Risk Rating	280
Risk Treatment Strategy & Plan	*Strategy*: Tolerate *Plan*: Work with construction and project teams to enhance estimation methods Continuously update unit costs to match industry standards

8. Asset Management Improvements and Next Steps

Effective transportation asset management represents an evolving discipline of best practices that must adapt to changing conditions and emerging challenges. Asset management plans function as living documents. This Toll Bridge Asset Management Plan is the first comprehensive framework specifically developed for the Bay Area's state-owned toll bridges. Development of the Toll Bridge Asset Management Plan has been an intensive four-year process of research, collaboration and refinement. This process identified several key areas for continuous improvement:

Data and Modeling Enhancement Priorities

- Validate life cycle models' performance against actual data and projects, and enhance the models for better maintenance and rehabilitation planning.
- Assess technologies for enhanced asset management.

BATA-Caltrans Coordination Improvements

- Maintain and regularly update standardized processes, procedures, and defined roles and responsibilities for toll bridge asset management.

Risk Management Enhancement

- Conduct additional assessments and align with the state Transportation Asset Management Plan on climate adaptation strategies, long-term resilience planning, and vessel collision protection. BATA and Caltrans are committed to advancing asset management practices for the Bay Area's toll bridges, building on the foundation established by the Toll Bridge Asset Management Plan.

Future Expansion

- The current TBAMP focuses solely on the main bridge structures, extending from abutment to abutment. Subsequent phases of work may expand this scope to include bridge approaches, in accordance with the master cooperative agreement between BATA and Caltrans. Future expansion will also address vessel allision protection following the completion of ongoing vulnerability assessments. Projects may include fender rehabilitation and upgrades to navigational aids and informational systems.

In alignment with state guidelines, the plan will be updated every four years, or sooner if needed, based on performance data, stakeholder input, and operational experience. Future improvements will be prioritized according to available resources and potential impacts.

[i] BATA Long Range Plan. Accessed at: https://mtc.ca.gov/sites/default/files/documents/2025-01/BATA_Long_Range_Plan_Amendment_0.pdf.
[ii] Toll Bridge Program Report, February 2023. Accessed at: https://mtc.legistar.com/LegislationDetail.aspx?ID=6017410&GUID=87C708D1-603E-49C9-8E74-0D0F607ED9B4.
[iii] Report 483: Bridge Life-Cycle Cost Analysis; National Highway Cooperative Research Program (NCHRP), 2003. Accessed at: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_483.pdf.
[iv] Life-Cycle Cost Analysis Primer, August 2002, U.S. Department of Transportation, Federal Highway Administration Office of Asset Management. Accessed at: https://www.fhwa.dot.gov/asset/lcca/010621.pdf.
[v] Source: The official statement for BATA's San Francisco Bay Area Toll Bridge Revenue Bonds, 2025 Series F-2 (Green Bonds – Climate Bond Certified) and Second Subordinate Toll Bridge Revenue Bonds, 2025 Series SSL-2 (2025 Official Statement). Accessed at: https://bayareatollauthorityinvestorrelations.bondlink.com/bay-area-toll-authority-investor-relations-ca/documents/view-file/i1032?mediaId=1154913.
[vi] Bay Area Toll Authority Investors Relations: Accessed at: https://bayareatollauthorityinvestorrelations.bondlink.com/bay-area-toll-authority-investor-relations-ca/i1032.
[vii] BATA Resolution No.133 (2019). Accessed at: https://mtc.legistar.com/LegislationDetail.aspx?ID=4272722&GUID=ED3B53C9-FD71-439A-8A2E-50C399D905C6&Options=ID%7cText%7c&Search=resolution+133. Accessed in February 2024.
[viii] The National Academies of Sciences Engineering and Medicine, NCHRP Project 08-93, "Managing Risk Across the Enterprise: A Guidebook for State Departments of Transportation," June 2016, Accessed at: http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3635.