State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

M e m o r a n d u m

TAB 51

To: CHAIR AND COMMISSIONERS
CALIFORNIA TRANSPORTATION COMMISSION

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Action Item

From: NORMA ORTEGA
Chief Financial Officer

Prepared by: Bruce De Terra, Chief
Division of
Transportation Programming

Subject: **2017 TEN-YEAR STATE HIGHWAY OPERATION AND PROTECTION PLAN**

RECOMMENDATION:

The California Department of Transportation (Department) recommends that the California Transportation Commission (Commission) review and comment on the 2017 Ten-Year State Highway Operation and Protection Program (SHOPP) Plan content included in this Book Item.

ISSUE:

The Department is requesting that the Commission review the portions of the 2017 State Highway System Management Plan (SHSMP) related to the SHOPP in accordance with the Streets and Highway Code and provide written comments to the Department.

The Department intends to return to the Commission at a later date to seek adoption of the remaining physical asset class targets as provided under the California Government Code. This approach will allow the SHSMP to move forward as statutorily required while still reserving the Commission's authority to adopt targets for the remaining asset classes.

The Department is required by California Streets and Highways Code Section 164.6 to:

- Prepare a Ten-Year SHOPP Plan every two years that identifies all state highway system rehabilitation needs for the ten-year period, and to submit the draft SHOPP Plan to the Commission for review and comment; and

- Prepare a Five-Year Maintenance Plan every two years and submit the Plan to the Governor and the Legislature.

Furthermore, California Government Code Section 14526.4 (Senate Bill 486) requires the Department to prepare an Asset Management Plan for Commission approval and to robustly implement the approved Asset Management Plan beginning with the 2020 SHOPP.

Rather than preparing three separate documents that are each focused on the preservation and rehabilitation of the State Highway System (SHS), the Department has combined all three documents into the 2017 SHSMP to meet the requirements of all three mandated plans.

In order to clearly delineate the portion of the SHSMP that constitutes the 2017 Ten-Year SHOPP Plan that the Commission will take action on, the Department has consolidated SHSMP content (as Attachment 1) that directly addresses the 2017 Ten-Year SHOPP Plan requirements into this Book Item for Commission review and comment. The full SHSMP is attached for reference.

BACKGROUND:

The 2017 SHSMP provides a comprehensive overview of the existing condition of all of State Highway System assets, identifies asset performance and identifies the approximate amount of funding that would be required to achieve the desired performance or condition for each asset class. (There are 34 unique asset classes.) The 2017 SHSMP estimates the amount of funding that can be reasonably expected to be available over the ten-year plan period and refines the performance and goal targets to identify what can be achieved with available funding and designates funding amounts for each asset class.

Previous actions by the Commission selected 4 of the 34 asset classes to set performance targets: pavement, bridge, culverts and intelligent transportation system (ITS) elements. Taken together, approximately 75 percent of SHOPP asset investments are directed to these 4 asset classes.

The SHSMP is an integrated management plan that provides a systematic asset management approach to the management of the State Highway System assets. The plan includes the full implementation of Performance Management as required under federal regulation (MAP-21/FAST Acts). The implementation of Performance Management satisfies the requirements contained in California Government Code (14526.4) requiring a robust asset management plan to guide the investments in the SHOPP. The SHSMP also satisfies the Streets and Highway Code Requirements for a SHOPP Ten Year Plan and Five Year Maintenance Plan.

In order to complete the Performance Management analysis required under federal regulation, the Department utilized the federal performance measures for pavements, bridges and targets adopted by the Commission in October of 2016. The analysis also utilizes the performance measures and targets adopted by the Commission for culverts and Traffic Management System (TMS) elements. The SHSMP includes additional targets on less impactful asset classes such as signs, lighting, buildings, pump plants, and roadside rest areas. The Commission has the authority to approve these targets at their discretion; however, the combined investment proposed in the SHSMP for these remaining asset classes represents 2.4 percent of the proposed SHOPP investment over the next ten years. Given the limited degree of impact to the SHOPP, the Department proposes to recommend adoption of the remaining targets in mass at a future Commission meeting.

Attachments:
Draft 2017 Ten-Year State Highway Operation and Protection Program Plan Content
Draft 2017 State Highway System Management Plan

2017 TEN-YEAR STATE HIGHWAY OPERATION AND PROTECTION PROGRAM (SHOPP) PLAN CONTENT SUMMARY

This document is a subset of the Draft 2017 State Highway System Management Plan (SHSMP), which is attached for reference. It focuses on SHSMP content that comprises the Draft 2017 Ten-Year State Highway Operations and Protection Program (SHOPP) Plan as required by California Streets and Highways Code Section 164.6. There is not a separate, stand-alone Draft Ten-Year SHOPP Plan. This summary clarifies which components of the SHSMP are relevant to the Commission in regards to providing comments on the Draft 2017 Ten-Year SHOPP Plan. When finalized, the SHSMP will include the Ten-Year SHOPP Plan and a separate document will not be issued.

As the State Highway System (SHS) continues to age, the demands of automotive and truck traffic is accelerating the deterioration of these assets. Compounding this deterioration is the lack of adequate funding for rehabilitation and restoration work necessary to bring highway infrastructure to a state of good operating condition. The increased demands and deferred rehabilitation and restoration results in lower operational performance, higher user operating costs and ultimately require a higher overall investment when needed repairs to the system are undertaken.

The ten-year escalated need for the rehabilitation and operation of the State Highway System (SHS) for the period 2017-18 through 2026-27 is $85.8 billion. Absent additional revenue, the annual funding shortfall to meet SHS rehabilitation and operation needs is estimated at approximately $6.1 billion.

MAINTENANCE VERSUS SHOPP ACTIVITIES AND PROJECTS

Caltrans strives to preserve the condition of the SHS in the most economical means possible by performing the right treatment at the right time through a three-pronged approach: (1) field maintenance, (2) Highway Maintenance (HM) projects and (3) SHOPP projects.

1. **Field maintenance** activities are the day-to-day demands that Caltrans maintenance staff must regularly react to. Maintenance strategies are important tools for extending the service life of assets in a cost-effective manner. Preventive maintenance is applied to assets in good condition and some fair condition assets when appropriate, with the goal of maintaining their condition. Local crews address minor maintenance, repairs, and preservation work. This typically includes pothole repair, crack sealing, cleaning of drains, servicing lighting and signs, structural painting, minor facility repairs, irrigation repairs and more. Crews also provide rapid response to repair minor accident damage. These field activities are the first line of defense in Caltrans' maintenance of the SHS, and are reactionary in nature. Caltrans employs maintenance crews

that collectively perform many aspects of ongoing maintenance of the highways and assets within the SHS. Every dollar spent on preventive maintenance delays the need for an equivalent $3 in rehabilitation or $8 in reconstruction or replacement of pavement in the future.

2. **Highway Maintenance** projects help further prolong the life of existing infrastructure. These projects include preventive and corrective maintenance work that exceeds the scope of what our crews can handle. Corrective maintenance typically applies to assets in fair condition; however, can also be applied to some assets in poor condition in some cases, with the goal of restoration to good condition. Asset deterioration can accelerate the longer the asset is in fair condition. A timely application of corrective maintenance can avoid more costly treatments later. The Maintenance Division utilizes contractors and service providers to execute work designed to extend the life of physical assets and delay rehabilitation or replacement of assets. HM projects are contract work routinely performed on pavements, bridges, culverts, facilities, traffic management systems and more. HM Projects may be preventive or corrective in nature. Examples include thin pavement overlays, bridge joint seals, and culvert repairs. These projects repair, but do not upgrade or replace the facilities.

3. **SHOPP** projects are necessary when field maintenance and more extensive HM project activities are no longer cost-effective or viable, asset rehabilitation or replacement is considered. Rehabilitation or replacement typically applies to assets in both fair and poor condition and is typically funded through the SHOPP. SHOPP projects are more complex capital construction projects that utilize private construction contractors through a competitive bidding process. These projects are overhauls of infrastructure that is nearing the end of its lifespan, and may involve complex upgrades. These projects may involve extensive planning and design, environmental permitting and even right-of-way acquisition. Rehabilitation and replacement activities are performed on pavements, bridges, culverts, buildings, overhead signs, lights, roadside elements and safety roadside rest areas. In addition to managing the condition of the physical infrastructure, Caltrans invests in safety improvements, operational improvements, environmental mitigation, traffic management systems, freight improvements and system resiliency activities. The SHOPP invests available funds to implement safety improvements, rehabilitate or replace physical assets, improve the operation of the highways, improve the system resiliency and mitigate transportation related environmental impacts. The SHOPP includes 34 specific focus areas that are individually described in the Needs Assessment. The Commission has direct responsibility to adopt the projects that constitute the SHOPP and to approve all scope, schedule and costs changes to the adopted projects. Further, the Commission has responsibility to set asset performance targets that help ensure the investments made through the SHOPP are achieving the desired statewide transportation outcomes. SHOPP funding cannot be used to add new highway lanes, though there is limited and narrow authority to use SHOPP funding to add truck climbing lanes and auxiliary lanes.

Utilizing this three-pronged approach to asset preservation, Caltrans crews are able to make timely repairs on minor needs before they grow into major and more expensive problems to fix, contract for highway maintenance activities at the right time to extend the useful life of the assets at the lowest possible long-term cost and delay future rehabilitation or replacement activities, and to then invest in major asset rehabilitation or replacement projects when the useful life of an asset has been reached.

Beyond the asset management objective of taking care of the existing SHS assets, there are additional SHS needs for upgrading and expanding facilities to accommodate increased freight movement, broader economic growth, population increases, new transportation technologies and evolving land use patterns. These needs are beyond the scope of the funding provided through the Maintenance and SHOPP programs and are instead addressed through a variety of other funding programs such as the recently enacted Fixing America's Surface Transportation (FAST) Act, the State Transportation Improvement Program (STIP), state transportation bond programs, local transportation tax measures and other funding programs. All of these programs invest in the SHS, as well as local roads, and sometimes address SHS preservation needs at the same time. As projects are developed and constructed through these other funding programs, it is essential that the project development process incorporate life cycle and asset management considerations so that when the SHS projects are completed and operational and come under the auspices of the Maintenance and SHOPP programs, the projects are designed and to be as efficient and cost-effective as possible to maintain, preserve, and when the time comes, rehabilitate.

STATE HIGHWAY SYSTEM NEEDS ASSESSMENT

The California Streets and Highway Code requires the development of a SHS Needs Assessment that defines the program areas and costs associated with achieving defined condition and performance targets. The Needs Assessment is intended to provide a picture of the total needs of the SHS and is not constrained by available funding. The majority of the needs on the SHS are determined through a gap analysis completed as part of the implementation of performance management. The performance management approach captures all of the needs associated with fair and poor condition gaps. Preventive maintenance needs, associated with activities that focus on keeping good condition assets in good condition as long as possible, are added to the performance management gap analysis needs to determine the total need required for the maintenance, rehabilitation and operation of the existing SHS.

The performance management based Needs Assessment conducted for this document is limited to activities that are consistent with state laws that govern the use of Maintenance and SHOPP funds. Generally, these laws require the available funding to be expended on the safety, maintenance, rehabilitation and operation of the existing system. System expansion is not permitted through Maintenance or SHOPP programs.

The SHOPP needs are determined through performance management gap analysis. The performance management approach involves the following general steps:

1. Establish the asset inventory or deficiency level
2. Establish the current and projected future condition/performance level of each objective
3. Establish goals to achieve desired asset performance levels
4. Perform a gap analysis between the projected condition/performance and the performance goals
5. Estimate the cost to close the performance gaps

These five steps are repeated for each objective being tracked by Caltrans related to the maintenance, rehabilitation and operation of the SHS. There are three distinct performance management models incorporated into the SHSMP: (1) asset, (2) deficiency and (3) reservation.

1. The asset model is used for physical assets such as pavements, bridges, culverts or any other tangible highway item. The asset model defines an inventory such as the number of lane miles of pavement or the square feet of bridge deck area contained in the SHS. The inventory condition is reported as a percentage of the total in good, fair or poor categories. The performance management approach applies a deterioration rate to each asset to account for expected future conditions. Condition goals for the physical assets are defined with key goals

being approved by the Commission. The gap analysis determines the number of lane miles or bridge deck area between projections and the desired performance goal. The performance management analysis has both a system preservation and rehabilitation/replacement goal to ensure a balanced management approach. The existing program of work (active projects) is then deducted from these gaps to determine the unaddressed need. The cost to improve the condition to the established goals is then estimated using historical unit costs. These costs, combined with the existing program of work, represents the total need over the ten-year period.

2. The deficiency model is used for objectives like storm water mitigation, safety or Americans with Disabilities Act (ADA) needs. These needs do not have a condition breakdown like the physical assets; they are either deficient or not. A gap analysis between the current deficiency and the goal is conducted similar to the asset model. The program of active projects is again deducted from the gap analysis to determine the unaddressed need. Cost estimates to address this need are calculated similar to the asset model.

3. The final Needs Assessment model is for unplanned needs. Emergency response activities and hazardous waste clean-up use this model. Objectives using the reservation model cannot be predicted in terms of the quantity or location of need as location and scope of needs are not known until an event such as a flood or landslide occurs. To effectively manage the SHS, Caltrans holds a financial reservation for when these needs arise. Reservations do not have an identified inventory, condition breakdown or goal. The reservation levels are established based on historical demand in the respective areas.

These various individual models are aggregated up to develop the statewide need figures shown in Ten-Year SHOPP Needs Table on the following page. In total, there are 34 different objectives being combined together in the Needs Assessment.

Ten-Year SHOPP Needs

Objectives	Sum* (in millions)
Safety	**$13,333**
Bridge Rail Replacement and Upgrade	$6,197
Collision Severity Reduction	$1,324
Roadside Safety Improvements	$1,602
Safety Improvements	$4,210
Stewardship	**$35,529**
Bridge Health	$5,485
Drainage Pump Plants	$165
Drainage System Restoration	$2,567
Lighting Rehabilitation	$602
Major Damage (Emergency Opening)	$1,525
Major Damage (Permanent Restoration)	$1,335
Office Buildings	$491
Overhead Sign Structures Rehabilitation	$481
Pavement Class I	$12,552
Pavement Class II	$4,970
Pavement Class III	$1,185
Relinquishments	$29
Roadway Protective Betterments	$467
Safety Roadside Rest Area (SRRA) Rehabilitation	$1,192
Transportation Related Facilities	$2,387
Water and Wastewater Treatment at SRRAs	$96
Sustainability	**$10,698**
ADA Pedestrian Infrastructure	$972
Advance Mitigation	$300
Bridge Scour Mitigation	$847
Bridge Seismic Restoration	$3,089
Hazardous Waste Mitigation	$5
Roadside Rehabilitation	$2,025
Storm Water Mitigation	$3,444
Zero Emission Vehicle Infrastructure	$15
Performance	**$9,859**
Commercial Vehicle Enforcement Facilities	$129
Operational Improvements	$933
Sign Panel Replacement	$700
Transportation Management Systems	$1,810
Bridge Goods Movement Upgrades	$5,907
Weigh-In-Motion Scales	$379
Subtotal	**$69,418**
Asset Management Pilot Program	$82
Minor Program	$1,500
PID Program Support	$1,379
Total	**$72,379**
Escalated Total	**$85,771**

**Numbers may not add due to rounding*

COMMISSION ADOPTED INTEGRATED ASSET CLASS SUMMARY

The California Transportation Commission defined four asset classes as "focus areas" in accordance with California Government Code. The four asset classes: pavement, bridges, culverts and transportation management systems were selected because they represent a significant portion of annual transportation investments in California. Pavements and bridges are also defined under provisions of the MAP-21 and FAST Acts. This section consolidates information presented in the Needs Assessment, Investment Plan and Performance Outcomes sections of this Plan and organizes this information by each of the asset classes.

Pavement

Maintaining the condition of the pavement on California's highways is the single most costly investment made on an annual basis. The large needs are a function of the size of the system, rapid deterioration caused by heavy use and costs associated with fixing the pavement. Pavement assets are divided into three pavement classes that reflect the varying demands of the different classes of roadways that make up the SHS.

The condition of the pavement inventory is deteriorating at a rate of 9 percent per year from good to fair and at a rate of between 3-4 percent from fair to poor (as shown in Chart 1).

The 2017 SHSMP establishes a goal of treating 1,900 lane miles annually through HM projects, based on existing funding of $234 million for HM projects. Caltrans anticipates using 10 percent of the HM funding to address the fair performance gap and 90 percent of the funding to keep pavement in good condition. Currently, there are

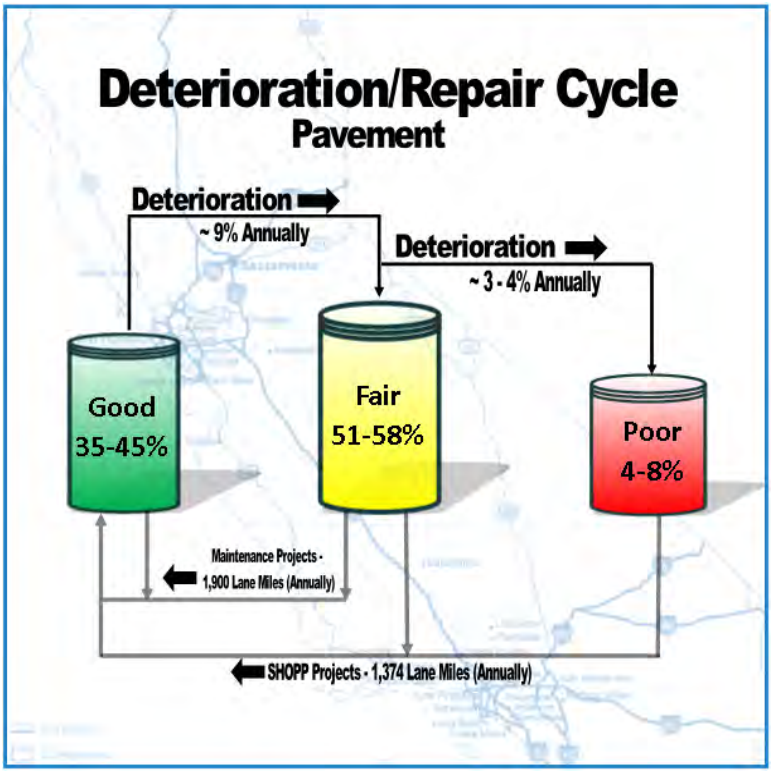


Chart 1. Displays the deterioration and repair cycle for pavement on the SHS. Currently there is between 35-45 percent of pavement in good condition – which ranges by pavement classification. Approximately 9 percent of pavement in good condition deteriorates to fair condition annually. Of the 51-58 percent of pavement in fair condition, approximately 3-4 percent of the pavement inventory declines to poor condition annually. SHOPP projects address pavement in both fair and poor condition and restores the condition of approximately 1,374 lane miles annually, while maintenance focuses on maintaining 1,710 lane miles in good condition as well addressing 190 lane miles of pavement in fair condition. It should be noted the deterioration rates are revised based on proposed MAP-21 condition criteria.

maintenance needs on approximately 12,900 lane miles of pavement. The maintenance need is expected to grow to slightly over 13,000 lane miles at the end of a ten-year period with funding at the current level and the rate of deterioration as shown in Chart 1. The expected modest increase in maintenance needs over the ten-year period would be offset by increased investment in the SHOPP. If pavement rehabilitation is funded in the SHOPP consistent with this report, no additional funding is recommended for the pavement maintenance program, as growth of future maintenance would be reduced. If pavement rehabilitation is not funded in the SHOPP as proposed in this Plan, the pavement maintenance needs will grow over time.

Bridge

Bridge maintenance needs are identified and documented during bridge inspections and through engineering analysis. Identified preventive maintenance needs that are beyond the capacity of Caltrans bridge crews are developed into projects to be completed under HM contracts. Development and construction of a typical bridge maintenance project takes approximately two to three years. While the current project stream is in development, additional HM needs are continuously being identified by the bridge inspectors.

As the bridge inventory ages, the rate of newly identified maintenance needs is growing and is expected to continue that growth in the future. This increase, considering the number of bridges Caltrans is able to address through HM bridge projects and state forces, is tracking with expectations. Through a combination of strategic planning, maintenance field activities, and bridge preservation contracts, Caltrans is working to slow the growth of rehabilitation and replacement needs.

The Bridge Health objective in the SHOPP has a projected performance gap of 5.8 million square feet (approximately 310

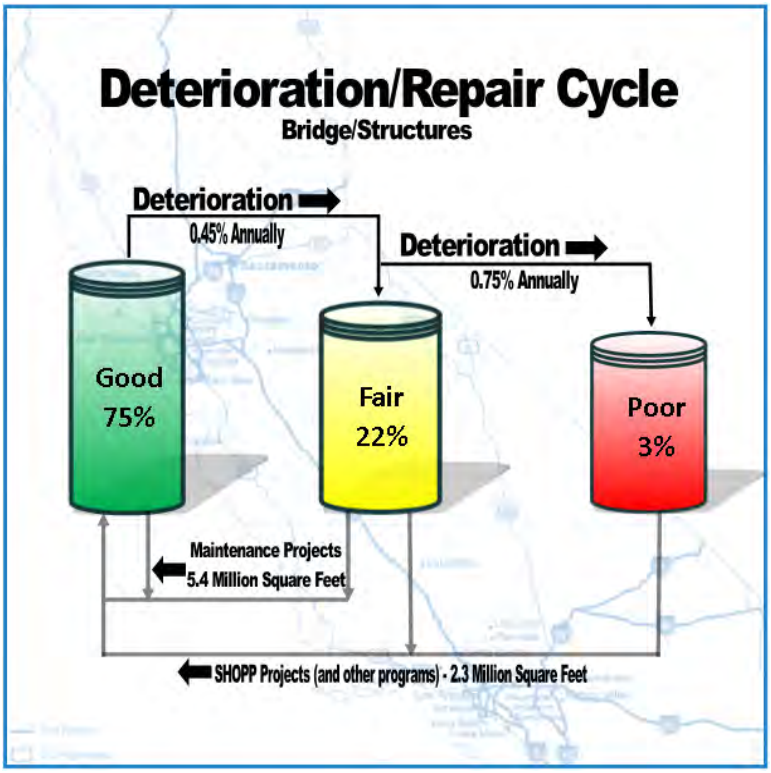


Chart 2. Displays the deterioration and repair cycle for bridges on the SHS. Currently 75 percent of bridge decks, measured by square feet, are in good condition. Approximately 0.45 percent of bridge decks in good condition deteriorates to fair condition annually. Of the 22 percent of bridge decks in fair condition, approximately 0.75 percent of the bridge deck inventory declines to poor condition annually. SHOPP projects address 2.3 million square feet of bridge decks annually in both fair and poor condition and restores the condition of the asset, while maintenance focuses on maintaining 5.4 million square feet annually of bridge decks in good condition as well addressing some bridge decks in fair condition.

bridges) of deck area in fair condition. It is anticipated that the Maintenance Program will address 40 percent of that performance gap (2.3 million square feet or 124 bridges) through HM projects while continuing to provide preventive maintenance measures on good condition bridges to prevent them from deteriorating into fair condition. If bridge rehabilitation is funded consistent with the SHOPP Investment Plan identified in this Plan, no additional funding is recommended for the bridge maintenance program. If bridge rehabilitation and replacement is not funded as recommended in this Plan, the bridge maintenance needs will grow over time.

Drainage (Culvert)

Caltrans continues to build our inventory of culverts running under or draining the SHS. Ongoing culvert inspections are adding between 8,000-12,000 culverts to the statewide inventory annually. Inspection production rates are dependent on many factors including right-of-way constraints, environmental permits, multiyear mitigation permits, and traffic considerations. Much of the "easier" access locations have been captured leaving locations that are more difficult to access and more time consuming to inspect. Caltrans is actively pursuing various methods to increase the number of inspections performed. Between 2014-15 and 2015-16 an annual average of 8,215 culverts were inspected.

The condition of the culvert inventory is deteriorating at a rate of 2 percent per year – both from good to fair and from fair to poor. Based on historical assessment rates and anticipated rates of deterioration creates an annual increase of approximately 270,000 linear feet (2,760 culverts) in the fair category and an annual increase of 141,000 linear feet (1,440 culverts) to the poor category.

Between 2014-15 and 2015-16 an annual average of 144 culverts were repaired through HM contracts. There are approximately 392,000 linear feet (4,000 culverts) in need

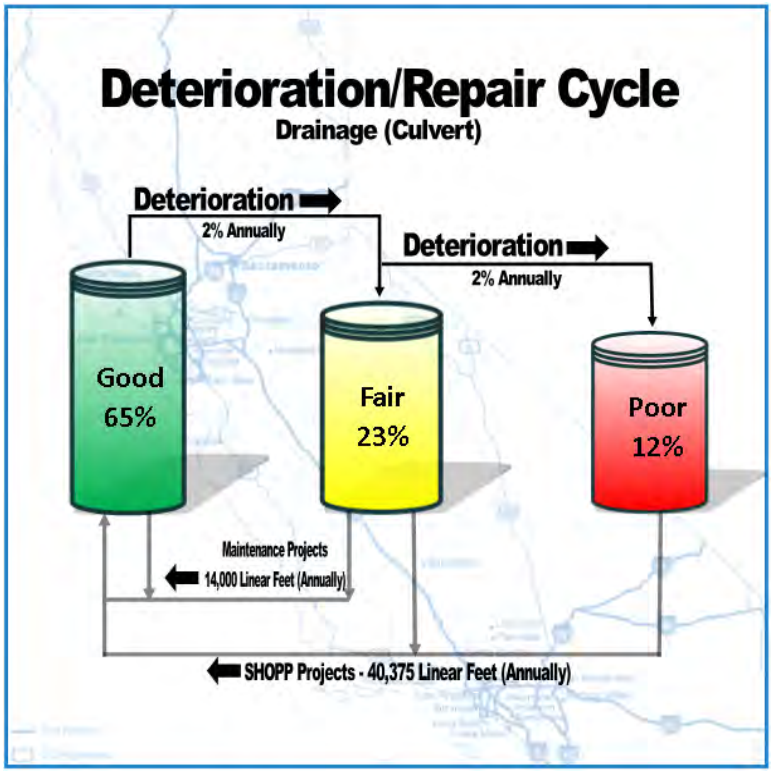


Chart 3. Displays the deterioration and repair cycle for drainage systems (culverts) on the SHS. Currently 65 percent of culverts, measured by linear feet, are in good condition. Approximately 2 percent of culverts in good condition deteriorate to fair condition annually. Of the 23 percent of culverts in fair condition, approximately 2 percent of the culvert inventory declines to poor condition annually. SHOPP projects address over 40,375 linear feet of culverts annually in both fair and poor condition and restores the condition of the asset, while maintenance focuses on maintaining 14,000 linear feet of culverts annually in good condition as well addressing culverts in fair condition.

of maintenance on an annual basis. At the current annual maintenance investment of $23 million, the number of culverts in need of maintenance treatment is anticipated to increase to just short of 6.9 million linear feet (70,000 culverts) in a ten-year period.

The culvert maintenance needs have been recognized in various funding proposals; therefore, no additional changes are recommended to the $23 million annual level of investment. The 2017 SHSMP Investment Plan calls for an investment of $845 million for culvert rehabilitation and replacement in the SHOPP. If Drainage System Restoration is funded consistent with the SHOPP Investment Plan identified in this Plan, no additional funding is recommended.

TMS Elements

Preventive maintenance is performed on a regular basis to keep TMS equipment in good working order and achieve maximum service life. TMS elements on the SHS deteriorate at a rate of almost 5 percent per year and require over 80,000 preventive maintenance checks and repairs annually to existing TMS inventory to maintain operating condition. Maintenance utilizes a combination of state forces and on-call service contracts to maintain TMS elements. TMS field elements are maintained with a goal Level of Service score of 90. State forces address preventive maintenance checks and repairs for the majority of field elements such as traffic signals, ramp meters as well as other TMS elements. On-call service contracts are primarily used for maintaining the communications infrastructure associated with TOSNET which include the maintenance of wireless assets, fiber optic cables, copper cable, and communications hubs.

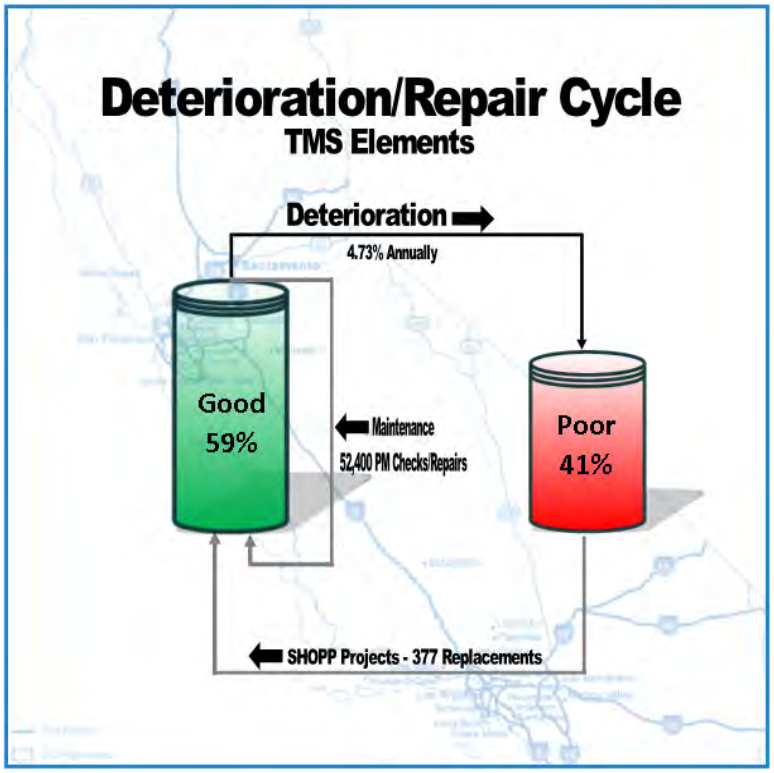


Chart 4. Displays the deterioration and repair cycle for TMS elements on the SHS. Currently 59 percent of TMS elements are in good condition. TMS elements are categorized as good or poor condition. As a result, approximately 4.73 percent of TMS elements deteriorate to poor condition annually. 41 percent of TMS assets are currently in poor condition. SHOPP projects address 377 TMS elements annually in poor condition and restores the condition of the asset, while maintenance focuses on maintaining TMS elements in good condition by performing over 52,000 preventive maintenance checks as well as repairs annually.

Through a combination of state forces and on-call service contracts, Caltrans is able to address more than 52,000 preventive maintenance

checks and repairs annually. Some assets reporting in poor condition may be operational but have exceeded the expected service life and are obsolete. As a result, operational readiness may be higher than good condition shown in Chart 4. The operational readiness of TMS elements, except for traffic signals, ranges between 65-85 percent good, varying by district. Caltrans is working diligently to increase the operational readiness of TMS assets. Caltrans Maintenance Program expends an average of $20 million and 169 positions on the maintenance of these assets and recommends the existing level of funding to maintain TMS elements remain unchanged. If TMS elements are provided funding consistent with the SHOPP Investment Plan, no additional funding is recommended for the TMS in the Maintenance Program. The SHOPP Investment Plan calls for $864 million investment for TMS elements. Given the combined investments in TMS, the condition is expected to improve markedly in the early portion of the plan period due to a 2016 SHOPP investment in detection and then begin to slowly decline later in the Plan period.

Release Copy

2017

State Highway System Management Plan

California Department of Transportation

March 8, 2017

Prepared by
California Department of Transportation
in accordance with Streets and Highways Code 164.6

Table of Contents

EXECUTIVE SUMMARY

The 2017 State Highway System Management Plan (SHSMP) is a new integrated management plan that fulfills the Streets and Highway Code section 164.6 requirements for the State Highway Operation and Protection Program (SHOPP) Ten-Year Plan and the Five-Year Maintenance Plan.

The SHSMP integrates the maintenance, rehabilitation and operation into a single management plan that implements a number of key federal asset management requirements. The SHSMP organizes key activity areas into categories that align with the California Department of Transportation (Caltrans) Strategic Management Plan. The SHSMP introduces new national performance measures for pavement and bridges as required by federal law, presents performance targets approved under provisions of California Senate Bill 486, implements the results of the Automated Pavement Condition Survey (APCS) and pavement management system in a plan that has unprecedented transparency.

The Plan fundamentally changes the way Caltrans manages available funding by focusing on measured condition and performance objectives. The historic asset-based funding approach has been replaced by a performance based approach that provides greater local flexibility to achieve multiple objectives within a single project. The new management methodology allows Caltrans to better integrate multimodal transportation options into traditional rehabilitation work to provide a cost-effective way to expand mode choice and reduce transportation related emissions.

The SHSMP includes a Needs Assessment to achieve the established performance targets and an Investment Plan that will guide the management of the State Highway System (SHS) and related infrastructure.

The Needs Assessment is an aggregation of numerous analyses that fully defines our existing inventory or deficiencies, conditions and performance targets, presents existing pipeline of work, a gap analysis and cost estimate to close the gap. Collectively these steps are referred to as Performance Management and are a requirement of our Transportation Asset Management Plan (TAMP) under federal regulations. The ten-year Needs Assessment identified a total need to maintain the existing system as shown in the following table.

Table 1. Program Funding Projected vs. Available

Program	Ten-Year Needs (in billions)	Available Funding (in billions)
Highway Maintenance (Maintenance Program)	$10.3	$4.2
Rehabilitation / Operations (SHOPP)	$85.8	$26.6
Total	**$96.1**	**$30.8**

The Needs Assessment identified for the 2017 SHSMP reflects a total increase of approximately $6 billion over estimates in the 2015 SHOPP Plan. Four billion dollars of the $6 billion is attributable to

higher cost inflation factors used to project the cost of construction in future years. Addressing transportation funding needs now, has the benefit of accelerating road repair projects that improve facilities and also reduces the impact of future construction cost inflation. In addition to escalation increases, the 2017 Plan reflects an increase of approximately $2.5 billion in needs relative to the 2015 Plan.

The SHS needs for the existing system exceeds the funding currently available. There are a number of proposals currently being considered that would augment the funding currently available for maintenance and rehabilitation of the existing SHS. The Highway Maintenance program is focusing on four asset classes; pavement, bridges, culverts and transportation management system projects with an identified ten-year funding shortfall of approximately $6.1 billion. The SHOPP has a $59.2 billion ten-year funding shortfall that imposes a significant constraint that requires transportation objectives to be prioritized for funding. The constrained funding proposal is presented in the SHSMP as an Investment Plan.

The SHSMP Investment Plan considers many factors including judicial and legislated mandates, consequences of inaction, current condition levels, system performance and environmental stewardship to arrive at the proposed allocation of funding. A breakdown of the recommended Maintenance and SHOPP Investment Plans for the ten-year period is as follows:

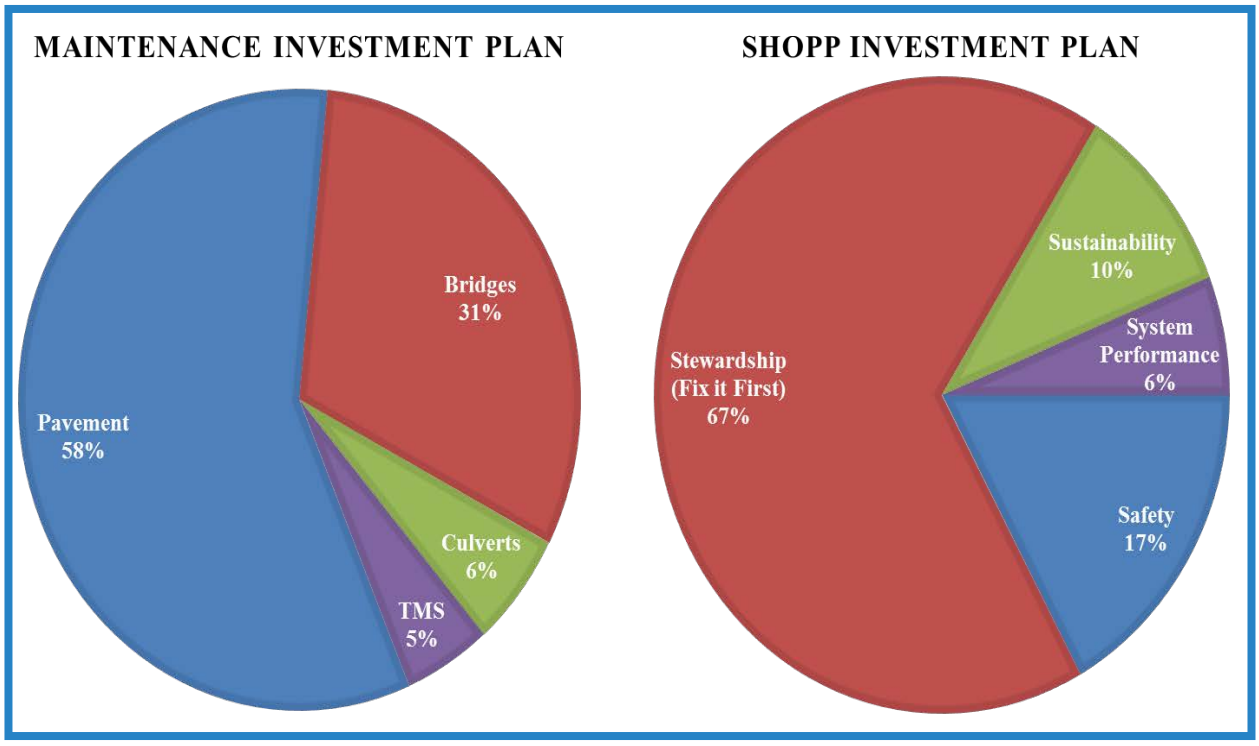


Chart 1. Investment Plan by Program

With the available funding and anticipated deterioration over the next ten years, Caltrans expects to be able to complete maintenance and rehabilitation work as shown in the Performance Outcomes section

of this plan. The following table highlights expected accomplishments for the four major asset classes. This table shows the combined performance from the Maintenance and SHOPP programs. Assets in good condition show the quantity of preventive maintenance treatments that can be applied, fair condition assets show a range of corrective maintenance to minor rehabilitation that can be carried out in the Maintenance Program or SHOPP, and the poor asset category reflect rehabilitation or replacement quantities possible with available funding. Quantities have been rounded for presentation.

Table 2. Estimated Ten-Year Performance Accomplishments

Asset Class	Good Condition (Preventive Maintenance)	Fair Condition (Maintenance and SHOPP)	Poor Condition (Rehab or Replacement)
Pavement	17,000 Lane Miles	12,000 Lane Miles	3,200 Lane Miles
Bridges	31 million Square Feet	41 million Square Feet	5 million Square Feet
Culverts	N/A	148,000 Linear Feet	396,000 Linear Feet
Transportation Management Systems (TMS)	524,000 Maintenance checks/repairs	N/A	3,700 Replacements 1,600 New Elements

With the current constrained funding, the accomplishments possible over the next ten years will not be adequate to maintain the current condition of the SHS. The following table provides the projected condition for the four asset classes at the end of the Plan period relative to current conditions.

Table 3. End of Plan Condition Estimates

Asset Class	Projected End of Plan Condition Relative to Current
Pavement	The amount of poor condition pavement is expected to increase over the Plan period in all pavement classes. The fair pavement conditions are expected to improve slightly for Classes I and II and be flat for Class III. Inexpensive short-term repairs will be necessary to maintain operation of the highway.
Bridges	The number of bridges in poor condition is expected to increase slightly over the ten-year period due to investments in several larger bridge replacements that limit the count of bridges that can be addressed.
Culverts	The culvert inventory is expected to grow substantially, and the culvert needs will increase proportionately. The condition of the culverts is expected to gradually decline over the Plan period.
Transportation Management Systems (TMS)	The TMS inventory is expected to grow over the plan period and the condition is expected to improve markedly in the early years of the Plan due to increased investments in the 2016 SHOPP, but is expected to begin to decline again by the end of the Plan period if additional investments are not made.

There has been broad recognition of the transportation funding shortfall and the unsustainable transportation revenue structure in general. The Fiscal Year 2017-18 Governor's Budget proposal calls for increased transportation funding that would provide the resources necessary to achieve condition targets approved by the California Transportation Commission (Commission) for the four primary asset

classes. Caltrans has been piloting a road user charge transportation funding structure that may also provide a pathway to more stable transportation funding in the future. If the Governor's transportation funding proposal is passed, the ten-year funding provided would allow the condition of the four major asset classes to be improved to the target levels approved by the Commission over the ten-year period beginning July 2017 as shown below:

Table 4. Funding Proposal Accomplishment Comparison

Asset	Without New Investment	With New Investment
Pavement	Lane miles in poor condition will grow to 9,500	17,000 lane miles of pavement fixed, resulting in 98 percent good or fair condition
Bridges	Bridges in poor condition will grow to 500	500 bridges fixed, resulting in 98.5 percent good or fair condition
Culverts	Culverts in fair or poor condition will grow to 74,000	55,000 culverts fixed, resulting in 90 percent in good or fair condition
Transportation Management Systems (TMS)	8,000 TMS elements that are inoperable representing ramp meters, cameras, changeable message signs, and loop detectors	7,700 TMS elements fixed, resulting in 90 percent in good condition

Until the transportation funding situation is resolved, Caltrans will continue to prioritize investments on the core highway asset classes on the most critical routes. This practice effectively defers addressing identified needs in other areas. The deferment of needs in areas such as facilities presents a growing liability that carries with it the potential for more costly ultimate fixes.

The SHSMP brings together many changes that collectively are designed to improve the management of the system, squarely focus activities on performance in alignment with our Strategic Management Plan and provide structural changes and transparency that improve asset management of the SHS.

INTRODUCTION

The 2017 State Highway System Management Plan (SHSMP) is a new integrated management plan that encompasses the Streets and Highway Code section 164.6 requirements for the State Highway Operation and Protection Program (SHOPP) Ten-Year Plan and the Five-Year Maintenance Plan. The Streets and Highway Code requires California Department of Transportation (Caltrans) to prepare an update to this Plan every two years. The SHSMP includes both a Needs Assessment and Investment Plan that will guide the management of the State Highway System (SHS) and related infrastructure. The SHSMP includes a number of significant changes that are part of the overall implementation of asset management in California.

The SHSMP reorganizes key activity areas into categories that fully align with the Caltrans Strategic Management Plan. The new structure provides greater clarity on the specific strategic goals Caltrans is working to accomplish, along with more transparency of the level of needs and investments in each of the strategic areas.

Another major change is the integration of the investments made through the SHOPP and Maintenance Programs for pavements, bridges, culverts and transportation management system (TMS) elements. These four asset classes represent a significant portion of the SHS maintenance and rehabilitation investments in California and were designated as focus areas by the California Transportation Commission (Commission) as part of the ongoing implementation of asset management. The integrated presentation provides a clear understanding of how these funding programs work together to a continuum of management of the assets throughout their life cycle.

The SHSMP implements a number of key requirements of the Moving Ahead for Progress in the 21st Century (MAP-21) and Fixing America's Surface Transportation (FAST) Act for asset management. This Plan implements the federal requirements for performance management required for all states. The principles of performance management are applied at the asset level to develop the total need for the asset subject to defined performance targets. The total needs are reflective of both SHOPP and Maintenance Program contributions to the condition or performance of the assets.

Along with the performance management implementation, the SHSMP implements new national performance measures for pavements and bridges. Under requirements of MAP-21, all states are required to adopt national asset management performance measures to establish nationwide consistency for condition reporting of these major highway assets. The new performance measures utilize a good, fair, and poor scale that reports the area of these assets in each category. To comply with new federal requirements, Caltrans is required to assess the condition of the pavements and bridges in a new way. These new condition assessment requirements have been incorporated by utilizing the Automated Pavement Condition Survey (APCS) for pavements and Element Level Inspection data for bridges.

The SHSMP provides unprecedented transparency in the presentation of the current conditions and performance of the system, project stream, deterioration rates, repair costs, and targets used to develop the Needs Assessment. The Investment Plan clearly presents where available funds are being invested and the expected condition and Performance Outcomes from those investments.

The new SHSMP is more than a new title and look. The Plan is implementing fundamental changes in the way Caltrans manages the available funding by placing the focus on measured condition and performance objectives. The historic silo-based funding approach has been replaced by a performance-based approach that provides greater local flexibility to combine multiple objectives together into a single project. Under the provisions of the new Plan, performance and funding targets are being provided to each Caltrans district which is empowered to combine performance accomplishments together in projects that are cost-effective, less disruptive and better aligned with local partners work. The new management methodology allows Caltrans to better integrate multimodal transportation options into traditional rehabilitation work to provide a cost-effective way to expand mode choice and reduce transportation related emissions.

STATE HIGHWAY SYSTEM MANAGEMENT PLAN ORGANIZATION

The State Highway System Management Plan (SHSMP) is organized into five primary sections:

- System Definition, Asset Management Structure and Funding Trends
- Needs Assessment
- Ten-Year Investment Plan
- Performance Outcomes
- Appendices

The initial chapters focus on defining the State Highway System (SHS), explaining the asset management structure used to manage the SHS and describing the sources and trends of highway funding in California. All of these items are statewide in nature and are relevant to all funding programs that maintain or rehabilitate the SHS.

The Needs Assessment presents the total needs of the existing SHS resulting from a performance management analysis conducted for this Plan. This performance management analysis estimates the costs necessary to close all condition and performance gaps. The Needs Assessment is not constrained by funding currently available for the management of the SHS.

The Investment Plan section defines how the available funding is recommended to be allocated. With funding constraints, particularly in the State Highway Operation and Protection Program (SHOPP), tough decisions must be made to prioritize where available resources should be focused to keep highways functioning.

Based on the Investment Plan, the Performance Outcomes are presented for each of the funding programs. This section defines what specific performance metrics are estimated to be achieved given the defined investment plan.

The SHSMP Appendices include the details of the performance management analysis and a listing of statutory requirements that have influence on the SHSMP.

CALIFORNIA STATE HIGHWAY SYSTEM

The transportation system assets that comprise the SHS include nearly 50,000 lane miles of pavement, 13,160 bridges, 205,000 culverts and drainage facilities, 86 safety roadside rest areas (SRRA), and 30,000 acres of landscaped roadside among others. The vast extent of this transportation system is illustrated in Figure 1. Additional support facilities, such as maintenance stations, equipment shops, and transportation materials laboratories and testing facilities are also included as assets of the SHS. Many of the components of this system were built in 1950s, 1960s, and early 1970s and has reached or is reaching the end of their service lives. Asset deterioration is accelerating at a faster rate than in previous decades due to age and traffic demands, often requiring extensive rehabilitation and even full reconstruction.

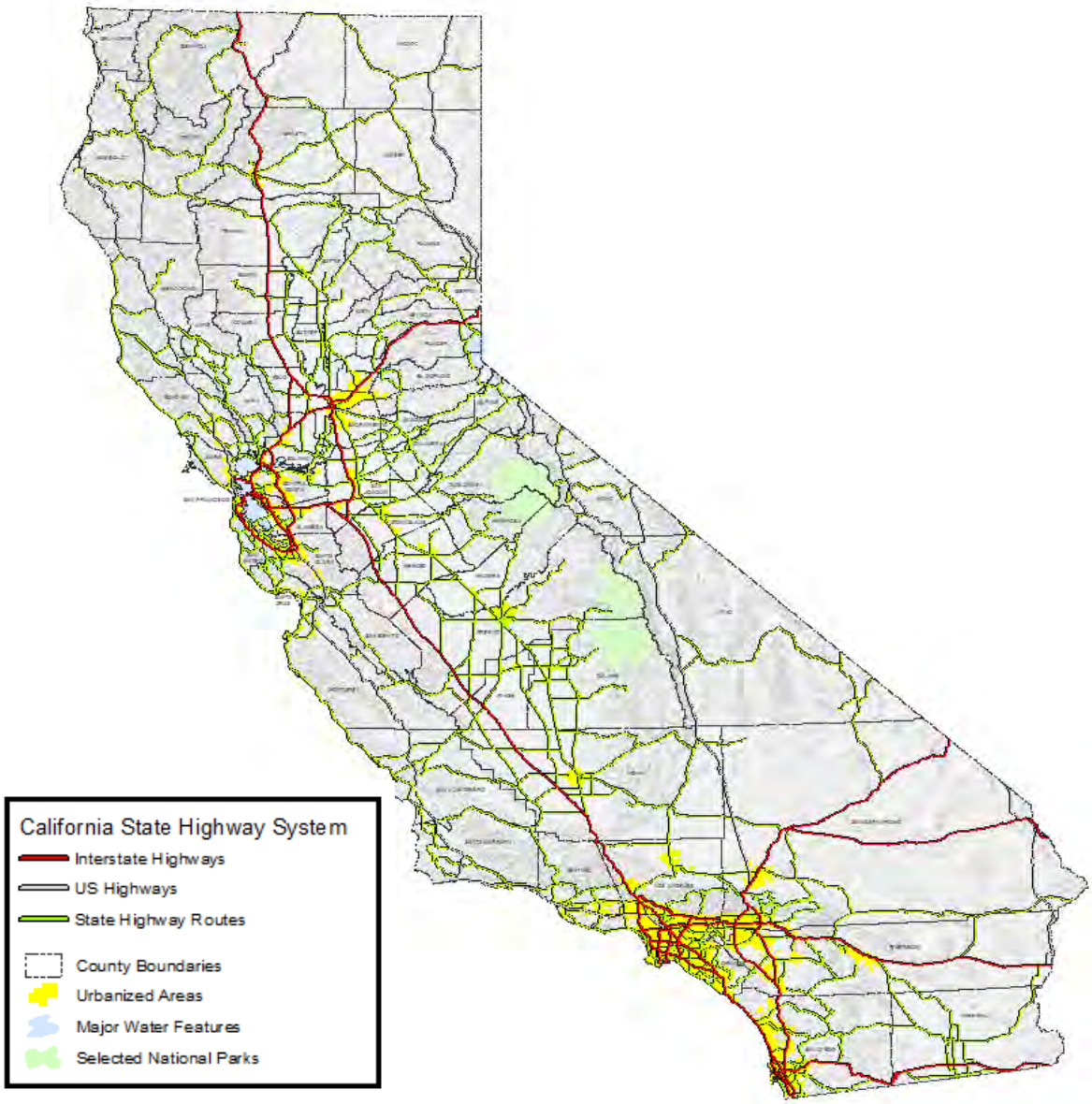


Figure 1. California State Highway System

Under California statutes, Caltrans is the state agency responsible for planning, developing, maintaining and operating the legislatively designated SHS and a variety of supporting infrastructure such as but not limited to highway maintenance stations, SRRAs and drainage facilities. Similarly, various state highway funding and project approval responsibilities are assigned to the California Transportation Commission (Commission). Together, and working in partnership with a wide variety of local, regional and federal transportation and oversight agencies and with the private sector, Caltrans and the Commission are transitioning highway system preservation activities and projects to a robust asset management approach as required by Senate Bill 486 (2015). This approach also directly responds to federal requirements to implement asset management.

ASSET MANAGEMENT STRUCTURE

Caltrans strives to preserve the condition of the SHS in the most economical means possible through carefully planned preservation strategies (preventive maintenance strategies, corrective maintenance strategies, and minor rehabilitation) and rehabilitation or replacement when necessary. Caltrans manages the condition of the SHS by performing the right treatment at the right time through a three-pronged approach: (1) field maintenance, (2) Highway Maintenance (HM) projects and (3) SHOPP projects. Each of the following approaches play key roles in the overall management and preservation of the system:

1. Field maintenance activities are the day-to-day demands that Caltrans maintenance staff must regularly react to. Maintenance strategies are important tools for extending the service life of assets in a cost-effective manner. Preventive maintenance is applied to assets in good condition and some fair condition assets when appropriate, with the goal of maintaining their condition. Local crews address minor maintenance, repairs, and preservation work. This typically includes pothole repair, crack sealing, cleaning of drains, servicing lighting and signs, structural painting, minor facility repairs, irrigation repairs and more. Crews also provide rapid response to repair minor accident damage. These field activities are the first line of defense in Caltrans' maintenance of the SHS, and are reactionary in nature. Caltrans employs maintenance crews that collectively perform many aspects of ongoing maintenance of the highways and assets within the SHS. For example, as shown in Chart 2, every dollar spent on preventive maintenance delays the need for an equivalent $3 in rehabilitation or $8 in reconstruction or replacement of pavement in the future.
2. HM projects help further prolong the life of existing infrastructure. These projects include preventive and corrective maintenance work that exceeds the scope of what our crews can handle. Corrective maintenance typically applies to assets in fair condition; however, can also be applied to some assets in poor condition in some cases, with the goal of restoration to good condition. Asset deterioration can accelerate the longer the asset is in fair condition. A timely application of corrective maintenance can avoid more costly treatments later. The Maintenance Division utilizes contractors and service providers to execute work designed to extend the life of physical assets and delay rehabilitation or replacement of assets. HM projects are contract work routinely performed on pavements, bridges, culverts, facilities, traffic management systems and more. HM Projects may be preventive or corrective in nature. Examples include thin pavement overlays, bridge joint seals, and culvert repairs. These projects repair, but do not upgrade or replace the facilities. The Major Maintenance Program invests over $330 million annually, through HM projects, to extend the life of physical assets through timely repair and preservation activities.
3. When field maintenance and more extensive HM project activities are no longer cost-effective or viable, asset rehabilitation or replacement is considered. Rehabilitation or replacement typically applies to assets in both fair and poor condition and is typically funded through the

SHOPP. SHOPP projects are more complex capital construction projects that utilize private construction contractors through a competitive bidding process. These projects are overhauls of infrastructure that is nearing the end of its lifespan, and may involve complex upgrades. These projects may involve extensive planning and design, environmental permitting and even right-of-way acquisition. Rehabilitation and replacement activities are performed on pavements, bridges, culverts, buildings, overhead signs, lights, roadside elements and safety roadside rest areas. In addition to managing the condition of the physical infrastructure, Caltrans invests in safety improvements, operational improvements, environmental mitigation, transportation management systems, freight improvements and system resiliency activities. The SHOPP invests available funds to implement safety improvements, rehabilitate or replace physical assets, improve the operation of the highways, improve the system resiliency and mitigate transportation related environmental impacts. The SHOPP includes 34 specific focus areas that are individually described in the Needs Assessment. The Commission has direct responsibility to adopt the projects that constitute the SHOPP and to approve all scope, schedule and costs changes to the adopted projects. Further, the Commission has responsibility to set asset performance targets that help ensure the investments made through the SHOPP are achieving the desired statewide transportation outcomes.

Utilizing this three-pronged approach to asset preservation, Caltrans crews are able to make timely repairs on minor needs before they grow into major and more expensive problems to fix, contract for highway maintenance activities at the right time to extend the useful life of the assets at the lowest

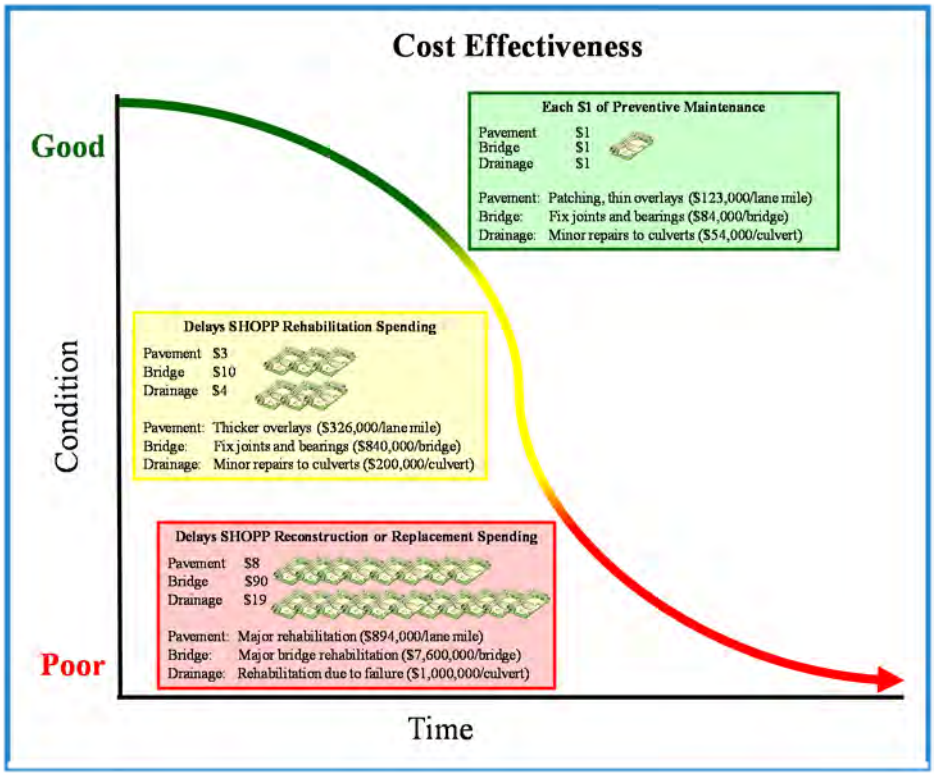


Chart 2. Graphical Representation of Benefits of Preventive Maintenance

possible long-term cost and delay future rehabilitation or replacement activities, and to then invest in major asset rehabilitation or replacement projects when the useful life of an asset has been reached.

Beyond the asset management objective of taking care of the existing SHS assets, there are additional SHS needs for upgrading and expanding facilities to accommodate increased freight movement, broader economic growth, population increases, new transportation technologies and evolving land use patterns. These needs are beyond the scope of the funding provided through the Maintenance and SHOPP programs and are instead addressed through a variety of other funding programs such as the recently enacted Fixing America's Surface Transportation (FAST) Act, the State Transportation Improvement Program (STIP), state transportation bond programs, local transportation tax measures and other funding programs. All of these programs invest in the SHS, as well as local roads, and sometimes address SHS preservation needs at the same time. As projects are developed and constructed through these other funding programs, it is essential that the project development process incorporate life cycle and asset management considerations so that when the SHS projects are completed and operational and come under the auspices of the Maintenance and SHOPP programs, the projects are designed to be as efficient and cost-effective as possible to maintain, preserve, and when the time comes, rehabilitate.

A number of funding programs are utilized by Caltrans to manage the SHS assets. The largest funding program available is the SHOPP. The SHOPP invests approximately $2.6 billion annually to implement safety improvements, rehabilitate or replace physical assets, improve the operation of the highways, improve the system resiliency and mitigate transportation related environmental impacts. The SHOPP includes 34 specific focus areas that are individually described in this Plan.

The Maintenance Program invests over $330 million annually, through HM projects, to extend the life of physical assets through timely repair and preservation activities. Caltrans employs maintenance crews that collectively perform many aspects of ongoing maintenance of the highways and assets within the SHS. Crew expenditures statewide are over $350 million annually for all activities including maintenance of the four asset classes.

Each of the programs mentioned above play key roles and work together in the overall management of the SHS. Utilizing this three-pronged approach to asset preservation, Caltrans is able to make timely repairs at the right time to extend the useful life of the assets at the lowest possible long-term cost and delay future rehabilitation or replacement activities.

STATE HIGHWAY SYSTEM FUNDING TRENDS

The Federal Highway Trust Fund (Trust Fund) and the State Highway Account (SHA) are the main funding sources for SHOPP. The majority of SHOPP funding is provided through the federal government via fuel taxes. Each state collects a federal excise tax of 18.4 cents per gallon of gasoline, and 24.4 cents per gallon for diesel fuel, and remits that revenue to the federal government for deposit into the Trust Fund. The Trust Fund then provides funding to states for highway and mass transportation (transit) programs. The uses and distribution of these funds are outlined in federal transportation acts. As the states' needs for transportation revenue have begun to exceed the amount of money held in the Trust Fund in recent years, the Trust Fund has had to rely on infusions of federal general fund revenue. Federal fuel taxes no longer provide sufficient revenue to meet federal funding obligations to the states.

In addition to federal fuel taxes, both Maintenance and the SHOPP receive a portion of their funding from an 18 cents per gallon state excise tax. The SHOPP also receives funding from a 9.8 cents per gallon price-based excise tax on gasoline. The price-based portion of the excise tax is statutorily required to be adjusted annually to maintain revenue neutrality with California's former sales tax on gasoline. Only a small portion of the price-based tax revenue is earmarked for the SHOPP. Both SHOPP and Maintenance receive a portion of the 16 cents per gallon excise tax on diesel fuel, which is adjusted annually as well. As identified in the 2016 STIP Fund Estimate and funding outside of the fund estimate, projected annual funding for the SHOPP currently averages $2.6 billion per year. Because Maintenance is fully funded before SHOPP funding is determined, reductions in revenue affect the SHOPP to a greater extent than the Maintenance Program. Unfortunately, the fiscal needs for SHS maintenance, preservation, rehabilitation and replacement consistently exceed available federal and state funding by wide margins.

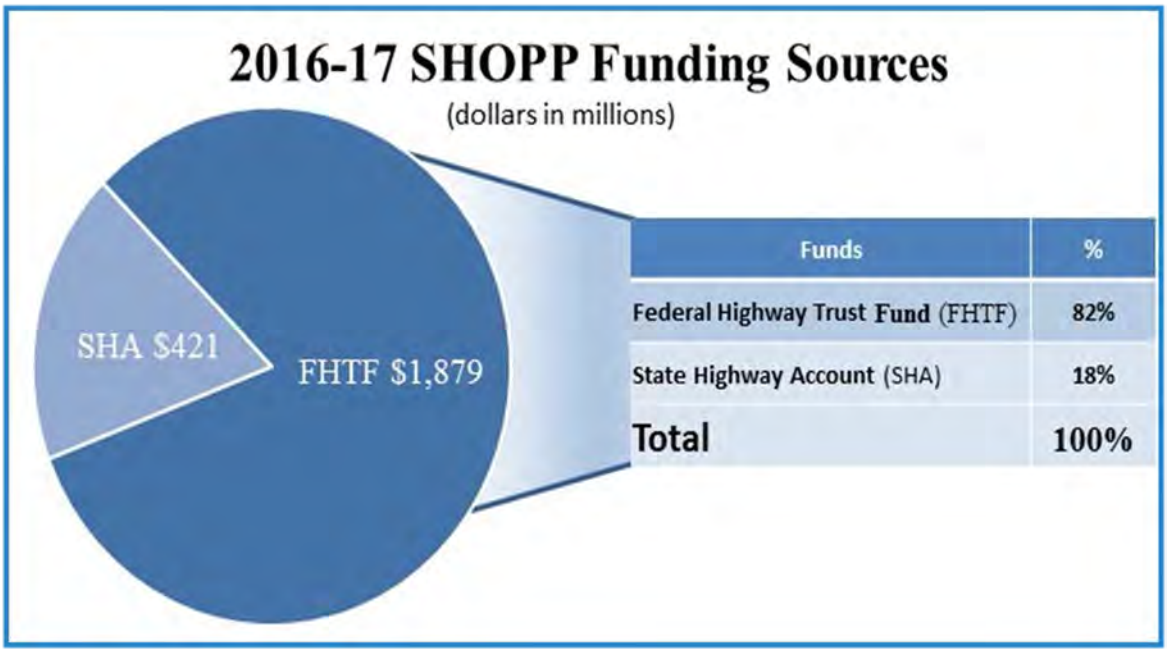


Chart 3. SHOPP Funding Sources

Funding Challenges

California faces aging road and highway infrastructure and related assets that are creating a growing demand for transportation funding. Specific transportation funding challenges include inflation, fuel tax rates that are not adjusted for inflation, a decrease in gasoline consumption per mile traveled, increased per-capita vehicle miles traveled and price-based excise tax volatility. The state base excise tax on gasoline has not been increased in over 22 years and remains at 18 cents per gallon. While the 2006 voter approved Proposition 1B Transportation Bond programs provided a substantial but temporary influx of transportation funding, that funding has been mostly depleted as projects have been completed. Thus, transportation funding is already returning to lower, pre-Bond Program levels.

As available funding declines, legal mandates and public demands to achieve more with every transportation dollar invested in the SHS add to the fiscal challenge. The state's multimodal system, particularly the freight transportation system, is vital to both national and international economies. Consequently, funding issues have a wide-ranging effect not just to the economic health of the state, but to the entire nation's as well. With inflation's growth over time, these factors are putting pressure on transportation funding.

The actual buying power of transportation funding available for the Maintenance and SHOPP programs is steadily eroding due to inflation. As the effective buying power of the dollar goes down, material and equipment costs for rehabilitative projects increase, and Caltrans' ability to respond to the rehabilitative transportation needs is diminished even though the same amount of money is being invested in the system. Chart 4 shows the tax rate at the bottom (green bars) and the tax rate adjusted for inflation (green line). Over time, inflation has eaten away at the value of the tax rate.

The increase in fuel efficiency of vehicles reduces the amount of gasoline and diesel fuel needed per vehicle mile traveled, thus reducing the amount of fuel taxes collected per mile driven. Even though average per-capita vehicle miles traveled has increased in recent years, the improved vehicle mileage exceeds the increased amount of driving. Vehicles are using less gasoline to travel greater distances. Less gasoline consumption leads to a steady decrease in SHOPP funding because gasoline is taxed on a per-gallon basis.

Additionally, when gas prices go down, so does the revenue collected for state and local road improvements. There is a direct correlation between gas prices and the amount of the price-based excise tax revenues available for transportation funding. The funds allotted for the Weight Fee Backfill remain at the same funding level because weight fees are taken off the top from price-based excise tax revenues. However, the remaining programs funded by these revenues, including the SHOPP, continue to decrease. Without a steady revenue stream for state and local road improvements, it becomes difficult for Caltrans to plan and fund projects for programs like the SHOPP. This leads to less rehabilitative measures taken for all California roads, including the SHS.

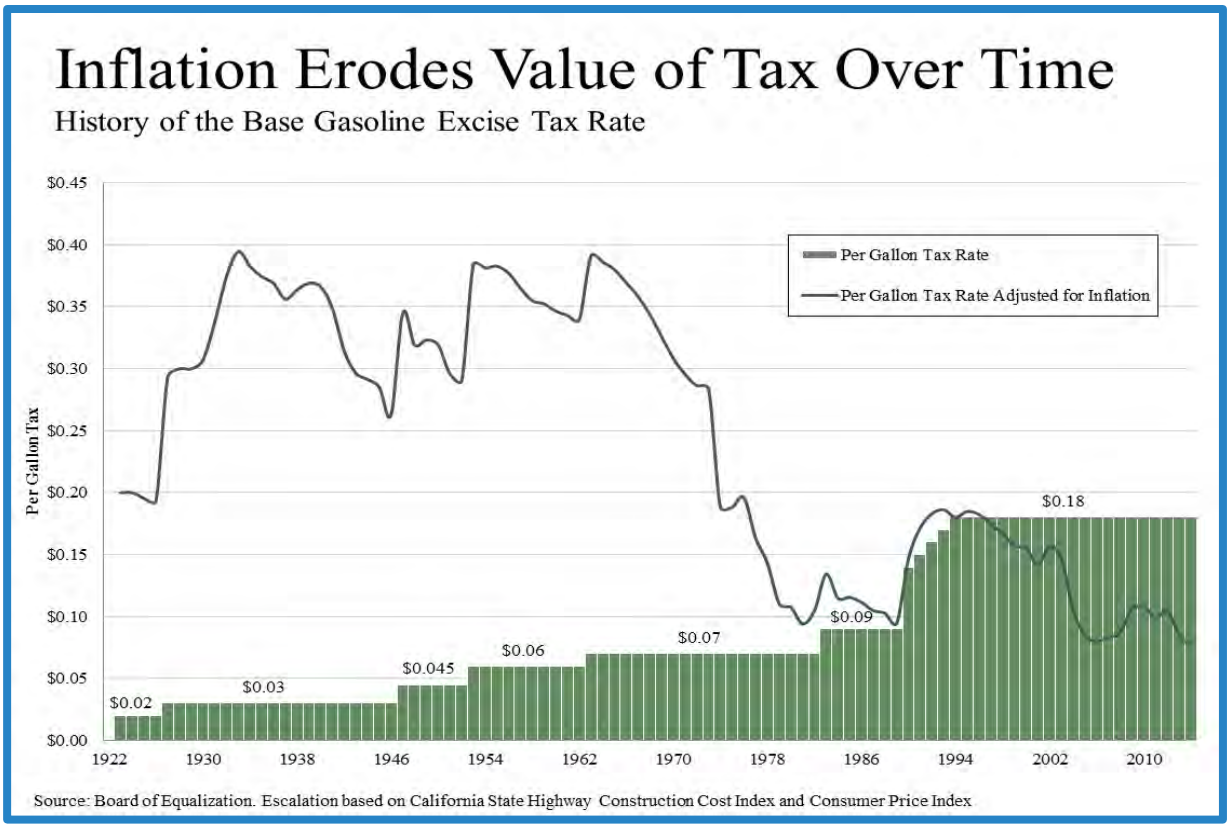


Chart 4. Gasoline Excise Tax Rate

Split of State Taxes between State and Local

State funding for both Maintenance and SHOPP is primarily derived from the state excise taxes on gasoline. The base portion of the excise tax is 18 cents per gallon, of which the SHA receives approximately 64 percent of the total revenue generated. A substantial portion of this revenue is used to fund the maintenance and operations of the SHS, research, administrative costs, and other departmental costs. The balance is used for highway rehabilitation through the SHOPP.

In addition, Caltrans receives a portion of the state excise tax on diesel fuel (16 cents per gallon for 2016-17), which is adjusted annually. In accordance with Streets and Highways Code, sections 2104-2108, the local portion is approximately 5.67 cents per gallon while the SHA portion is approximately 10.33 cents per gallon.

Local governments receive 44 percent of the price-based excise tax revenue through the Motor Vehicle Fuel Account (MVFA) after the Weight Fee Backfill. Additionally, local agencies receive 36 percent of the base excise tax revenue through the Highway Users Tax Account (HUTA). Both the decrease in price-based excise tax, and the subsequent decrease to SHOPP funding from that tax, can be seen in Chart 5. As the economy continues to recover from the recent recession, and inflation continues to

rise, it is expected that the deferred maintenance backlog will increase due to further decreases in the value of the collected transportation revenues that are dedicated to SHS infrastructure preservation.

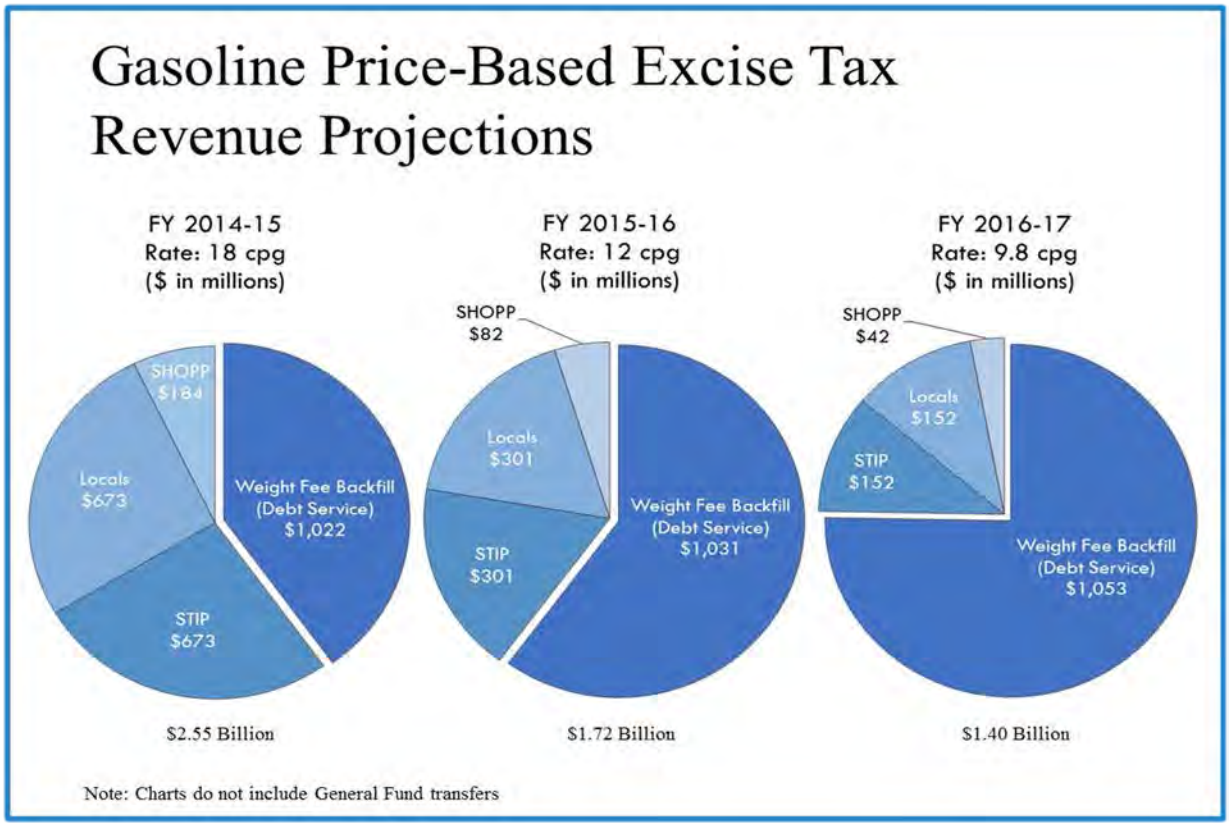


Chart 5. Price-Based Excise Tax Comparison

Cost Escalation

Cost estimates must be escalated to account for expected cost increases in future year projects. Escalation is based on the California Highway Construction Index (CHCI) cost trends over a defined period of time. The cost to address the needs of the SHS are very sensitive to the cost escalation percentages used.

Utilizing the Caltrans Highway Cost Index information shown in the chart below, one can develop the following escalation rates:

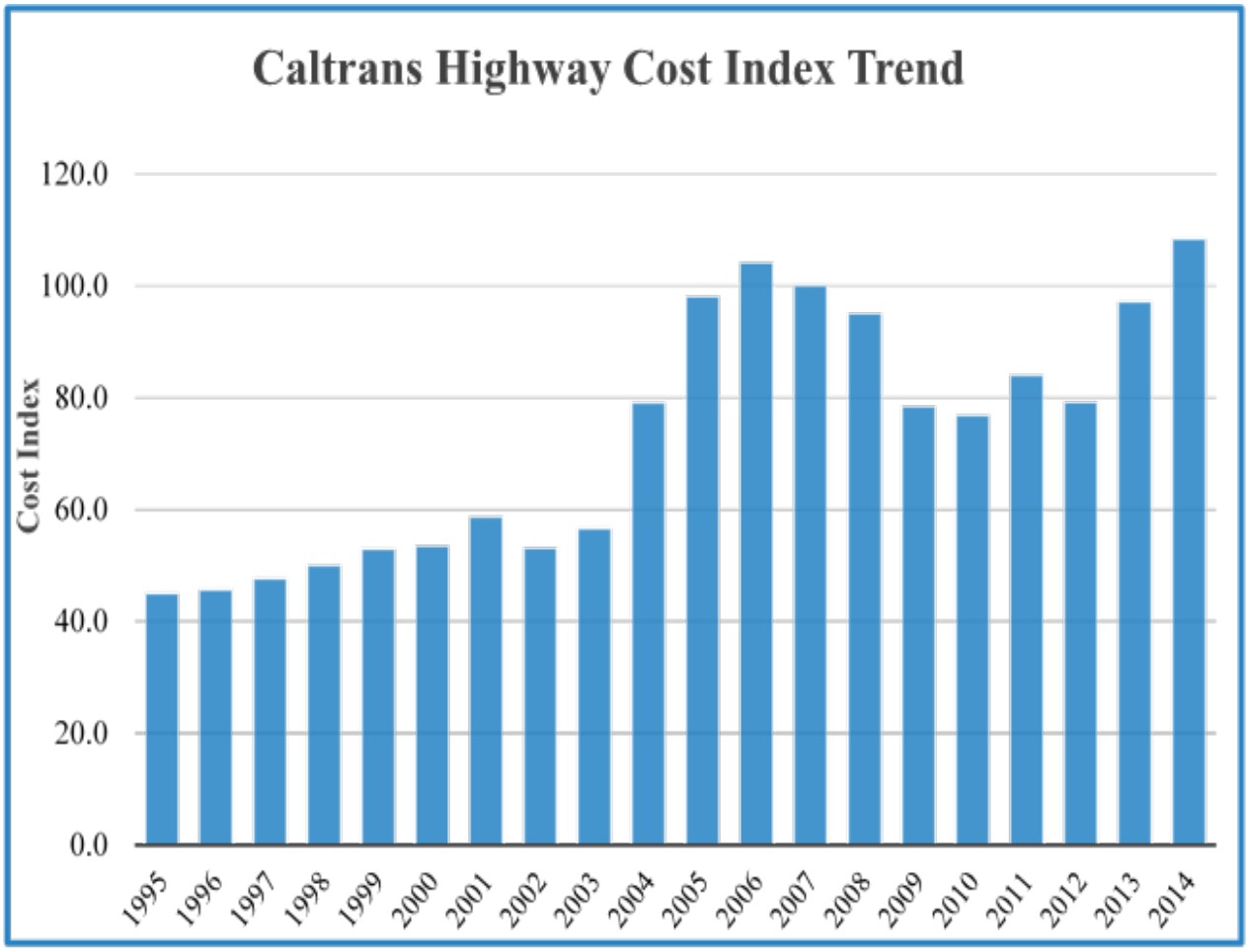


Chart 6. California Highway Construction Index Trend

Table 5. Alternative Escalation Rates

Analysis Period	Analysis Method	Escalation Rate	Escalated Total Need (in billions)
10 Years	Compounded	1%	$76.6
20 Years	Best Fit Curve	3%	$85.8
20 Years	Compounded	4.5%	$93.5

The total needs vary by up to $17 billion depending on the escalation rate used for the calculation. The most recent fund estimate used a 4.5 percent escalation rate and the 2015 Ten-Year Plan used a 2 percent rate. Escalation is applied only to the future needs because the costs for programmed projects or projects in a formal planning work plan are already escalated. For the 2017 SHSMP, the escalation rate used is 3 percent. The "best fit curve" escalation calculation was selected as the most appropriate method because it is based on all previous data points over the past 20 years instead of just the first and last data points used for the compounded method. Costs are escalated to the mid-point of the escalated needs; 7.5 years into the ten-year plan period.

NEEDS ASSESSMENT

The California Streets and Highway Code requires the development of a SHS Needs Assessment that defines the program areas and costs associated with achieving defined condition and performance targets. The Needs Assessment is intended to provide a picture of the total needs of the SHS and is not constrained by currently available funding. The majority of the needs on the SHS are determined through a gap analysis completed as part of the implementation of performance management. The performance management approach captures all of the needs associated with fair and poor condition gaps. Preventive maintenance needs, associated with activities that focus on keeping good condition assets in good condition as long as possible, are added to the performance management gap analysis needs to determine the total need required for the maintenance, rehabilitation and operation of the existing SHS.

The performance management based Needs Assessment conducted for the SHSMP is limited to activities that are consistent with state laws that govern the use of Maintenance and SHOPP funds. Generally, these laws require the available funding to be expended on the safety, maintenance, rehabilitation and operation of the existing system. System expansion is not permitted through Maintenance or SHOPP programs.

Maintenance Needs

Maintenance needs are identified through the performance management gap analysis for fair condition pavement, bridges, culverts and transportation management system elements. The needs from the gap analysis are then added to the preventive maintenance needs associated with activities primarily focused on good condition assets. Table 6 summarizes the maintenance needs for the four asset classes. The cost presented in Table 6 include costs associated with inspection forces and Caltrans crews efforts and Highway Maintenance contracts.

Table 6. Ten-Year Maintenance Needs by Asset Class

Asset Class	Total Needs (in millions)
Stewardship	
Pavement	
Pavement Class I	$3,080
Pavement Class II	$1,990
Pavement Class III	$800
Pavement Total HM Projects	**$5,870**
Maintenance Crews (Crack Sealing)	$90
Bridge	
Bridge Health HM Projects	$868
Maintenance Crews	$442
Drainage	
Drainage System Restoration	$2,460
Drainage Maintenance Crews	$160
Performance	
Transportation Management Systems	$360
Total	**$10,250**

State Highway Operation and Protection Program (SHOPP) Needs

The SHOPP needs are determined through the performance management gap analysis. The performance management approach involves the following general steps:

1. Establish the asset inventory or deficiency level
2. Establish the current and projected future condition/performance level of each objective
3. Establish targets to achieve desired asset performance levels
4. Perform a gap analysis between the projected condition/performance and the performance targets
5. Estimate the cost to close the performance gaps

These five steps are repeated for each objective being tracked by Caltrans related to the maintenance, rehabilitation and operation of the SHS. There are three distinct performance management models incorporated into the SHSMP: (1) asset, (2) deficiency and (3) reservation.

1. The asset model is used for physical assets such as pavements, bridges, culverts or any other tangible highway item. The asset model defines an inventory such as the number of lane miles of pavement or the square feet of bridge deck area contained in the SHS. The inventory condition is reported as a percentage of the total in good, fair or poor categories. The performance management approach applies a deterioration rate to each asset to account for expected future conditions. Condition targets for the physical assets are defined with key targets being approved by the Commission. The gap analysis determines the number of lane miles or bridge deck area between projections and the desired performance target. The performance management analysis has both a system preservation and rehabilitation/replacement goal to ensure a balanced management approach. The existing program of work (active projects) is then deducted from these gaps to determine the unaddressed need. The cost to improve the condition to the established targets is then estimated using historical unit costs. These costs, combined with the existing program of work, represents the total need over the ten-year period.
2. The deficiency model is used for objectives like storm water mitigation, safety or Americans with Disabilities Act (ADA) needs. These needs do not have a condition breakdown like the physical assets; they are either deficient or not. A gap analysis between the current deficiency and the target is conducted similar to the asset model. The program of active projects is again deducted from the gap analysis to determine the unaddressed need. Cost estimates to address this need are calculated similar to the asset model.
3. The final Needs Assessment model is for unplanned needs. Emergency response activities and hazardous waste clean-up use this model. Objectives using the reservation model cannot be predicted in terms of the quantity or location of need as location and scope of needs are not known until an event such as a flood or landslide occurs. To effectively manage the SHS, Caltrans holds a financial reservation for when these needs arise. Reservations do not have an identified inventory, condition breakdown or goal. The reservation levels are established based on historical demand in the respective areas.

These various individual models are aggregated up to develop the statewide need figures shown in Table 7. In total, there are 34 different objectives being combined together in the Needs Assessment. Each of these are included in the Appendix of this report providing a fully transparent presentation of the needs calculation. These Needs Assessment models are numerically intensive, relying on narratives provided later in this document to plainly describe what each objective strives to accomplish.

Table 7. Ten-Year SHOPP Needs

Objectives	Sum* (in millions)
Safety	**$13,333**
Bridge Rail Replacement and Upgrade	$6,197
Collision Severity Reduction	$1,324
Roadside Safety Improvements	$1,602
Safety Improvements	$4,210
Stewardship	**$35,529**
Bridge Health	$5,485
Drainage Pump Plants	$165
Drainage System Restoration	$2,567
Lighting Rehabilitation	$602
Major Damage (Emergency Opening)	$1,525
Major Damage (Permanent Restoration)	$1,335
Office Buildings	$491
Overhead Sign Structures Rehabilitation	$481
Pavement Class I	$12,552
Pavement Class II	$4,970
Pavement Class III	$1,185
Relinquishments	$29
Roadway Protective Betterments	$467
Safety Roadside Rest Area (SRRA) Rehabilitation	$1,192
Transportation Related Facilities	$2,387
Water and Wastewater Treatment at SRRAs	$96
Sustainability	**$10,698**
ADA Pedestrian Infrastructure	$972
Advance Mitigation	$300
Bridge Scour Mitigation	$847
Bridge Seismic Restoration	$3,089
Hazardous Waste Mitigation	$5
Roadside Rehabilitation	$2,025
Storm Water Mitigation	$3,444
Zero Emission Vehicle Infrastructure	$15
Performance	**$9,859**
Commercial Vehicle Enforcement Facilities	$129
Operational Improvements	$933
Sign Panel Replacement	$700
Transportation Management Systems	$1,810
Bridge Goods Movement Upgrades	$5,907
Weigh-In-Motion Scales	$379
Subtotal	**$69,418**
Asset Management Pilot Program	$82
Minor Program	$1,500
PID Program Support	$1,379
Total	**$72,379**
Escalated Total	**$85,771**

**Numbers may not add due to rounding*

Operational Improvement Needs

Tables 6 and 7 summarize the total needs associated with achieving the defined condition and performance targets associated with the existing SHS. Improvement needs are also identified through the STIP and California Freight Mobility Plan (CFMP) Programs that are focused on making improvements to or expanding the existing SHS. Improvement needs are identified by Regional Transportation Planning Agencies (RTPA) and Caltrans in regional and interregional improvement plans funded through the STIP and local transportation funding sources. Given the distributed sources of needs identification, placing a specific dollar value on the needs is difficult but it would easily exceed several hundred billion dollars annually.

For example, the 2014 CFMP presents a list of 707 freight system improvement projects for all freight modes, with an estimated total cost of approximately $138 billion. The project list uses prioritized corridors, focus areas and overarching strategies and is multi-tiered to address the needs of California's full, multimodal integrated freight system, as well as to respond to each of the CFMP goals and their corresponding federal freight goals. The project list will be updated as needed to include additional freight projects contained in newly adopted or amended Regional Transportation Plans. The FAST Act provides formula and discretionary funding available to address freight system improvements. California is projected to receive approximately $100 million annually for formula-based state and local freight projects and is eligible to apply for additional discretionary funding. A significant portion of these funds will likely be focused on the SHS. These projects will be approved by the Commission on an annual basis and therefore specific dollar figures for the SHS cannot be determined over the ten-year planning horizon of this Plan.

TEN-YEAR INVESTMENT PLAN

The Needs Assessment identifies the funding necessary to achieve defined condition and performance targets. The identified needs exceed current available funding. Funding for transportation infrastructure comes from a number of sources depending on the asset or deficiency. For example, the condition of the pavement is a function of the activities performed by Caltrans crews, maintenance projects, and rehabilitation or replacement project investments coming from the SHOPP. The Investment Plan defines where the available resources are recommended to be allocated to effectively manage the SHS.

Many factors influence the magnitude of investments. In some cases, investment levels are written into law or are terms of court settlements. In other cases, the investments are mandated based on terms of permits or required to be expended on specific activities. The current conditions of highway system assets and consequences of not funding certain objectives must also be taken into consideration. The Investment Plan should also look at longer term life cycle costs and performance that results from various investment scenarios. The Investment Plan should balance highway safety, asset condition, system performance, and sustainability objectives through the allocation of available funding. All of these factors are considered in the development of the recommended Investment Plan.

The Investment Plan is a combination of investments from three primary sources: (1) Major Maintenance Program, (2) SHOPP, and (3) Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) funds. Each of these investment plans are defined within this section for the assets or objectives that are applicable to the funding source.

Maintenance Investment Plan

Preventive maintenance is the most cost-effective means of protecting the state's infrastructure investment. Applying the right maintenance treatment at the right time slows deterioration and extends the life of the pavements, bridges, drainage system assets and transportation management system (TMS) assets at the lowest possible long-term cost.

Table 8. Proposed and Recommended Maintenance Investment Plans

Annual Maintenance Investment Plan						
	Baseline		**Achieve Goal in Five Years**		**Achieve Goal in Ten Years**	
	Baseline Funding *(Recommended)*	**SHOPP Cost Avoidance**	**Projected Funding**	**SHOPP Cost Avoidance**	**Projected Funding**	**SHOPP Cost Avoidance**
Asset Class	Annual Cost ($ millions)	Cost ($ millions)	Annual Cost ($ millions)	Cost ($ millions)	Annual Cost ($ millions)	Cost ($ millions)
Stewardship						
Pavement Class I	$128	$365	$486	$1442	$314	$930
Pavement Class II	$82	$239	$312	$942	$201	$608
Pavement Class III	$33	$98	$126	$388	$81	$250
Pavement Total[1]	**$243**	**$702**	**$924**	**$2,772**	**$596**	**$1,788**
Bridge Health[2]	$131	$1,102	$187	$1,603	$131	$1,102
Drainage System Restoration[3]	$23	$92	$442	$1,578	$262	$911
Performance						
Transportation Management Systems[4]	$20	**	$34	**	$36	**
Total	**$417**	**$1,896**	**$1,587**	**$5,953**	**$1,025**	**$3,801**

1. Pavement costs include state forces services and Major Maintenance contracts. Annual costs include $234 million in Highway Maintenance contracts and delivery support. This includes approximately $9 million in crack sealing efforts performed by Caltrans maintenance crews.
2. Bridge costs include state force repair crews, materials, equipment rental, contract dollars, and support. Bridge structural resources include $63 million in preventive maintenance contracts and $68 million in support of contract delivery, paint, and inspection.
3. Drainage costs include $16 million for state maintenance forces for assessments, maintenance, repairs, and associated equipment/materials and $7 million in Highway Maintenance contract dollars and support costs.
4. TMS costs include PM checks/repairs completed by state forces and repairs completed by on-call service contracts.

**SHOPP Avoidance data for TMS elements is unavailable for the 2017 Plan submittal. It is anticipated it will be available in the 2019 Five-Year Maintenance Plan.

SHOPP Investment Plan

The SHOPP Investment Plan defines the funding levels for each of the objectives. The investment in Strategic categories strives to be consistent with state law, policy directives and Caltrans Strategic Management Plan objectives. The investments reflect a "fix it first" approach that prioritizes maintenance and rehabilitation of the system along with safety improvements.

The magnitude of investment in each of the areas is determined based on many factors. These factors include programmed work, current condition, judicial or legislatively mandated funding levels, consequences of inaction, past investment levels and preservation needs versus rehabilitation consideration. The establishment of investment levels also considers the impact on the system of the investment, the existing pipeline of work, expected deterioration rates, and expected growth in inventory.

Table 9. SHOPP Ten-Year Investment Plan

Objectives	Sum* (in millions)
Safety	**$4,572**
Bridge Rail Replacement and Upgrade	$314
Collision Severity Reduction	$1,173
Roadside Safety Improvements	$865
Safety Improvements	$2,220
Stewardship	**$15,703**
Bridge Health	$2,736
Drainage Pump Plants	$74
Drainage System Restoration	$845
Lighting Rehabilitation	$24
Major Damage (Emergency Opening)	$1,525
Major Damage (Permanent Restoration)	$1,181
Office Buildings	$31
Overhead Sign Structures Rehabilitation	$24
Pavement Class I	$5,810
Pavement Class II	$2,493
Pavement Class III	$454
Relinquishments	$29
Roadway Protective Betterments	$143
Safety Roadside Rest Area (SRRA) Rehabilitation	$93
Transportation Related Facilities	$167
Water and Wastewater Treatment at SRRAs	$75
Sustainability	**$2,736**
ADA Pedestrian Infrastructure	$415
Advance Mitigation	$40
Bridge Scour Mitigation	$266
Bridge Seismic Restoration	$780
Hazardous Waste Mitigation	$5
Roadside Rehabilitation	$121
Storm Water Mitigation	$1,094
Zero Emission Vehicle Infrastructure	$15
Performance	$1,588
Commercial Vehicle Enforcement Facilities	$70
Operational Improvements	$390
Sign Panel Replacement	$76
Transportation Management Systems	$864
Bridge Goods Movement Upgrades	$149
Weigh-In-Motion Scales	$39
Subtotal	**$24,600**
Asset Management Pilot Program	$82
Minor Program	$1,500
PID Program Support	$395
Total	**$26,577**

**Numbers may not add due to rounding*

PERFORMANCE OUTCOMES

The Investment Plan allocates available funding to specific transportation objectives. These include safety, physical asset condition, system performance, and sustainability goals. Based on the recommended level of investment in each objective area, the corresponding accomplishments that can be expected for the investment are determined. Investments may be defined for good, fair and poor condition assets depending on the objectives of the funding programs. Having specific investments addressing physical assets at all levels helps to minimize long-term cost by avoiding a worst first asset management approach. The following tables detail the specific quantity and units of performance that is expected from each of the funding programs:

Table 10. Proposed Annual Maintenance Accomplishments at Recommended Funding Level

Annual Maintenance Performance Accomplishments				
Asset Class	**Unit**	**Accomplishment**		**Total**
Stewardship		**Good to Good**	**Fair to Good**	
Pavement Class I	Lane Miles	900	100	1,000
Pavement Class II	Lane Miles	576	64	640
Pavement Class III	Lane Miles	234	26	260
Pavement Total[1]		**1,710**	**190**	**1,900**
Bridge Health	Square Feet	3,100,000	2,300,000	5,400,000
Drainage System Restoration[2]	Linear Feet	-	14,000	14,000
	Assessments	7,800	2,880	12,000
Performance				
Transportation Management Systems	PM Checks/Repairs	52,400	-	52,400

1. The accomplishments listed above do not reflect lane miles that are crack sealed (approximately 3,000) by maintenance forces to maintain fair lane miles as fair, extending the time to when they would become poor.
2. The total 12,000 assessments also include approximately 1,320 assessments of culverts in poor condition.

Table 11. Ten-Year Performance Accomplishments

SHOPP Performance Accomplishments				
Objectives	**Unit**	**Fair to Good**	**Poor to Good**	**New**
Safety				
Bridge Rail Replacement and Upgrade	Linear Feet	119,968	131,401	-
Collision Severity Reduction	Injuries	-	4,333	-
Roadside Safety Improvements	Locations	-	11,006	-
Safety Improvements	-	-	-	-
Stewardship				
Bridge Health	Square Feet	18,053,180	5,379,176	-
Drainage Pump Plants	Locations	2	78	-
Drainage System Restoration	Linear Feet	7,867	395,890	-
Lighting Rehabilitation	Each	0	1,911	-
Major Damage (Emergency Opening)	-	-	-	-
Major Damage (Permanent Restoration)	-	-	-	-
Office Buildings	Square Feet	Various	41,700	-
Overhead Sign Structures Rehabilitation	Each	0	125	-
Pavement Class I	Lane Miles	6,808	1,595	-
Pavement Class II	Lane Miles	3,238	1,178	-
Pavement Class III	Lane Miles	418	504	-
Relinquishments	-	-	-	-
Roadway Protective Betterments	Locations	-	26	-
Safety Roadside Rest Area Rehabilitation	Locations	0	11	0
Transportation Related Facilities	Square Feet	0	72,455	97,383
Water and Wastewater Treatment at SRRAs	Locations	0	27	-
Sustainability				
ADA Pedestrian Infrastructure	Locations	-	15,148	-
Advance Mitigation	-	-	-	-
Bridge Scour Mitigation	Square Feet	-	1,185,260	-
Bridge Seismic Restoration	Square Feet	-	4,933,322	-
Hazardous Waste Mitigation	-	-	-	-
Roadside Rehabilitation	Acre	0	871	-
Storm Water Mitigation	Acre	-	4,777	-
Zero Emission Vehicle Infrastructure	Locations	-	30	-
Performance				
Commercial Vehicle Enforcement Facilities	Stations	9	9	-
Operational Improvements	Daily Vehicle Hours of Delay	-	24,069	-
Sign Panel Replacement	Each	0	9,392	-
Transportation Management Systems	Each	0	3,772	1,646
Bridge Goods Movement Upgrades	Square Feet	571,024	1,043,940	-
Weigh-In-Motion Scales	Stations	12	11	0

TRANSPORTATION FUNDING PROPOSALS

Recognizing the ongoing transportation funding shortfall, Governor Brown proposed a transportation funding proposal in the 2017-18 budget that would provide additional funding for maintenance and rehabilitation of the SHS along with funding for freight improvements. Increased funding proposals were also introduced by Senator Beall and Assemblyman Frasier through their respective transportation committees. These proposals vary in total magnitude and specific details, but all recognize the need to find a permanent solution to the current lack of funding for transportation in California.

Governor Brown's funding proposal, for example, provides for the following funding augmentations that would directly benefit the condition and performance of the SHS. The Governor's transportation funding plan, when added to existing funding, would result in total funding for the noted asset classes as shown below:

Table 12. Funding Proposal Comparison

Governor Brown's Transportation Funding Proposal		
Funding Areas	**2017 SHSMP Investment Plan** ($ billions)	**Ten-Year Funding Increase** ($ billions)
Pavement	$8.8	$9.1
Bridges and Culverts	$3.6	$5.1
Transportation Management Systems	$0.9	$0.9
Highway Maintenance	$4.2	$1.2
Total	**$17.5**	**$16.3**

If the Governor's transportation funding proposal is passed, the additional funding provided would allow the condition of these four major asset classes to be improved to the target levels approved by the Commission over the ten-year period beginning July 2017 as shown below:

Table 13. Funding Proposal Accomplishment Comparison

Asset	Without New Investment	With New Investment
Pavement	Lane miles in poor condition will grow to 9,500	17,000 lane miles of pavement fixed, resulting in 98 percent good or fair condition
Bridges	Bridges in poor condition will grow to 500	500 bridges fixed, resulting in 98.5 percent good or fair condition
Culverts	Culverts in fair or poor condition will grow to 74,000	55,000 culverts fixed, resulting in 90 percent in good or fair condition
Transportation Management Systems	8,000 TMS elements that are inoperable representing ramp meters, cameras, changeable message signs, and loop detectors	7,700 TMS elements fixed, resulting in 90 percent in good condition

PROGRAM DEFINITIONS

Safety

Safety activities are carried out to minimize the number of fatalities and injuries and to minimize the number and severity of accidents for all modes of transportation. Engineered safety activities improve the safety of the transportation system for all modes. Examples of activities carried out to improve the safety of the transportation system include:

- The installation of center dividing rails
- Upgrading bridge rails to meet current standards
- Installing guardrail
- Protection for bicyclists and pedestrians
- Installing crosswalks
- Worker protection activities
- Placement of rumble strips
- Installing signals
- Geometric changes to the SHS
- Construction of bicycle and pedestrian facilities

The ongoing commitment to transportation safety requires continual monitoring of the SHS for changing conditions or use patterns that would necessitate engineered safety solutions. As these situations are identified, improvements are carried out through both Maintenance and SHOPP as appropriate for the specific situation.

Bridge Rail Replacement and Upgrade

The Bridge Rail Replacement and Upgrade objective includes improvement or replacement of bridge rails that do not meet federal crash standards for the posted roadway speed or that have deteriorated conditions or damage due to other causes. There are over 13,160 bridges on the SHS containing over 8.2 million linear feet of bridge rail. Approximately 60 percent of the bridge rail is in good condition,

Figure 2. Saratoga Creek Bridge Rail before and after Repair

33 percent is in fair condition and 7 percent is in poor condition. The goal of the Bridge Rail Replacement and Upgrade objective is to eliminate all non-crashworthy bridge rail on the SHS. The assessment for bridge rail needs on the SHS is approximately $6.2 billion from SHOPP over the next ten years, which includes both needs currently being addressed through the project development process and the existing and projected performance gap.

Safety Improvements and Collision Severity Reduction

The Safety Improvements and Collision Severity Reduction objectives include a variety of different safety improvements meant to reduce the severity and number of collisions on the SHS. Statistical analysis is used to identify locations needing safety improvements based on collision data, with a cost-benefit analysis ensuring that projects produce net savings for the public. Other targeted improvements align with the Strategic Highway Safety Plan and focus on an area of improvement, such as pedestrian safety. Other projects repair or replace obsolete or non-functional safety assets such as crash cushions or guard rail. In 2013, there were 1,105 fatal collisions, 51,378 injury collisions, and 98,338 property damage only collisions reported on the SHS. These add up to a total economic impact of almost $22 billion. The goal for the Safety Improvements program is to fund all identified safety improvements which meet the program criteria or cost-benefit analysis. The goal for the Collision Severity Reduction program is to proactively reduce the severity of 10 percent of fatal and injury collisions over ten years. The need for triggered Safety Improvements and Collision Severity Reduction on the SHS is approximately $5.5 billion from SHOPP over the next ten years.

Roadside Safety Improvements

The Roadside Safety Improvements primary goals are to reduce roadside worker fatalities to zero, and reduce employee injury rates by minimizing the frequency and duration of highway worker exposure to traffic. Roadside Safety Improvements are an effective means to improve worker safety and reduce fatality and injury rates as determined by site specific factors. Improving highway worker safety also improves safety for travelers on the SHS by eliminating collision hazards. The following are Roadside Safety Improvements activity objectives (S.A.F.E.R):

- Site - improve safety by locating features in safe locations.
- Accessible - provide safe worker access to the roadside and highway features.
- Facilitate - accommodate mechanized maintenance activities and understand equipment constraints.

Figure 3. Vegetation control under guardrails reduce fire risks and pesticide use.

- Eliminate - implement design decisions that eliminate the maintenance activity and the need for workers on foot adjacent to the travel way.
- Relocate - minimize the need for recurrent damage repair by relocating equipment and irrigation systems out of the clear recovery zone and away from traffic.

The need for Roadside Safety Improvements on the SHS is approximately $1.6 billion from the SHOPP over the next ten years.

Stewardship

Stewardship activities are carried out primarily to minimize the long-term costs of ownership of physical assets. These activities generally maintain or improve the condition of the asset which can often also improve system reliability and safety at the same time. Stewardship needs continue to increase as the transportation system demand grows and the infrastructure ages. Failure to perform timely stewardship investments in the transportation system increases long-term costs of ownership, reduces the system reliability and safety, and will ultimately take even greater investments to restore the condition in the future. Examples of stewardship activities include:

- Emergency restoration of damaged infrastructure
- Maintaining pavement, bridges, and culverts
- Applying protective coatings, protection systems or overlays
- Maintenance and rehabilitation of pedestrian and bicycle facilities
- Maintenance and rehabilitation of SRRA facilities
- Performing maintenance on state-owned maintenance stations, office building, equipment shops, transportation management centers and labs
- Maintaining and replacing signs and lighting
- Rehabilitation or replacement of pavements, bridges, culverts, buildings, etc.

Bridge Health

The Bridge Health objective is to identify and address structural needs of SHS bridges to maintain their structural integrity. Caltrans is responsible for the maintenance of over 13,160 bridges on the SHS totaling over 245 million square feet of bridge deck area. These bridges are an average of 45 years old and have increasing maintenance needs as a result. With the implementation of Moving Ahead for Progress in the 21st Century (MAP-21) requirements, the performance measure for bridge has changed to total deck area of the structures in good, fair, or poor condition versus the number of distressed bridges (previous performance measure in the SHOPP) or the number of bridges with backlogged preventive maintenance needs (previous performance measure for the Maintenance Program). Caltrans has established a goal for Bridge Health as 83.5 percent of SHS bridge deck inventory in good

Figure 4. Scofield Ave Deck Spall Scofield Avenue Deck before and after Repair

condition, no more than 15 percent in fair condition and no more than 1.5 percent in poor condition. Table 14 identifies the condition target for Bridge Health.

Table 14. Bridge Performance Targets

Bridge Performance Target (Measured by Deck Area Square Feet)		
Good	**Fair**	**Poor**
83.5%	15%	1.5%

Bridge maintenance needs are identified and documented during regular, routine bridge inspections and when applicable in specialty investigations which include hydraulics, underwater and fracture critical inspections. When needs are identified, bridge inspectors complete a Bridge Inspection Report documenting the needs and code any changes to the individual structural elements per federal guidelines. The good, fair or poor condition classifications are developed based on these federal coding guidelines. Currently, for Bridge Health, approximately 75 percent of the SHS bridge inventory deck area is in good condition, 22 percent in fair condition, and 3 percent in poor condition.

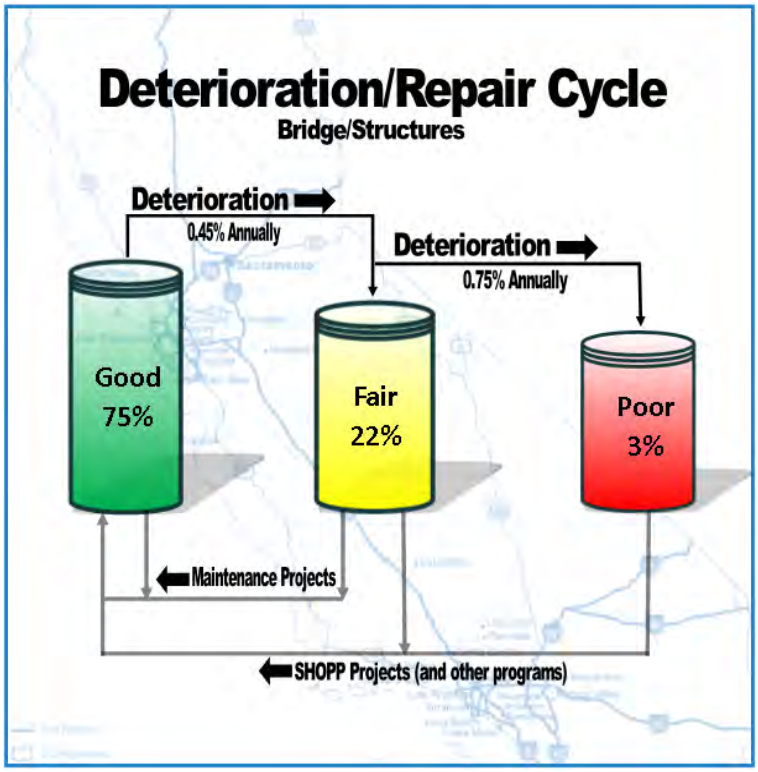


Chart 7. Displays the deterioration and repair cycle for bridges on the SHS. Currently 75 percent of bridge decks, measured by square feet, are in good condition. Approximately 0.45 percent of bridge decks in good condition deteriorates to fair condition annually. Of the 22 percent of bridge decks in fair condition, approximately 0.75 percent of the bridge deck inventory declines to poor condition annually. SHOPP projects address bridge decks in both fair and poor condition and restore the condition of the asset, while maintenance focuses on maintaining bridge decks in good condition as well addressing some bridge decks in fair condition.

Caltrans works to manage the bridge inventory safely and efficiently to extend the service life of the structures and limit operational restrictions. Preventive maintenance work accomplished through bridge crew repairs or the HM Program provide significant benefit and extend the service life of the structures by addressing minor defects before they progress to more extensive damage. Maintenance bridge work includes repairs that require immediate attention and other minor maintenance work including joint repairs, spalls, paint needs, as well as deck overlays and repairs. When minor defects are not addressed quickly and efficiently, the resulting damage often requires

major structural rehabilitation or replacement which is not only more costly than preventive maintenance, but can cause significant long-term disruptions to the traveling public.

The first stage of preventive maintenance is the work performed by bridge maintenance crew forces. These crews address repairs that require immediate attention and other minor maintenance work. Bridge preventive maintenance needs that are beyond the scope of our bridge maintenance crews are combined into maintenance projects completed by contractors. Bridges that have damage or deterioration and can be addressed through preventive maintenance activities, which include bridges in good condition and a portion of the bridges in fair condition, are funded through either the HM Program or the preventive maintenance activities funded through the SHOPP.

Bridges that have deteriorated structurally or have damage due to other causes, which include bridges in poor condition and a portion of the bridges in fair condition, are addressed with major rehabilitation or replacement activities funded through the SHOPP. When bridges require major rehabilitation or replacement, it is sometimes appropriate to make additional geometric or structural improvements. Such improvements are permissible, however, the primary purpose for the work shall be to address the condition of the structural elements of the bridge.

Drainage System Restoration

The SHS includes an estimated 205,000 culverts totaling almost 20.3 million linear feet of culverts that drain rainwater, drainage channels, streams, and rivers away from highways via metal or concrete tubes or structures that direct water flow in a controlled manner under the highways. Culvert damage or failure can seriously damage or close roadways, create the need for extensive repairs and threaten the mobility and safety of the traveling public. Of the culverts inventoried to date, approximately 65 percent of the culverts are in good condition, 23 percent in fair condition and 12 percent in poor condition. Caltrans has established a goal to bring 90 percent of culverts to good and fair condition, as well as having no more than ten percent culverts in poor condition.

Figure 5. State Route 39 Culvert before and after Repair

The Drainage System Restoration primary objective is to provide for the replacement or in-place rehabilitation of culverts, drainage pumping plants, and highway drainage systems that have lost serviceability because of age, wear, or degradation. Upgrades or modifications of culverts, drainage pumping plants, and highway drainage systems to increase flow or improve drainage alignment are included, however, the priority is in addressing the poor condition culverts and pumping plants. Projects to abandon culverts are also included. The criteria used to define the Drainage goal was to eliminate all known poor condition culverts from the inventory. The goal was set using Commission

and Caltrans program management guidance and engineering judgement taking into account the deterioration rate and the anticipated annual culvert inspection rate. The need for the Drainage System Restoration on the SHS is approximately $5 billion for the culverts and $165 million for the pumping plants from the SHOPP and Maintenance Program over the next ten years.

Table 15. Drainage System Performance Target

Drainage System Performance Goal		
Good	**Fair**	**Poor**
80%	10%	10%
16,219,598 Linear Feet	2,027,451 Linear Feet	2,027,451 Linear Feet

Culverts exemplify the potentially severe consequences of not caring adequately for components of the transportation system that are out-of-sight but are critically important to the safety and reliability of the SHS. If a culvert becomes clogged, decays, or fails due to rust or other factors, and fails to convey water away from the highway as a result, the water may then flood the highway or erode highway foundations or adjacent slopes resulting in washouts of the road and its closure. Caltrans utilizes a proactive inspection program and has developed management procedures to measure the health of drainage systems, prioritize potential culvert projects based on condition, cost, and traveler delay, and track accomplishments and delivery schedules for maintenance work. Culverts require regular maintenance to avoid costly replacement and possible catastrophic failure in the future. The repairs of catastrophic events are far more expensive than providing adequate funding to maintain and upgrade culverts.

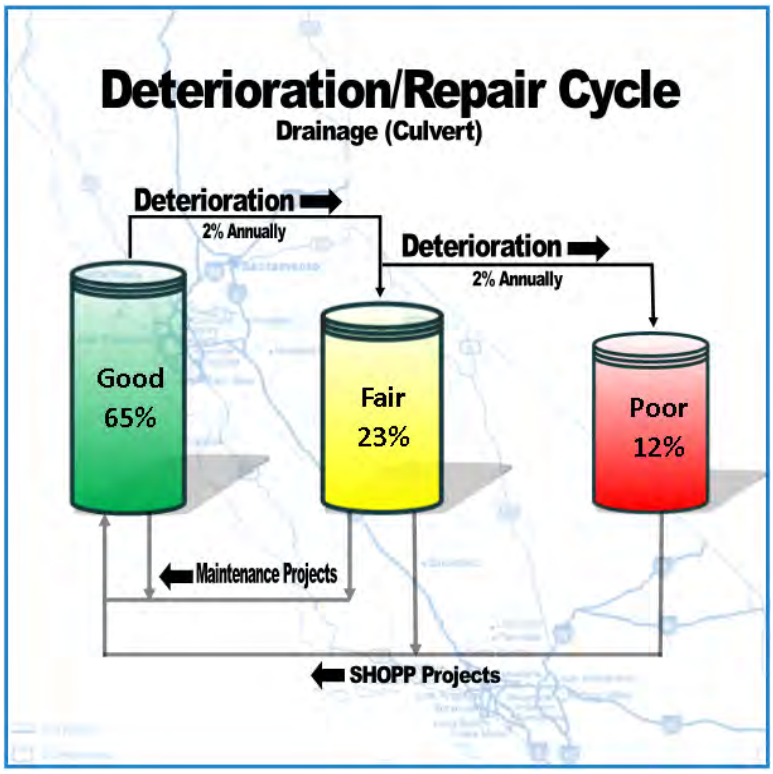


Chart 8. Displays the deterioration and repair cycle for drainage systems (culverts) on the SHS. Currently 65 percent of culverts, measured by linear feet, are in good condition. Approximately 2 percent of culverts in good condition deteriorate to fair condition annually. Of the 23 percent of culverts in fair condition, approximately 2 percent of the culvert inventory declines to poor condition annually. SHOPP projects primarily address culverts in poor condition and restores the condition of the asset, while maintenance focuses on maintaining culverts in good condition as well addressing culverts in fair condition.

The Maintenance Program is responsible for the inspection and maintenance of culverts on the SHS. Slightly more than 50 percent

of the drainage system inventory has been inspected to date. As previously identified, 23 percent of culverts are in fair condition and 12 percent are in poor condition. At the beginning of 2014-15, Caltrans identified an estimated 27,166 culverts with preventive maintenance needs. The Maintenance Program utilizes a combination of state forces and HM contracts to address culvert maintenance needs. State forces inspect culverts and perform minor maintenance to ensure culverts are functioning properly. HM projects are utilized to address maintenance needs which are beyond the scope of maintenance forces. Advanced culvert repairs and culvert relining are examples of culvert projects addressed in the HM Program. Rehabilitation projects work to restore the drainage system by providing for the replacement or in-place rehabilitation of culverts, drainage pumping plants, and highway drainage systems that have lost serviceability because of age, wear or degradation. Upgrades or modifications of culverts, drainage pumping plants and highway drainage systems to increase flow or improve drainage alignment are included; however, the priority is in addressing the poor condition culverts and pumping plants. Projects to abandoned culverts are also included.

Lighting Rehabilitation

The lighting objective includes rehabilitation and replacement of roadway lighting systems (poles, foundations, luminaires, etc.) that have damage or deteriorated conditions due to aging, weather or other factors. Lighting systems need to be updated to current technology and/or structural requirements to prevent structural failure, improve operational reliability and reduce the use of electricity. Caltrans has converted significant portions of the SHS to LED lighting already and we continue to look at adaptive lighting solutions to further reduce power demand. The primary factor for this activity is asset age, since many of the points of deterioration are directly associated with age of the system. As lighting systems age, metal fatigue can set in, corrosion weakens the pole or base bolts, and wire can deteriorate to the point of insulation failure which will cause electrical failure. There are approximately 90,000 roadway lights identified. About 46 percent (41,000) are older than 40 years, therefore rated as poor. During this ten-year Plan, an additional 6,600 units will surpass this time threshold and also need rehabilitation. The goal is to have no lighting system in poor condition, convert all lighting to LED technology. The need is $602 million over the ten years from SHOPP. The Maintenance Program does not replace poles and foundations unless damaged by collision.

Major Damage (Emergency Opening)

The Emergency Opening objective includes emergency repair of assets damaged or imminently threatened by unforeseen events. Qualifying repairs include those needed to maintain essential traffic. To be considered for the program the work must be tied to an identifiable natural event such as storms, floods, fire, earthquake, tsunami, or volcanic action. Human-caused events such as vehicle collision, explosion, theft, civil unrest and acts of war or terrorism are included. The goal of the program is to complete repairs within 180 days of the event. Repair to current design standards is allowed. As expected, the level of repairs needed varies annually depending on the number and severity of damaging events. Funding needs are known in real-time when the event(s) occur based on the damage experienced and cost of repair. The goal is to repair 100 percent of qualifying emergency opening

damage within 180 days of event so that we can maintain 100 percent roadway access. The need based on historical trends is approximately $1.5 billion from SHOPP over the next ten years.

Figure 6. State Route 3 in Trinity County before emergency opening repair of a major slipout following intense rainfall in March 2016.

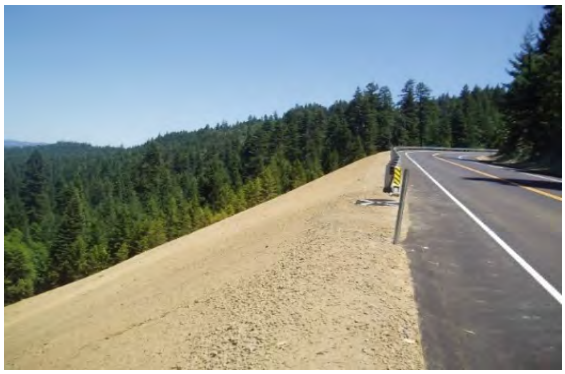


Figure 7. Emergency opening included rebuilding the embankment and pavements.

Major Damage (Permanent Restoration)

The Permanent Restoration objective includes full restoration of assets in-kind and follows the emergency opening phase. Qualification for Permanent Restoration is the same as for Emergency Opening. Restoration to current design standards is allowed. Accelerated permanent restoration under Emergency Opening is sometimes allowed if it is more economical to complete the repairs as part of Emergency Opening. It is expected that projects begin construction within three years of the incident date. Funding needs are known in real-time when the event(s) occur based on the damage experienced and cost of repair. The need based on historical trends is approximately $1.3 billion from SHOPP over the next ten years. This need does not include funding to respond to a major disaster such as a powerful earthquake in a heavily urbanized area.

Figure 8. SR 1 in Monterey County before a slipout.

Figure 9. Permanent Restoration involved building a new viaduct.

Office Buildings


Figure 10. Caltrans Headquarters Built In 1936.

The Office Building objective includes major rehabilitation and/or replacement of state office buildings that have deteriorated conditions or critical infrastructure deficiencies, such as fire, life safety, seismic, code, or building deficiencies. Additionally, as office building infrastructure begins to deteriorate or become obsolete, it may require repairs to keep the facility operational so that it achieves its full service lifespan. There are ten state-owned office buildings in Caltrans' portfolio totaling approximately 2.8 million square feet. Approximately 42 percent of that area is in good condition, 32 percent is in fair condition, and 26 percent is in poor condition. It is our goal to have zero office building assets in poor condition, defined as exceeding the useful lifespan of 50 years for fixed buildings, 20 years for modular buildings, and/or with critical infrastructure deficiencies. The goal is to award construction contracts within three years of damaging event for all known needs. All damage locations are considered poor condition and need restoration. The need for the state's office building assets are approximately $491 million from SHOPP over the next ten years.

Overhead Sign Structure Rehabilitation

The Overhead Sign Structure Rehabilitation objective includes the replacement and upgrade of overhead sign structures (that support overhead sign panels) that have damage or deteriorated due to aging, weather or other factors. Sign structures are susceptible to corrosion and metal fatigue, and these conditions are exacerbated by age. Many older structures which were designed to previous standards are at risk of failure due to metal fatigue from being subjected to constant vibration. Based on a report from the Division of Maintenance, Office of Structures Maintenance and Investigations, of the approximately 16,500 structures, over 600 are in poor condition and 3,600 are in fair condition. The goal is to have no overhead sign structure in poor condition. The need is $481 million over the next ten years from the SHOPP. The Maintenance Program does not reconstruct these structures.

Pavement

The SHS includes approximately 50,000 lane miles of pavement. Caltrans strives to effectively manage the pavement on the SHS at the lowest possible long-term cost. To maintain the health of the system, Caltrans has invested in Ground Penetration Radar (GPR) and the Automated Pavement Condition Survey (APCS) and developed the Pavement Management System (PaveM). APCS uses high definition images and lasers to gather condition data of every lane on the system. This data, along with GPR, is used to assess the pavement health and predict future performance. The accuracy of the predictions is expected to increase as additional surveys are completed. PaveM is "state of the art" technology that stores the APCS imagery and analyzes every mile of pavement. PaveM analyses is based on a project optimization tool that uses pavement condition, pavement type, climate, traffic

volumes and project history to propose the right repair treatment at the right time. PaveM recommends future repairs that provide the best value for the least amount of money.

Pavement condition is now reported by pavement classification and is assessed based on MAP-21 assessment criteria in the Proposed Rule. MAP-21 assessment criteria requires a different approach than Caltrans has utilized previously. Rather than assessing each condition independently and rating based on a combination of independent conditions, the previous system assessed various elements including ride quality and structural damage to determine pavement condition. Accordingly, only 35-45 percent of all state highway lane miles are in good condition, with 51-58 percent of lane miles in fair condition, and approximately 4-8 percent of lane-miles in poor condition.

Figure 11. APCS working view, which displays aerial, forward, and downward images. (Source: Pathway)

The SHS is broken down by class of route considering usage and other demands such as freight. The following tables provide definitions of the pavement class and breakdown of total system miles. Consistent with the three-pronged approach noted in the introduction, Caltrans addresses pavement maintenance through state forces, HM projects and SHOPP projects.

Table 16. Distribution of Lane Miles on SHS by Pavement Class

Route Class	Lane Miles	Description
Class I (52%)	26,014	Interstates, other principle arterials and urban freeways / expressways
Class II (34%)	16,759	Rural freeways / expressways and minor arterials
Class III (14%)	6,871	Major and minor collector routes owned by the state

Table 17. Current Pavement Condition on SHS, according to preliminary MAP-21 assessment criteria, by Pavement Class

Pavement Condition			
Route Class	**Good**	**Fair**	**Poor**
Class I	45%	51%	4%
Class II	35%	58%	7%
Class III	38%	54%	8%

MAP-21 utilizes four main condition criteria to classify a pavement section (0.1 mile segments) as either good, fair or poor. These condition metrics are cracking, roughness, faulting (concrete) and rutting (asphalt). The International Roughness Index (IRI) is a measure of roughness and is used for both concrete and asphalt pavements. Cracking is also measured for both concrete and asphalt pavements. Faulting and rutting are both signs of distress in concrete and asphalt pavements respectively. Pavements are rated good when all condition criteria are rated good. Pavements are rated as poor when two condition metrics are poor. All other combinations are rated as fair. Using MAP-21 criteria, as shown in the table above, there is a higher percentage of fair pavements, as compared to good or poor pavements. Performance targets for MAP-21 are tailored by route classification and shown in Table 18.

Table 18. Condition Goals by Pavement Class

Pavement MAP-21 Performance Targets			
Route Class	**Good**	**Fair**	**Poor**
Class I	60%	39%	1%
Class II	55%	43%	2%
Class III	45%	53%	2%

The Maintenance Program strives to utilize maintenance resources effectively to slow the deterioration of pavement and maintain the SHS at the lowest possible long-term cost. The SHSMP focuses preservation strategies on pavement conditions which benefit from this philosophy. PaveM is used to identify the best locations and times to perform pavement preservation to minimize future costs in the SHOPP (SHOPP avoidance). Pavements identified in fair condition may be targeted for various preservation, corrective or rehabilitation strategies.

The Maintenance Program works to maximize the service life of pavements through both state forces and HM projects. State forces perform maintenance such as crack sealing as well as pot hole and spall repairs. HM projects are utilized to meet longer-term preventive maintenance needs of the SHS. Preventive treatments completed through the HM Program include seal coats, thin asphalt overlays or, for concrete, joint seal installation or replacement. Corrective and preventive maintenance treatments addressed by Maintenance include digouts, cold in-place recycling, grinding, and isolated slab replacements. By efficiently using preventive treatments, Caltrans can avoid more costly repairs in the

future. For example, the HM projects awarded in 2013-14 had preventive maintenance costs averaging $123,000 per lane mile.

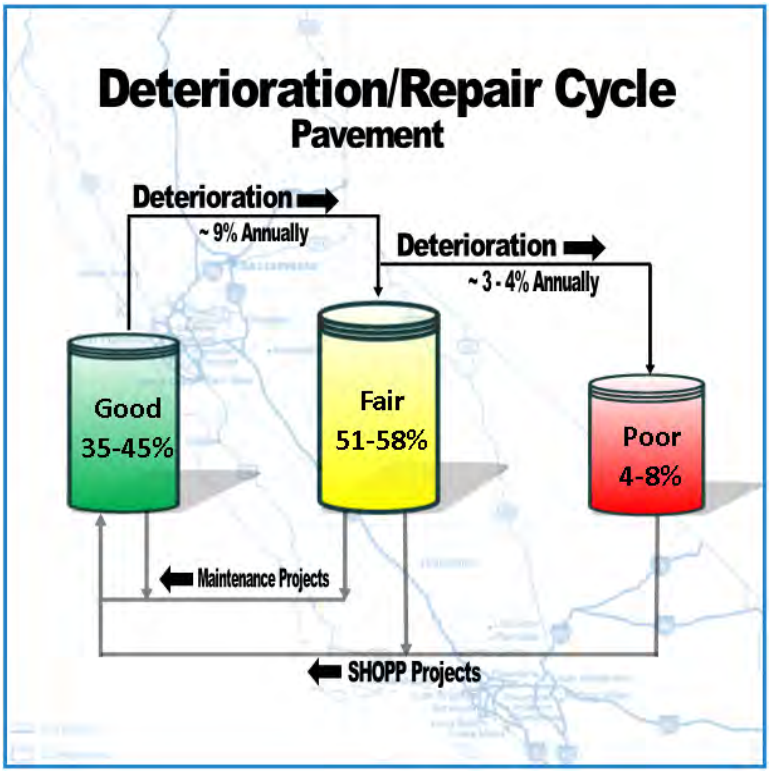


Chart 9. Displays the deterioration and repair cycle for pavement on the SHS. Currently there is between 35-45 percent of pavement in good condition – which ranges by pavement classification. Approximately 9 percent of pavement in good condition deteriorates to fair condition annually. Of the 51-58 percent of pavement in fair condition, approximately 3-4 percent of the pavement inventory declines to poor condition annually. SHOPP projects address pavement in both fair and poor condition and restores the condition of the asset, while maintenance focuses on maintaining pavement in good condition as well addressing some pavement in fair condition. It should be noted the deterioration rates are revised based on proposed MAP-21 condition criteria.

Capital Preventive Maintenance (CAPM) projects involve lower cost minor rehabilitation strategies for pavements that exhibit surface wear due to weather, aging, and traffic and limited or minor structural damage which is more than what can be addressed with HM projects but less than a full pavement rehabilitation. These projects are intended to extend service life for 5-15 years depending on strategy. CAPM strategies typically include pavement grinding to improve smoothness, isolated slab replacements, and thin asphalt overlays. CAPM projects target pavement work only (thus are less expensive than a rehabilitation project that brings a highway up to current standards) but do include low cost safety/maintenance upgrades such as guardrails, worker safety, sign panels, striping, ADA curb ramps, and other items which do not require widening or realigning the roadway. CAPM projects are more costly than an HM project and often require a longer lead-time to prepare the project, due to the inclusion of other work.

Rehabilitation projects include major rehabilitation and replacement of pavements that have significant structural distress (damage impacting the underlying layers of pavement) due to repeated loading and wear from trucks along with impacts from weather and aging of the pavement. A roadway that is rehabilitated should provide at least 20-40 years of service life with relatively low maintenance expenditures (not requiring an additional SHOPP project during its life cycle). When pavements require major rehabilitation or replacement, it may be appropriate to make operational and performance improvements, such as guardrail modifications, pedestrian and bicycle improvements, storm water or other environmental enhancements, shoulder improvements, and other valued transportation

enhancements. These projects may also require expensive environmental and cultural resource mitigation due to impacts.

Relinquishments

The Relinquishment objective provides funding for legislative relinquishments of portions of state highway routes where ownership of the highway segments is transferred to cities and counties when the relinquishments are considered to be "in the best interest of the state". Benefits to relinquishing facilities that are no longer required to serve regional and statewide needs include:

- The relinquishment of applicable facilities allow local agencies to be more responsive to community interests in the administration, planning, construction and operation of that facility. The result is a cost savings to taxpayers by eliminating the need for state encroachment permits.
- Reduction of ongoing state maintenance costs.
- Reduction in state tort liability.
- Decrease in incidence response efforts.
- Decreased competition for capital funds for regional and statewide improvements.

When relinquishing a state highway route segment, there may be occasions when it is appropriate for Caltrans to perform work or to provide financial contributions to the recipient agency to ensure that the facility is well-maintained and in operable condition. Additional work or financial contributions may be considered if they are in the best interest of the state. The need for the Relinquishments objective on the SHS is approximately $28.6 million from the SHOPP over the next ten years.

Roadway Protective Betterments

The Roadway Protective Betterments objective is to protect assets from anticipated future catastrophic damage from natural events such as storms and floods. Example projects include rock slope and rock fall protection, installation of larger diameter culverts, catchment basins and retaining walls. The goal is to address 100 percent of known needs. Unmet needs have high potential for cost increase. The Needs Assessment identified approximately $467 million from the SHOPP over the next ten years.

Figure 12. Catchment Ditch site along Interstate 80 to mitigate future rock slides.

Unstable slopes and narrow shoulders along Route 101 to be cut to mitigate landslide risks.

Safety Roadside Rest Area Rehabilitation

The Safety Roadside Rest Area (SRRA) Rehabilitation objective is to correct deficiencies, restore existing facilities to a safe condition, and improve capacity and operations at the 86 SRRAs in the SHS. The objective includes addressing the following needs:

- Compliance with mandates
- Operational improvements
- On-site capacity expansion (parking and comfort stations)
- Existing comfort station or other structural element rehabilitation or replacement
- Compliance with ADA and Division of Occupational Safety and Health (Cal/OSHA) regulations
- Maintenance facilities, crew rooms, and office space for California Highway Patrol personnel
- Utility upgrades (such as photovoltaic energy and water/wastewater)
- Ramp upgrades to current design standards
- Relocation of existing safety SRRAs
- Auxiliary facility construction where expansion and upgrading an existing site is not feasible
- Alternative stopping opportunities for freight trucking only

The SRRA objective is to provide new, safe, conveniently spaced stopping opportunities as an integral part of the SHS where the traveler may stop, rest, relax, obtain travel information and return to the highway more alert and driving safely. California law states that SRRA, "s*hould be provided so that, in combination with other stopping facilities, there shall be facilities available at intervals of approximately one-half hour's normal driving time*." Cal/OSHA standards, California Green Building Standards (CALGreen) Code, Leadership in Energy & Environmental Design (LEED) requirements and other applicable regulatory mandates will be met. A total of nine highway segments have been identified in the 2011 SRRA Master Plan as being in need of new rest area services, with 11 high priority locations identified. Funding for new SRRAs and alternate stopping opportunities has not been available for many years, though there have been some unsuccessful attempts to develop public/private partnerships, including the Federal Highway Administration (FHWA) Interstate Oasis Program and the state Wayside Stop Demonstration Program. The Needs Assessment identified approximately $1.2 billion from the SHOPP over the next ten years.

Figure 13. Buckman Springs Rest Area before and after Construction (San Diego County near Pine Valley)

Transportation Related Facilities

The Transportation Related Facility (TRF) objective includes correcting building and site deficiencies associated with worker safety, Cal/OSHA and ADA as well as improve operational efficiency at equipment facilities, maintenance facilities, transportation management centers and transportation material and testing laboratories. Approximately 21 percent of the four million TRF building square footage is in good condition, 15 percent is in fair condition and 64 percent is in poor condition. The goal is to have no TRFs in a poor condition. The need to fix facilities graded poor over the next ten years is approximately $2.4 billion.

El Centro Maintenance Station and Equipment Sub-Shop Constructed In 1935.

Figure 14. El Centro Maintenance Station and Equipment Sub-Shop after Relocation in 2016

Water and Wastewater Treatment at SRRAs

The Water/Waste Water Treatment objective is to maintain the traveler safety benefits provided by the SRRA System by preventing closures due to noncompliance with drinking water quality and waste water treatment standards. All ADA and structural deficiencies at SRRAs are identified through the SRRA Rehabilitation element. The identified need is approximately $96 million from the SHOPP over the next ten years.

Sustainability

Sustainability activities cover a broad spectrum of work that is intended to minimize transportation system impacts on the environment and communities, improve transportation system resiliency, improve the livability of California residents and improve economic prosperity associated with freight movement. Example sustainability activities include:

- Make transportation accessible for all Californians
- Integration of bicycle, transit and pedestrian mode choices for transportation
- Minimize transportation impacts on air quality, water quality and wildlife
- Improve the resiliency of the transportation system to extreme events and climate change
- Make freight improvements to improve prosperity

Collectively, the sustainability activities strive to improve the quality of life in California by making responsible transportation decisions that will be sustainable for future generations. A number of the activities included within the sustainability area have specific legal or permit requirements that mandate minimum investment levels. Failure to adhere to mandated requirements could have future legal implications and condition and performance ramifications that could negatively impact transportation in California. Failure to reduce transportation related pollution and biological impacts is not sustainable for future generations of Californians.

Americans with Disabilities Act Pedestrian Infrastructure

Figure 15. ADA-Compliant Sidewalk

Pedestrian facilities include such things as sidewalks, pedestrian overcrossings and undercrossings, park and ride lots, SRRAs, and accessible pedestrian signals. Unlike other assets, with regards to ADA compliance, pedestrian facilities are either compliant or noncompliant. There is no intermediate condition. There are currently approximately 208,000 noncompliant elements within our pedestrian facilities statewide. The goal is to have all pedestrian facilities in compliance with the Americans with Disabilities Act of 1990.

This objective is not only mandated by state and federal law, but Caltrans is also under requirements of the *Californians for Disability Rights, Inc. v. California Department of Transportation* (2010), Case No.: C 06 5125. This settlement agreement requires $1.1 billion be spent over a 30-year period beginning in 2010-11 towards the following types of activities:

- Project development and construction costs (including staffing costs) associated with the covered program access improvements.

- Establish and maintain accessibility grievance procedure, including a system to process other access requests.

The annual requirement increases incrementally from $25 million for the first five years to $45 million for the last five fiscal years. For each year the required amount is not met, the remained rolls over to the next fiscal year. Funding from SHOPP for these projects has been increasing. As the amount exceeds the required settlement amount, it is anticipated that Caltrans will catch up and exceed the settlement agreement requirements in 2018-19.

Advance Mitigation

The Advance Mitigation objective includes developing stand-alone compensatory mitigation projects that will help ensure that the right type and quantity of environmental mitigation is available for future transportation projects, in advance of funding those transportation projects. The goal is to improve wildlife habitat connectivity and reduce animal vehicle conflict along highways. Currently, the statutory requirement for compensatory mitigation due to unavoidable impacts to jurisdictional resources can significantly increase the uncertainty related to a project's scope, schedule and cost. Having available mitigation reserves in place reduces the risk to a transportation project's cost and schedule associated with securing environmental permits and/or compensatory mitigation. The means to implement advance mitigation include, but are not limited to, conservation banks or mitigation banks (either by creating new banks or through bulk credit purchases from existing banks), in-lieu fee programs, property transfers and permittee responsible mitigation (i.e. mitigation on public or private lands). The goal is based on the acreage of estimated potential compensatory mitigation need for the transportation projects in the SHSMP. The need for Advance Mitigation is approximately $300 million from SHOPP over the next ten years.

Figure 16. Highway 89 Stewardship Team project is the second in a series of planned mitigation and research efforts. Two concrete box tunnels and 1.3 miles of wildlife fencing guide animals to safely pass under the highway.

Bridge Scour Mitigation

The Bridge Scour Mitigation objective is to prevent catastrophic bridge failures from natural disasters such as floods and storm events. Bridge Scour Mitigation addresses bridges over water whose bridge foundations have been determined to be unstable for potential assessed or calculated scour conditions (scour critical) per federal guidelines. In past SHOPP documents, the performance measure for bridges has been the number of distressed bridges. Similar to MAP-21 Bridge Health requirements, the performance measure for Bridge Scour Mitigation has changed to a deficiency model of total deck area of the structures in poor condition (scour critical).

Capell Creek Critical Scour before and after

Interstate 10 Tex Wash Bridge Damage before Replacement

Figure 17. Interstate 10 Tex Wash Bridge after Replacement

There are over 13,160 bridges on the SHS totaling over 245 million square feet of bridge deck area. There is an existing scour critical deficiency of 1.4 million square feet of bridge deck area. Ideally, the goal of this objective would be to address all identified scour critical (poor) bridges but due to the dynamic nature of identification of scour critical bridges (major flooding or storm events) and the time required for the project delivery process, it is not realistic to assume that at the end of the ten-year cycle all scour critical bridges would be addressed. Therefore, the Bridge Scour Mitigation target is to reduce scour critical bridges to 10 percent of the projected ten-year scour critical need. The need for Bridge Scour Mitigation is approximately $847 million, which includes both needs currently being addressed through the project development process and the existing and projected performance gap. This increase from previous SHOPP documents reflects updated scour assessments of bridges following the collapse of the Tex Wash Bridge on Interstate 10 in July 2015.

Bridge Seismic Restoration

The Bridge Seismic Restoration objective is to prevent catastrophic bridge failures from seismic events (earthquakes). Bridge Seismic Restoration addresses bridges that have been determined to be vulnerable to potential seismic activity through screening processes implemented by Caltrans' Office of Earthquake Engineering. A rescreening of potentially seismically vulnerable bridges was completed in 2015 to evaluate these bridges based on updated seismic criteria.

Figure 18. Trinidad Rd Undercrossing before and after Repair

In past SHOPP documents, the performance measure for bridges has been the number of distressed bridges. Similar to MAP-21 Bridge Health requirements, the performance measure for Bridge Seismic Restoration has changed to a deficiency model of total deck area of the structures in poor condition (seismically vulnerable). There is an existing seismic vulnerability of approximately 16 million square feet of bridge deck area. Ideally, the goal of the Bridge Seismic Restoration objective would be to address all seismically vulnerable (poor) bridges identified in the preliminary screening process. The screening process is a preliminary review of bridges that may be seismically vulnerable based on the element configuration of the structure and the surrounding soil prior to detailed seismic analyses being completed. Because bridges identified in the screening process may be found to not require seismic restoration during detailed seismic analysis and due to the length of the time required for the project delivery process, it is not realistic to assume that at the end of the ten-year cycle all currently identified seismically vulnerable bridges would be addressed. Therefore, the Bridge Seismic Restoration target is to reduce seismically vulnerable bridges to 30 percent of the projected ten-year seismic need. The need for Bridge Seismic Restoration is over $3 billion which includes both needs currently being addressed through the project development process and the existing and projected performance gap. This increase from previous SHOPP documents reflects the updated seismic rescreening of vulnerable bridges completed in 2015.

Hazardous Waste Mitigation

The Hazardous Waste Mitigation objective include removal of underground storage tanks at maintenance stations and Caltrans owned properties, placement of above ground tanks, removal and disposal of contaminated soil and materials, construction and removal of remediation systems, and cleanup of hazardous waste contamination on Caltrans owned properties and right of way. This is a SHOPP reservation program used to ensure contaminated Caltrans facilities and rights-of-way are mitigated to achieve compliance with federal and state regulatory requirements. Funds are set aside to address hazardous waste mitigation needs as they arise. Funded activities are mandated owner operator

responsibilities. Projects include stand-alone construction activities addressing the removal and retrofit of maintenance station underground storage tanks, contaminant removal actions and the construction of mitigation and monitoring systems. The requirements for hazardous waste mitigation fluctuate significantly year to year due to new regulatory mandates and directives and newly identified violations of regulatory requirements. Violation of the federal and state hazardous waste control laws and regulations may result in administrative civil penalties, regulatory orders, federal civil penalties, citizens' law suits and potential criminal charges. Violations may lead to the loss of credibility with regulatory agencies, causing project delivery delays and increased project costs. The risk level and financial impact is high and may include penalties of up to $25,000 per day per violation. No performance assessment was completed because there are no known needs at this time.

Figure 19. Dorris Maintenance Station Soil Vapor Extraction System (State Route 97, Siskiyou County)

Underground Storage Tank Removed During a Remediation Project

Roadside Rehabilitation

The Roadside Rehabilitation objective is to reduce the long-term maintenance costs of highway planting roadside infrastructure, and provide for replacement, restoration, and rehabilitation of almost 30,000 acres of existing highway planting to an economically maintainable state following damage by weather, acts of nature, or deterioration. This element includes improvements for water conservation, worker safety, and aesthetics:

- Upgrade to more water efficient irrigation systems to achieve a reduction in water consumption.
- Improvements for the purpose of water conservation.
- Convert systems to meet departmental goal of 100 percent recycled water use by 2036.
- Erosion control to comply with Caltrans National Pollution Discharge Elimination System permit requirements.
- Implement strategies to improve worker and traveler safety by reducing the frequency and duration of maintenance workers' exposure to traffic.
- Improve roadside appearance and coordination with community character.

Figure 20. Recycled water project designed to improve water conservation using SMART controllers that enable efficient water usage to maintain roadside landscaping.

It is also the purpose of this objective to perform roadside protection and restoration objective which means to enhance, preserve or restore scenic and native landscape areas within or near roadsides, improve corridor functionality, reduce highway facility life cycle costs and improve worker safety, and comply with the following regulatory agency mandates:

- Surface Mining and Reclamation Act of 1975 and Storm Water Construction General Permit regulations
- Fish passage remediation when not part of bridge or culvert replacement work
- Wildlife preservation and protection
- Biological connectivity
- Relinquishment of environmental mitigation sites
- Restoration of unsuccessful environmental mitigation sites
- Securing environmental resources that are in high demand but short supply
- Roadside ecological viewing areas
- Rehabilitation of vista points
- Scenic enhancements
- Elimination of qualifying junkyards
- Nonconforming outdoor advertising sign removal

The identified need of this objective is approximately $2 billion from the SHOPP over the next ten years.

Storm Water Mitigation

The goal of this objective is to ensure Caltrans' storm water discharges to California and federal waters meet applicable water quality standards, through construction of control measures to meet the current National Pollutant Discharge Elimination System (NPDES) permit requirements and other state and federal laws, such as the Porter-Cologne Water Quality Control Act, the Clean Water Act (CWA) and evolving storm water requirements. The NPDES permit mandates Caltrans to achieve a minimum of

33,000 compliance units (CUs) over a 20 year window starting from 2014-15 or 1,650 CUs annually[1] within the 84 Total Maximum Daily Loads (TMDLs)[2] as well as Areas of Special Biological Significance (ASBS). The Caltrans NPDES Permit also requires retrofits (storm water specific projects) for the location specific requirements and ASBS discharge areas. Failure to achieve annual CU requirements could result in NPDES permit noncompliance and increased project delivery costs, including penalties[3]. In addition, CUs will accumulate and be added to the 1,650 CU requirement in the following year resulting in the risk of subsequent enforcement actions. Violation of the CWA and the Porter-Cologne Water Quality Act and their implementing permits and regulations may result in substantial administrative civil liabilities, regulatory enforcement actions, and lawsuits. The requirements of the storm water regulations are dynamic in nature. CUs are expected to increase as new TMDLs are adopted by the State Water Resources Control Board (SWRCB) and incorporated into subsequent Caltrans NPDES Permit cycles (every five years). In consultation with the SWRCB, Caltrans uses the following four methods to achieve CUs:

1. Caltrans SHOPP Storm Water projects (storm water mitigation stand-alone projects).
2. Caltrans SHOPP Storm Water funding contribution only (FCO) projects, in partnership with locals.
3. Other SHOPP projects such as fish passage projects and projects that include post construction storm water best management practices (BMPs).
4. Other Non-SHOPP, Cooperative Implementation Agreements (CIAs) that provide funding for local agency projects.

Caltrans prioritizes its storm water related activities and addresses TMDLs through implementation of source control measures, BMPs and CIAs. Caltrans will utilize asset management principles and multi-objective decision analysis during project planning and programming to optimize the achievement of CUs through the SHOPP program. Caltrans will continue to collaborate with the SWRCB and Regional Water Quality Control Boards (RWQCB) to achieve maximum water quality benefit economically and efficiently through CIAs and SHOPP program. The identified need of this objective is approximately $3.4 billion from the SHOPP, CIAs, and all other sources over the next ten years.

[1] One CU is equivalent to one acre of Caltrans right of way treated for a given pollutant or pollutants in a TMDL watershed for which Caltrans has been identified as a stakeholder.
[2] TMDL is defined as maximum amount of a pollutant that a water body can receive and still meet water quality standards. These are developed by either of the 9 RWQCBs, SWRCB, or United States Environmental Protection Agency (USEPA) pursuant to state and federal requirements to attain the water quality standards for a specific water body.
[3] Penalties for violating the CWA may include both fines up to $50,000 a day for each violation and imprisonment.

Zero Emission Vehicle Infrastructure

Figure 21. Public DC Fast Charging Station at the Del Lago Park and Ride in Escondido, CA

In 2012, Governor Brown issued Executive Order B-16-12 directing state government agencies to help accelerate the consumer market for zero-emission vehicles (ZEV) in California. The Executive Order called for 1.5 million ZEVs in California by 2025 and established several milestones on the pathway toward this target. In October 2016, the Governor's Office released its updated ZEV Action Plan, setting new strategies and targets to help accelerate the adoption of zero-emission technologies in California. Consistent with the actions in the Governors ZEV Action Plan, Caltrans will be installing publically accessible DC fast-charging stations for Electric Vehicles (EV) at a minimum of 30 Caltrans owned locations by December 2018.

Complete Streets and Climate Change

Executive Order B-30-15 requires all state investments to take greenhouse gas (GHG) reductions and climate change into consideration. In January 2016, Caltrans executive management issued a memo to immediately include project-level performance including complete streets and GHG emissions in the SHOPP. Over the past year, the Caltrans Division of Transportation Planning began quantifying GHG emissions using the Federal Highway Administration Infrastructure Carbon Estimator tool during project initiation document (PID) development. In addition, the Performance Tab of the SHOPP Tool database was modified to enable Caltrans to track the implementation of complete streets and climate change elements, including mitigated and unmitigated GHG emissions. For projects to be programmed in the 2018 and 2020 SHOPP cycles they must now document how complete streets and climate change elements were considered during the development of the Project Initiation Document (PID) with the goal of including complete streets elements in projects where these elements are feasible. For example, we can include complete streets elements on freeway projects that include ramps or projects along sections of freeway where bicyclists are not prohibited. This effort requires additional analysis and extensive collaboration with local and regional agencies to develop projects that consider all modes of travel including bicycles and pedestrians.

The majority of improvements for bicycle and pedestrian access on state facilities are incorporated in bridge, mobility, pavement, and safety SHOPP projects. The most common elements are curb ramps, sidewalk improvements, pedestrian signals, and enhanced crosswalk visibility. Complete street elements, such as a sidewalk or a bike lane, require acquisition of right-of-way and environmental considerations, so it is very important that these elements are considered early-on to determine the level of analysis and funding required for the project. Caltrans Strategic Management Plan calls for the percentage of projects with complete streets features to increase by 20 percent from a 2016 baseline.

Asset management will result in multi-objective SHOPP projects that consistently include complete streets and climate change elements. By moving towards asset management and breaking down SHOPP program silos, Caltrans will be better aligned to work collaboratively across Caltrans functional units, and work with local and regional partners to serve all users of the transportation system and maximize efficiency in the development of SHOPP projects. Complete streets and climate change project features do not have fiscal performance goals and targets because these project aspects are expected to be incorporated within all projects as applicable.

Figure 22. LA 110 SB Onramp from W. Manchester Avenue

System Performance and Operation

System performance activities focus on increasing mode choice, providing reliable travel times, improving goods movement and minimizing delay associated with congestion. Activities that improve the transportation system performance include:

- Maintain adequate signage
- Improve highway system traffic flow using transportation management systems
- Installation of cameras and monitoring system to help minimize non-recurrent delay
- Construction of truck climbing lanes, acceleration and deceleration lane and interchange weave lanes
- Installation of ramp meters and connected corridors

The noted activities are all designed to maximize the capacity of the existing transportation system footprint because available funding programs for the maintenance, rehabilitation and replacement of transportation assets prohibit the expansion of the highway system lanes and the state's priorities have shifted away from adding new highway lanes to making the most efficient use of the existing system and diversifying mode choice. Many of the system performance activities also help to improve freight movement that benefits California's businesses and consumers and provides increased employment opportunities. Failure to adequately invest in system performance activities would result in greater congestion, less reliable travel and a less favorable business climate.

Commercial Vehicle Enforcement Facilities

The Commercial Vehicle Enforcement Facilities (CVEF) objective includes truck weight and inspection stations where the California Highway Patrol monitors and inspects trucks using the SHS to ensure that they are operating safely, licensed properly, and have legal size and weight, which ensures that bridge and pavement assets are not damaged prematurely by overloaded trucks. These facilities are owned by Caltrans and operated by California Highway Patrol personnel. By agreement, both agencies work cooperatively to ensure that the facilities are safe and functional for the staff and public. There are 54 enforcement stations in California, and 85 percent are currently in fair condition, meaning that there are identified needs which must be met to bring the facilities up to good operational condition. The goal for the Commercial Vehicle Enforcement Facility objective is to have no facilities in poor condition. The need for CVEF is $129 million from SHOPP over the next ten years.

Operational Improvements

The Operational Improvement objective includes projects which reduce highway user delay by building improvements which alleviate localized congestion on the SHS. Typical improvements include intersection improvements, acceleration or deceleration lanes, shoulder widening, truck climbing lanes and auxiliary lanes which facilitate traffic merging or weaving. All improvements use a cost-benefit analysis to verify that the delay benefits are justified by the project cost. Delay is calculated by adding up the amount of time vehicles spend below 35mph on the SHS, (totaling more than one million hours

daily in the fourth quarter of 2015 with an economic impact of almost $17 million per day). The goal for this objective is to mitigate or reduce 10 percent of vehicle delay over ten years. The need for Operational Improvements on the SHS is approximately $933 million from SHOPP over the next ten years.

Sign Panel Replacement

The Sign Panel Replacement objective is to replace all large overhead and roadside signs to meet federal requirements for retro-reflectivity which and reduces the need for overhead sign lighting. Federal requirements for retro-reflectivity are in place to ensure that signs are visible even during night and in inclement weather. The goal is to replace all signs with the current standard for high performance retro-reflective sheeting. The use of this type of sheeting will increase sign service life to between 15-20 years. This will reduce annual replacement needs. Removal of the catwalks should reduce the potential for graffiti and the need for graffiti mitigation. In addition, the elimination of overhead sign lighting will reduce Caltrans' maintenance and utility costs and contribute to Caltrans' goal for reduced GHG footprint. There are approximately 87,000 large sign panels on the state's highways. Current rehabilitation efforts are replacing about 8,000 of those panels. There is a need to replace the other 79,000. The goal is to replace all of these sign panels. Since the service life of the panels currently being installed will exceed the duration of this ten-year Plan, there will be no additional needs based on sign panel age and deterioration. The need is $700 million over the ten years from SHOPP. The Maintenance Program replaces signs as they get damaged. The rate of damage is not a significant factor in sign replacement for these larger signs.

Transportation Management Systems

Transportation Management System (TMS) assets work together to reduce highway user delay, provide traveler information and collect information on traffic behavior. These assets are an integral part of the SHS, performing critical functions that keep people, vehicles and goods moving. TMS assets also support Integrated Corridor Management (ICM). TMS elements include elements such as changeable message signs, traffic signals, ramp meters, highway advisory radios, video cameras, traffic detectors, roadway weather information systems, and the associated communication infrastructure and software systems to support their operation – including infrastructure connecting these devices to the district transportation management centers (TMCs). Assets such as traffic signals and ramp meters control the flow of traffic on the system to optimize efficiency. Other assets allow system operators to detect highway incidents and dispatch assistance or provide information about detours. In addition to providing real-time data for system operators and travelers, TMS elements also provide historic data to help system planners and engineers forecast and plan projects. There are almost 19,000 TMS elements on the SHS. Approximately 59 percent of them are in good condition. The remaining 41 percent are obsolete or in poor operating condition and are in need of rehabilitation or replacement.
TMS elements represent a significant investment for Caltrans and its partners. Many of these elements are over ten years old approaching their operational life cycles and may require rehabilitation in the next five to ten years. Technological improvements are likely to make future elements more reliable

and potentially increase equipment life expectancies. Increased operational readiness of TMS elements will increase performance of the SHS and reduce congestion. TMS elements also require continuous maintenance to realize the operational benefits they are designed to achieve.

The Maintenance Program is responsible for maintaining these devices and communication links that ensure safety and provide real-time information to improve mobility throughout California. Preventive Maintenance is performed on a regular basis to keep equipment in good working order and reach maximum service life. TMS elements on the SHS require over 80,000 preventive maintenance checks and repairs annually to ensure maximum operability. Maintenance utilizes a combination of state forces and on-call service contracts to maintain TMS elements. State forces address preventive maintenance checks and repairs for the majority of field elements such as traffic signals and ramp meters as well as other TMS elements. On-call service contracts are used for overflow repairs beyond the scope of our maintenance crews and are also used for the field elements associated with the Traffic Operations Systems Network (TOSNET) which include the maintenance of wireless assets, fiber optic cables, copper cable, and communications hubs. Without preventive maintenance, TMS elements may not function properly, and may not provide reliable data to the TMCs or be able to provide accurate and reliable information to the motoring public. TMS projects completed in the SHOPP are larger in scale and typically address assets which are at end of life, obsolete, or otherwise non-functional. These projects could include system failures, systemic repairs, replacements, or upgrades. The goal of this objective is to leave no more than 10% of the TMS elements in a poor or obsolete condition. The identified need is approximately $1.8 billion from the SHOPP over the next ten years.

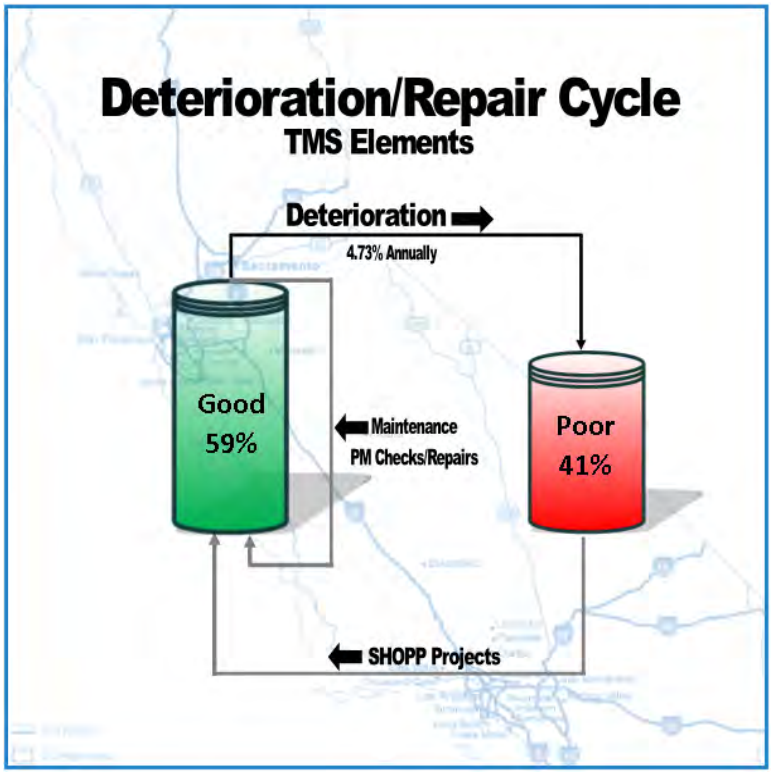


Chart 10. Displays the deterioration and repair cycle for TMS elements on the SHS. Currently 59 percent of TMS elements are in good condition. TMS elements are categorized as good or poor condition. As a result, approximately 4.73 percent of TMS elements deteriorate to poor condition annually. 41 percent of TMS assets are currently in poor condition. SHOPP projects address TMS elements in poor condition and restores the condition of the asset, while maintenance focuses on maintaining TMS elements in good condition by performing preventive maintenance checks as well as repairs.

Bridge Goods Movement Upgrades

The Bridge Goods Movement Upgrades objective is to identify and address geometric restrictions to permit vehicle traffic on the SHS. Bridge Goods Movement Upgrades address restrictions from reduced vertical clearance as established in the Caltrans' Highway Design Manual and load capacity restrictions as identified in federal guidelines. In past SHOPP documents, the performance measure for bridges has been the number of distressed bridges. Similar to MAP-21 Bridge Health requirements, the performance measure for Bridge Goods Movement Upgrades has changed to total deck area of the structures in good, fair, or poor condition.

Figure 23. Walters Road Overcrossing before and after Repair

For Bridge Goods Movement Upgrades, approximately 79 percent of the deck area does not require upgrade (good condition), 8 percent in fair condition, and 13 percent in poor condition. The emphasis of this objective is to address poor condition bridges impacting Interstate mainline traffic. As this is the first time restrictions to permit vehicle traffic have been fully identified, the need substantially exceeds what could be realistically funded or delivered for this objective. The established target is to reduce the inventory to 10 percent of bridges in poor condition for goods movement restrictions. The for Bridge Goods Movement Upgrades is approximately $5.9 billion which includes both needs currently being addressed through the project development process and the existing and projected performance gap. This increase from previous SHOPP documents reflects a proactive system wide approach to goods movement restrictions.

Weigh-In-Motion Scales

Weigh-In-Motion (WIM) devices are scales in the pavement which weigh vehicles at highway speeds on the mainline highway. These systems are able to calculate the gross vehicle weight of any car or truck, as well as measure the individual axle weights and spacing to determine the vehicle classification. This information is used to fulfil federal mandates, determine enforcement needs, to collect data needed to calculate bridge and pavement needs, and to better perform safety analysis and meet the special needs of trucks. There are 176 WIM stations on the SHS which includes 642 lanes of instrumentation and associated WIM pavement. The goal for the Weigh-In-Motion objective is to have 90 percent of the units in good condition. The identified need for WIM is $379 million from SHOPP over the next ten years.

Freight

Caltrans' freight transportation vision is reflected in the CFMP, completed in December 2014. This vision is reflected in the following six strategic goals:

Economic Competitiveness

Improve the contribution of the California freight transportation system to economic efficiency, productivity, and competitiveness

Safety and Security

Improve the safety, security, and resilience of the freight transportation system

Freight System Infrastructure Preservation

Improve the state of good repair of the freight transportation system

Environmental Stewardship

Avoid and reduce adverse environmental and community impacts of the freight transportation system

Congestion Relief

Reduce costs to users by minimizing congestion on the freight transportation system

Innovative Technology and Practices

Use innovative technology and practices to operate, maintain, and optimize the efficiency of the freight transportation system while reducing its environmental and community impacts

The FAST Act transforms the National Freight Policy provisions of MAP-21 into a new program that funds freight related projects. It authorizes a five-year total of $6.2 billion for the program nationwide. The FAST Act created two new freight programs: (1) National Highway Freight Program (NHFP) called FASTLANE Grants and (2) the discretionary funded National Significant Highway and Freight Projects Program (NSHFP). Working with the Commission and freight stakeholders, Caltrans is currently developing a freight investment plan that will include a list of priority projects and a description of how the state will invest and match NHFP funds. These projects need to align with the federally designated National Highway Freight Network (including the Critical Urban and Rural Freight Corridors to be cooperatively designated by Caltrans and MPOs). The freight investment plan will aid Caltrans in meeting the goals laid out in the CFMP.

Complementing the CFMP is the interagency California Sustainable Freight Action Plan (CSFAP), which was published in July 2016. The CSFAP includes a long-term 2050 vision and guiding principles for California's future freight transport system along with targets for 2030. The objectives of the plan are laid out in the Governor's Executive Order B-32-15, which seeks to improve freight efficiency, transition to zero-emission technologies, and increase competitiveness of California's freight system. This transition of California's freight transport system is essential to supporting the state's economic development in coming decades while reducing harmful pollution that affects many California communities.

Organizational Excellence

The Organizational Excellence goal's influence on the SHSMP is in how Caltrans carries out its work regardless of the type of work. These overarching principles will result in better project planning and development regardless of the type of work being performed. The following concepts may be applied individually or in combination as applicable to the project:

Communication

Caltrans shall communicate our planned and programmed projects publically. This communication allows interested parties to understand our plans and initiate communication related to specific projects as appropriate. Communication often means listening to input from differing perspectives related to proposed transportation solutions. This communication also provides a means of explaining the various transportation investments being made on behalf of the people of California.

Partnering

The SHS is a portion of a larger network of transportation that must work together to efficiently meet the transportation needs of all Californians. Caltrans shall partner with local transportation providers to maximize the benefit to the system users. This activity focuses on understanding shared objectives and working together to realize the coordinated delivery of transportation services to the public.

Innovation

Caltrans strives to be innovative in our work. Innovation may take the form of new procurement methods, improved safety ideas, incorporation of state of the art practices, use of innovative construction methods or materials, creative design approaches or creative coordination. Regardless of the form, innovation helps to make Caltrans a world leader in transportation and a premier transportation employer.

Risk Management

Transportation projects have many risks that must be appropriately considered during the project development process. Risks take many forms including design and construction risks, environmental permitting risks, schedule risks, cost risks and many more. Caltrans shall consider project risks and mitigate or manage the risk during the planning and development of our projects.

Collectively, the Organizational Excellence objectives help to make Caltrans a better organization for the public and our employees.

INTEGRATED ASSET CLASS SUMMARY

The California Transportation Commission defined four asset classes as "focus areas" in accordance with California Government Code. The four asset classes: pavement, bridges, culverts and transportation management systems were selected because they represent a significant portion of annual transportation investments in California. Pavements and bridges are also defined under provisions of MAP-21 and FAST Acts. This section consolidates information presented in the Needs Assessment, Investment Plan and Performance Outcomes sections of this Plan and organizes this information by each of the asset classes.

Pavement

Maintaining the condition of the pavement on California's highways is the single most costly investment made on an annual basis. The large needs are a function of the size of the system, rapid deterioration caused by heavy use and costs associated with fixing the pavement. Pavement assets are divided into three pavement classes that reflect the varying demands of the different classes of roadways that make up the SHS.

The condition of the pavement inventory is deteriorating at a rate of 9 percent per year from good to fair and at a rate of between 3-4 percent from fair to poor (as shown in Chart 11).

The 2017 SHSMP establishes a goal of treating 1,900 lane miles annually through HM projects, based on existing funding of $234 million for HM projects. Caltrans anticipates using 10 percent of the HM funding to address the fair performance gap and 90 percent of the funding to keep pavement in good condition. Currently, there are

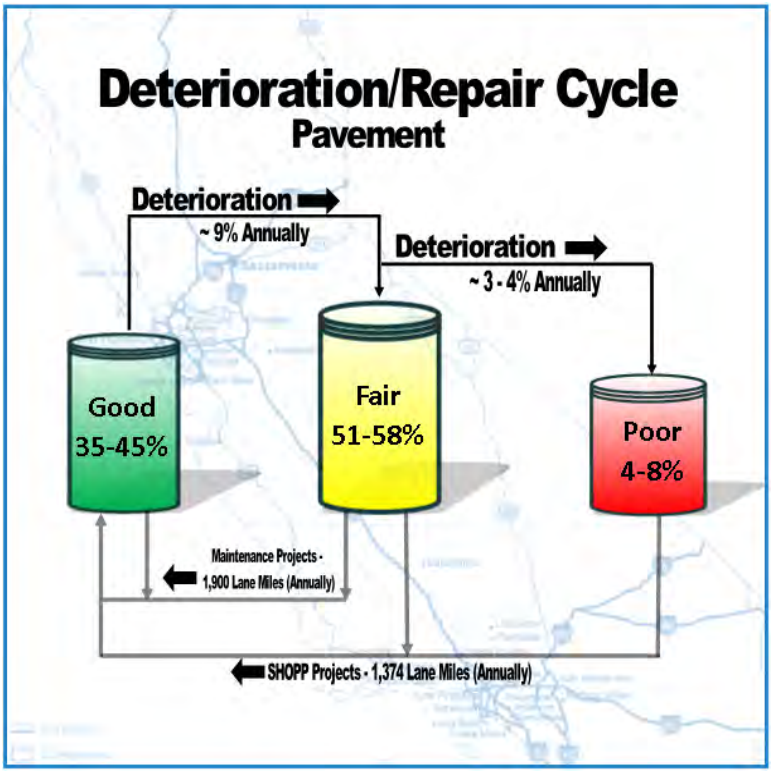


Chart 11. Displays the deterioration and repair cycle for pavement on the SHS. Currently there is between 35-45 percent of pavement in good condition – which ranges by pavement classification. Approximately 9 percent of pavement in good condition deteriorates to fair condition annually. Of the 51-58 percent of pavement in fair condition, approximately 3-4 percent of the pavement inventory declines to poor condition annually. SHOPP projects address pavement in both fair and poor condition and restores the condition of approximately 1,374 lane miles annually, while maintenance focuses on maintaining 1,710 lane miles in good condition as well addressing 190 lane miles of pavement in fair condition. It should be noted the deterioration rates are revised based on proposed MAP-21 condition criteria.

maintenance needs on approximately 12,900 lane miles of pavement. The maintenance need is expected to grow to slightly over 13,000 lane miles at the end of a ten-year period with funding at the current level and the rate of deterioration as shown in Chart 11. The expected modest increase in maintenance needs over the ten-year period would be offset by increased investment in the SHOPP. If pavement rehabilitation is funded in the SHOPP consistent with this report, no additional funding is recommended for the pavement maintenance program, as growth of future maintenance would be reduced. If pavement rehabilitation is not funded in the SHOPP as proposed in this Plan, the pavement maintenance needs will grow over time.

Bridge

Bridge maintenance needs are identified and documented during bridge inspections and through engineering analysis. Identified preventive maintenance needs that are beyond the capacity of Caltrans bridge crews are developed into projects to be completed under HM contracts. Development and construction of a typical bridge maintenance project takes approximately two to three years. While the current project stream is in development, additional HM needs are continuously being identified by the bridge inspectors.

As the bridge inventory ages, the rate of newly identified maintenance needs is growing and is expected to continue that growth in the future. This increase, considering the number of bridges Caltrans is able to address through HM bridge projects and state forces, is tracking with expectations. Through a combination of strategic planning, maintenance field activities, and bridge preservation contracts, Caltrans is working to slow the growth of rehabilitation and replacement needs.

The Bridge Health objective in the SHOPP has a projected performance gap of 5.8 million square feet (approximately 310

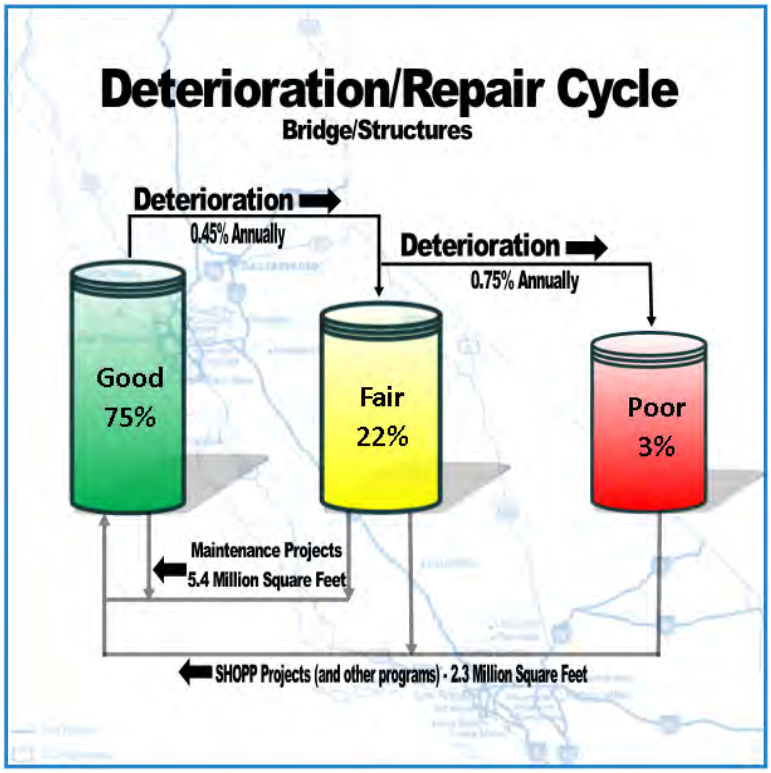


Chart 12. Displays the deterioration and repair cycle for bridges on the SHS. Currently 75 percent of bridge decks, measured by square feet, are in good condition. Approximately 0.45 percent of bridge decks in good condition deteriorates to fair condition annually. Of the 22 percent of bridge decks in fair condition, approximately 0.75 percent of the bridge deck inventory declines to poor condition annually. SHOPP projects address 2.3 million square feet of bridge decks annually in both fair and poor condition and restores the condition of the asset, while maintenance focuses on maintaining 5.4 million square feet annually of bridge decks in good condition as well addressing some bridge decks in fair condition.

bridges) of deck area in fair condition. It is anticipated that the Maintenance Program will address 40 percent of that performance gap (2.3 million square feet or 124 bridges) through HM projects while continuing to provide preventive maintenance measures on good condition bridges to prevent them from deteriorating into fair condition. If bridge rehabilitation is funded consistent with the SHOPP Investment Plan identified in this Plan, no additional funding is recommended for the bridge maintenance program. If bridge rehabilitation and replacement is not funded as recommended in this Plan, the bridge maintenance needs will grow over time.

Drainage (Culvert)

Caltrans continues to build our inventory of culverts running under or draining the SHS. Ongoing culvert inspections are adding between 8-12,000 culverts to the statewide inventory annually. Inspection production rates are dependent on many factors including right-of-way constraints, environmental permits, multiyear mitigation permits, and traffic considerations. Much of the "easier" access locations have been captured leaving locations that are more difficult to access and more time consuming to inspect. Caltrans is actively pursuing various methods to increase the number of inspections performed. Between 2014-15 and 2015-16 an annual average of 8,215 culverts were inspected.

The condition of the culvert inventory is deteriorating at a rate of 2 percent per year – both from good to fair and from fair to poor. Based on historical assessment rates and anticipated rates of deterioration creates an annual increase of approximately 270,000 linear feet (2,760 culverts) in the fair category and an annual increase of 141,000 linear feet (1,440 culverts) to the poor category.

Between 2014-15 and 2015-16 an annual average of 144 culverts were repaired through HM contracts. There are approximately 392,000 linear feet (4,000 culverts) in need

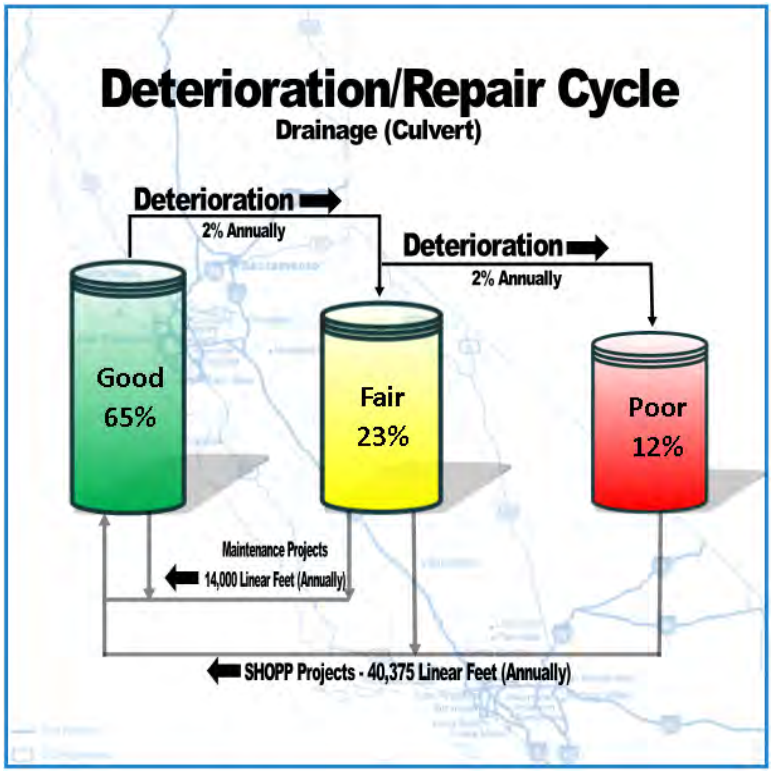


Chart 13. Displays the deterioration and repair cycle for drainage systems (culverts) on the SHS. Currently 65 percent of culverts, measured by linear feet, are in good condition. Approximately 2 percent of culverts in good condition deteriorate to fair condition annually. Of the 23 percent of culverts in fair condition, approximately 2 percent of the culvert inventory declines to poor condition annually. SHOPP projects address over 40,375 linear feet of culverts annually in both fair and poor condition and restores the condition of the asset, while maintenance focuses on maintaining 14,000 linear feet of culverts annually in good condition as well addressing culverts in fair condition.

of maintenance on an annual basis. At the current annual maintenance investment of $23 million, the number of culverts in need of maintenance treatment is anticipated to increase to just short of 6.9 million linear feet (70,000 culverts) in a ten-year period.

The culvert maintenance needs have been recognized in various funding proposals; therefore, no additional changes are recommended to the $23 million annual level of investment. The 2017 SHSMP Investment Plan calls for an investment of $845 million for culvert rehabilitation and replacement in the SHOPP. If Drainage System Restoration is funded consistent with the SHOPP Investment Plan identified in this Plan, no additional funding is recommended.

TMS Elements

Preventive maintenance is performed on a regular basis to keep TMS equipment in good working order and achieve maximum service life. TMS elements on the SHS deteriorate at a rate of almost 5 percent per year and require over 80,000 preventive maintenance checks and repairs annually to existing TMS inventory to maintain operating condition. Maintenance utilizes a combination of state forces and on-call service contracts to maintain TMS elements. TMS field elements are maintained with a goal Level of Service score of 90. State forces address preventive maintenance checks and repairs for the majority of field elements such as traffic signals, ramp meters as well as other TMS elements. On-call service contracts are primarily used for maintaining the communications infrastructure associated with TOSNET which include the maintenance of wireless assets, fiber optic cables, copper cable, and communications hubs.

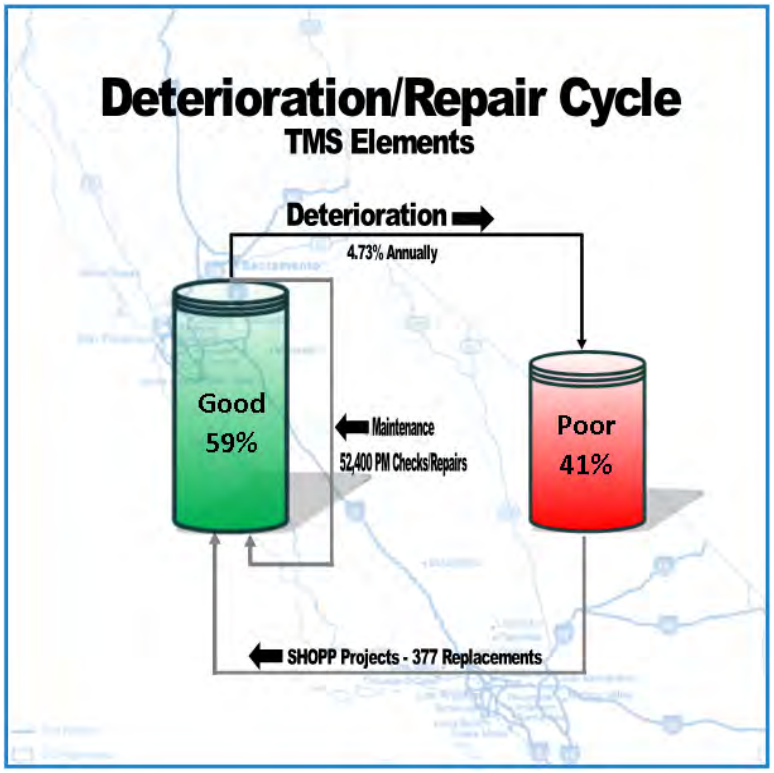


Chart 14. Displays the deterioration and repair cycle for TMS elements on the SHS. Currently 59 percent of TMS elements are in good condition. TMS elements are categorized as good or poor condition. As a result, approximately 4.73 percent of TMS elements deteriorate to poor condition annually. 41 percent of TMS assets are currently in poor condition. SHOPP projects address 377 TMS elements annually in poor condition and restores the condition of the asset, while maintenance focuses on maintaining TMS elements in good condition by performing over 52,000 preventive maintenance checks as well as repairs annually.

Through a combination of state forces and on-call service contracts, Caltrans is able to address more than 52,000 preventive maintenance

checks and repairs annually. Some assets reporting in poor condition may be operational but have exceeded the expected service life and are obsolete. As a result, operational readiness may be higher than good condition shown in Chart 14. The operational readiness of TMS elements, except for traffic signals, ranges between 65-85 percent good, varying by district. Caltrans is working diligently to increase the operational readiness of TMS assets. Caltrans Maintenance Program expends an average of $20 million and 169 positions on the maintenance of these assets and recommends the existing level of funding to maintain TMS elements remain unchanged. If TMS elements are provided funding consistent with the SHOPP Investment Plan, no additional funding is recommended for the TMS in the Maintenance Program. The SHOPP Investment Plan calls for $864 million investment for TMS elements. Given the combined investments in TMS, the condition is expected to improve markedly in the early portion of the plan period due to a 2016 SHOPP investment in detection and then begin to slowly decline later in the Plan period.

MAINTENANCE STATUTORY REQUIREMENTS

Cost Effectiveness

California Government Code requires Caltrans to identify strategies to control costs associated with the maintenance of the SHS. The following sections identifies a number of strategies being used for each asset class:

Pavement

- Apply life cycle cost analysis in design. Caltrans has doubled the rehabilitation design life of pavement from 20-40 years by using more effective pavement design and life cycle cost analysis. This design analysis, applied during the planning and development of pavement capital projects, ensures the most cost-effective project is constructed at the lowest cost. Maintenance treatments (including Highway Maintenance projects and state forces) are still required to reach the designed service life.
- Follow an appropriate 3-20 year cycle of preventive maintenance treatments on the SHS.
- Using recycled materials in pavement reduces the impact on new materials and the environment while maintaining the same or better pavement performance. Caltrans uses recycled tires in some pavement, reducing the pressure on landfills. According to the "2014 Crumb Rubber Report," approximately 27 percent of all flexible pavement on the SHS was designed with rubberized asphalt.

Bridges

- Caltrans continues to maximize the use of limited maintenance funding and to control bridge maintenance costs by using new materials that last longer and are easier to apply, such as epoxy paint, polyester concrete, corrosion resistant rebar and other design details.
- Caltrans is implementing policies to ensure that new projects are built with cost-effective and easily maintained elements. Caltrans is also studying best practices of other state departments of transportation to ensure the best business practices are employed in California.

Culverts

- Caltrans is using remote controlled cameras to complete culvert inspections which reduces worker exposure and completes difficult culvert inspections more efficiently.
- Caltrans is using remote controlled equipment where practical to perform drain cleaning activities more efficiently.
- Caltrans is utilizing trenchless culvert replacement techniques, where appropriate, which minimize disruptions to the ground surface and the infrastructure above it. This practice decreases the need for full replacement/rehabilitation.

- Caltrans is utilizing lining replacement techniques which allow the repair of existing culverts without having to remove and replace the existing deteriorated culvert. Some of the technology considered include paved invert, cured-in-place pipe liner, slip lining, and centrifugally cast liner.
- Preventive maintenance is performed to the extent practical to provide waterway adequacy, such as ditch cleaning and culvert cleaning on an annual basis at some locations, even more frequently at some locations to prolong the service life of the culverts.
- In improving efficiency, Maintenance staff check culverts annually, as well as during and after each major storm and perform preventative maintenance as needed (flushing sediment in the pipe, cleaning the inlets and outlets).

TMS Elements

- Caltrans utilizes on-call service contracts to supplement state forces and continues to integrate on-call service contracts to the extent possible. Caltrans has consolidated on-call contracts over multiple Districts (where feasible) to minimize administrative costs.
- Over the last two years, Maintenance and Traffic Operations have begun using one Trouble Ticket system to effect TOSNET system repairs. Once a problem is identified and entered into the Ticket system, the ticket is automatically relayed to the appropriate Maintenance staff. Maintenance then has the option of completing the repairs through state forces or by utilizing the on-call service contracts if state forces do not have the manpower or expertise. This method ensures consistent trouble reporting; ensures that problems are reported as expeditiously as possible; minimizes inaccurate trouble reporting, and duplications of effort.

Maintenance Program Budget

Highway Maintenance Projects

Highway Maintenance projects are selected by evaluating the asset condition at a route-specific level. This approach is needs-based and considers key factors including: asset age, climate and geographic location, Average Daily Traffic, and projected deterioration. HM projects provide the greatest value and extend service life of assets at the lowest possible long-term cost.

Highway Maintenance project selection balances the short-term needs of the system, long-term goals and available resources. HM projects extend the service life of assets and are our primary SHOPP cost avoidance mechanism in the Maintenance Program. The needs of the SHS are assessed in a systematic manner (e.g. PaveM) which includes analysis of these highway deficiencies and their potential solutions. Program advisors review proposed projects, and select those which maximize maintenance investments.

Maintenance Program Budget Allocation Tool (State Forces)

The Maintenance Program has examined its practices on how it allocates resources for field maintenance activities. This is especially valuable given the present and expected future funding, which could place considerable constraints on maintaining the system. Development is under way to improve these practices, and will be shaped by considering Level of Service (LOS), condition of assets, and performance while balancing mandated activities and historic demands on maintenance resources (snow, emergency response, maintenance service requests, etc.) with a commitment to system preservation.

The Maintenance Program Budget Allocation Tool (BAT) is under development and is expected to enhance budget management capabilities. The BAT uses a combination of climate and geographic location, Average Daily Traffic, LOS performance, and inventory data to project future resource needs with performance-level expectations. This tool will be used to develop 2017-18 allocations for the ten high-priority maintenance activities identified below:

- Pavement (potholes/cracks/spalls)
- Bridge field maintenance activities
- Guardrail
- Striping
- Signs
- Traffic signals
- Roadway lighting
- Tree/brush encroachment
- Litter/debris
- Graffiti

CONCLUSION

As the SHS continues to age, the demands of vehicle and truck traffic is accelerating the deterioration of these assets. Compounding this deterioration is the lack of adequate funding necessary for rehabilitation and restoration work necessary to bring all of the transportation infrastructure to a state of good operating condition. The increased demands and deferred rehabilitation and restoration results in lower operational performance, higher user operating costs and ultimately require a higher overall investment when needed repairs to the system are undertaken. The shortfall of available funding for infrastructure repair needs such as signs, lighting, drainage, planting, mandate compliance and transportation related facilities has resulted in increased worker exposure to traffic due to the need for more frequent maintenance and an increased level of urgent repair expenditures. In addition, the ever increasing cost of meeting legal, statutory, and regulatory mandates is a significant contributor to the ten-year needs.

The SHSMP presented a performance management based Needs Assessment that first defined the needs on the assets and subsequently divided the need into available funding sources. This Needs Assessment incorporated new performance measures proposed by federal regulation and goals established by the Commission. The SHOPP ten-year escalated need for the rehabilitation and operation of the SHS for the period from 2017-18 through 2026-27 is $85.8 billion. Major Maintenance Program needs are an additional $10.3 billion over the ten-year period.

The SHSMP presents an Investment Plan that defines the distribution of available funding from the SHOPP, Maintenance and the new FASTLANE Freight Program to address the identified needs. The SHOPP is the single largest funding source available to address rehabilitation needs on the SHS. The Projected funding available for the SHOPP is approximately $2.6 billion a year over the ten-year Plan period. Comparing the Needs Assessment to the Investment Plan identified annual funding shortfall for the SHS of approximately $6.2 billion across all objectives. Major Maintenance Programs are directed primarily at preventive and minor corrective repairs that delay the need for rehabilitation in the SHOPP. Maintenance contract funding is approximately $2.6 billion over the ten-year Plan period. The passage of the FAST Act has provided up to $900 million for freight improvements on the SHS over ten years.

The Needs Assessment identified needs that surpass available funding by almost four times. Caltrans will continue to prioritize the available resources to the most pressing areas. Maintenance contract funds are fully committed to treatments and strategies that extend the service life of existing assets and delay future rehabilitation needs. In the 2017 SHSMP approximately 67 percent of available SHOPP funding is focused on fixing the existing transportation system, 17 percent for safety improvement and 10 percent for sustainability initiatives and 6 percent for system performance improvements. The FAST Act freight funds will provide an estimated additional $90 million annually for system performance improvements on the SHS.

The 2017 SHSMP fully implemented the performance management requirements of MAP-21/FAST Acts. This strategic way of looking at performance based infrastructure management has resulted in a plan that is consistent in approach across assets and deficiencies in addition to being fully transparent in its analysis. Coupled with the implementation of performance management is a fundamental shift in how the SHOPP is being managed. Beginning with the 2017 SHSMP, SHOPP funding targets will be established at the district level instead of by asset in headquarters. The change in the funding allocation structure will provide greater flexibility for the Caltrans districts to better combine various types of work together to make the projects as efficient as possible with a minimum disruption to the traveling public.

Caltrans continues to refine our Multi-Objective Decision Analysis (MODA) project selection and decision methodologies. A pilot program initiated in 2016 has further informed this effort. Academic decision analysis experts are currently reviewing the pilot program work and making suggested improvements. By summer of 2017, we expect to have improved models that will provide a more transparent and objective project selection framework. The performance management approach implemented with this Plan is consistent with the ongoing project prioritization work. Together these pieces along with others are building the structure for sound asset management of the highway system in California.

APPENDIX A: STATUTORY REQUIREMENTS

Federal Endangered Species Act
Governs conservation of threatened and endangered ecosystems that species of fish, wildlife, and plants depend.

16 U.S.C. section 1531 et seq.

http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title16-section1531&num=0&edition=prelim

Federal Water Pollution Control Act (Clean Water Act)
Governs surface water pollution as enforced by the Environmental Protection Agency (EPA).

33 U.S.C. section 1251

http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title33-section1251&num=0&edition=prelim

National Pollutant Discharge Elimination System (NPDES)
Governs construction and maintenance activities that impact storm water quality.

33 U.S.C. section 1342

http://uscode.house.gov/view.xhtml?req=(title:33%20section:1342%20edition:prelim)%20OR%20(granuleid:USC-prelim-title33-section1342)&f=treesort&edition=prelim&num=0&jumpTo=true

Resource Conservation and Recovery Act (RCRA)
Governs hazardous and non-hazardous solid waste management.

42 U.S.C. section 6901 et seq.

http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title42-section6901&num=0&edition=prelim

Federal Comprehensive Environmental Response Compensation and Liability Act (CERCLA)
Governs hazardous waste site cleanup resulting from accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

42 U.S.C. section 9601 et seq.

http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title42-section9601&num=0&edition=prelim

Americans with Disabilities Act (ADA)
Governs accessibility services and facility requirements for individuals with disabilities.

42 U.S.C. section 12101 et seq.

http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title42-section12101&num=0&edition=prelim

Statewide Potable Urban Water Usage Reduction
Requires State Water Resources Control Board (SWRCB) to reduce statewide water usage by 25 percent.

Executive Order B-29-15

https://www.gov.ca.gov/docs/4.1.15_Executive_Order.pdf

Senate Bill 857
Requires Caltrans to prepare an annual report to the Legislature regarding department's progress in locating, assessing, and remediating barriers to fish passage.

Chapter 589, Statutes of 2005

http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060SB857

Fish and Wildlife Protection and Conservation
Requires written notification when an activity/project may substantially divert or obstruct the natural flow of any river, stream, or lake.

Fish and Game Code section 1602

http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=1602.&lawCode=FGC

California Endangered Species Act (CESA)
Protects and preserves all native species threatened by extinction or experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation.

Fish and Game Code sections 2050-2069

http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=02001-03000&file=2050-2069

California Transportation Commission
Requires Caltrans to prepare an asset management plan to CTC for approval no later than January 31 of each even-numbered year.

Government Code section 14526.5

http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=14526.5.&lawCode=GOV

California Environmental Quality Act (CEQA)
Requires state and local agencies to identify the significant environmental impacts associated with their activities and to mitigate those impacts.

Public Resources Code sections 21000-21177

http://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=PRC&division=13.&title=&part=&chapter=&article=

Transportation Funding Plan
Requires Caltrans to prepare a ten-year state rehabilitation plan and a five-year maintenance plan that addresses rehabilitation and maintenance needs of the state highway system.

Streets and Highways Code section 164.6

http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=164.6.&lawCode=SHC

Safety Roadside Rests
Requires CTC and Caltrans to plan, design, and construct safety roadside rests outside the state park system units. In addition, Caltrans must maintain safety roadside rests on the state highway system.

Streets and Highways Code section 218 et seq.

http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=SHC&division=1.&title=&part=&chapter=1.&article=7.

Surface Mining and Reclamation Act of 1975 (SMARA)
Establishes surface mining and reclamation policy to regulate surface mining operations to minimize adverse environmental impacts and reclaimed mined lands are in a usable condition.

Public Resources Code section 2710 et. seq.

http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=2.&title=&part=&chapter=9.&article=1.

Highway Users Tax Account (HUTA)
Explains fuel tax revenue uses and establishes county apportionment amounts in accordance with various tax laws.

Streets and Highways Code sections 2104-2108

http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=SHC&division=3.&title=&part=&chapter=3.&article=

Railroad Crossings
Outlines construction practices surrounding railroad crossings, including policy development by CTC in consultation with Caltrans.

Public Utilities Code sections 1201-1220

http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=6.&article=

Railway-Highway Crossings
Requires states to make safety improvements at public railroad-highway crossings and submit an annual progress report to FHWA.

23 U.S.C. section 130

http://uscode.house.gov/view.xhtml?req=(title:23%20section:130%20edition:prelim)%20OR%20(granuleid:USC-prelim-title23-section130)&f=treesort&edition=prelim&num=0&jumpTo=true

Assembly Bill 2289
Amends Government Code section 14526.5 to include capital improvement projects relative to the operation of state highways and bridges.

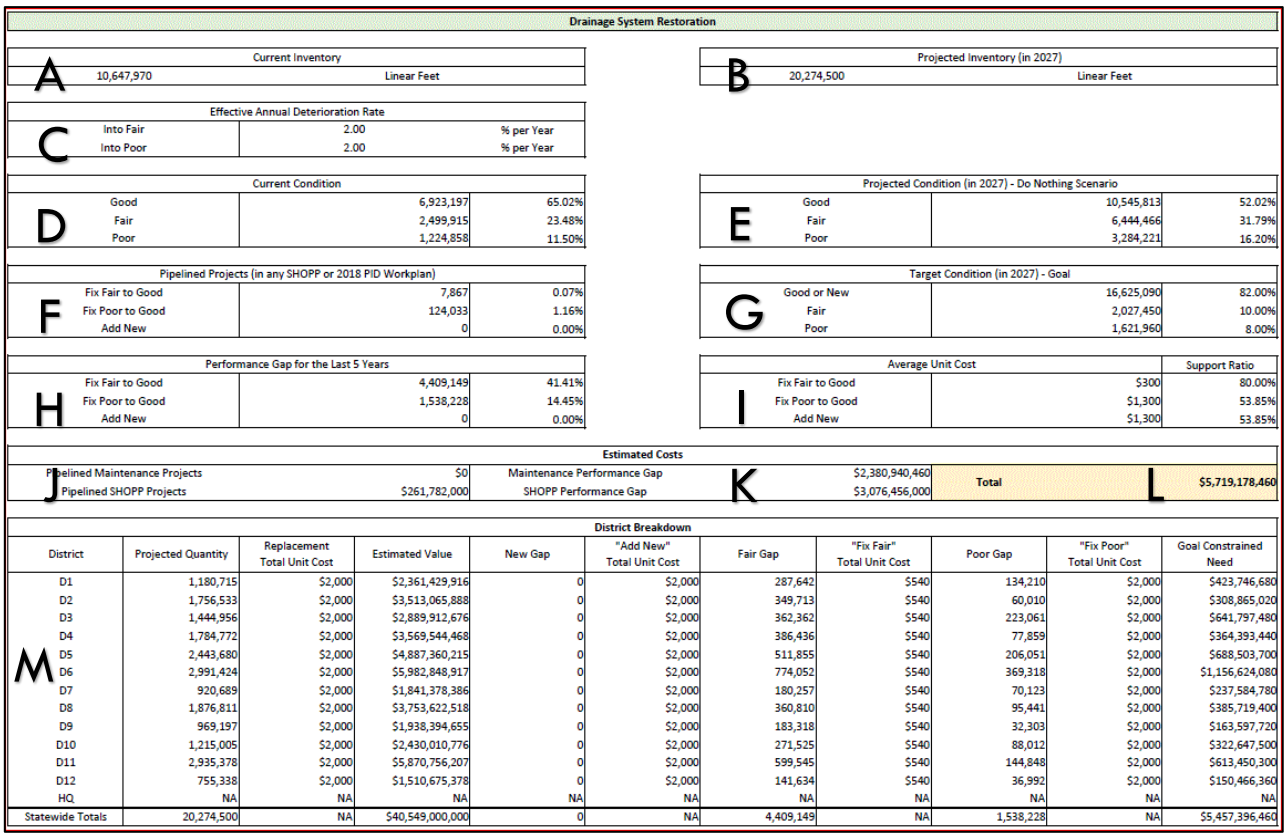
Chapter 76 , Statutes of 2016

http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB2289

APPENDIX B: PERFORMANCE MANAGEMENT SUMMARY SHEETS

ASSET MANAGEMENT FACTS

The Performance Management Summary Sheets are included in the appendix of the State Highway System Management Plan. These sheets summarize the inventory, condition breakdown, deterioration rates, pipelined work, targets, unit cost to address the needs and a statewide and district level cost summary. The summary sheets include sections A - M as shown below. A description of each section is provided for each lettered section below:



Drainage System Restoration

A — Current Inventory

10,647,970	Linear Feet

B — Projected Inventory (in 2027)

20,274,500	Linear Feet

C — Effective Annual Deterioration Rate

Into Fair	2.00	% per Year
Into Poor	2.00	% per Year

D — Current Condition

Good	6,923,197	65.02%
Fair	2,499,915	23.48%
Poor	1,224,858	11.50%

E — Projected Condition (in 2027) - Do Nothing Scenario

Good	10,545,813	52.02%
Fair	6,444,466	31.79%
Poor	3,284,221	16.20%

F — Pipelined Projects (in any SHOPP or 2018 PID Workplan)

Fix Fair to Good	7,867	0.07%
Fix Poor to Good	124,033	1.16%
Add New	0	0.00%

G — Target Condition (in 2027) - Goal

Good or New	16,625,090	82.00%
Fair	2,027,450	10.00%
Poor	1,621,960	8.00%

H — Performance Gap for the Last 5 Years

Fix Fair to Good	4,409,149	41.41%
Fix Poor to Good	1,538,228	14.45%
Add New	0	0.00%

I — Average Unit Cost

		Support Ratio
Fix Fair to Good	$300	80.00%
Fix Poor to Good	$1,300	53.85%
Add New	$1,300	53.85%

Estimated Costs

J — Pipelined Maintenance Projects	$0	Maintenance Performance Gap	K — $2,380,940,460	Total	L — $5,719,178,460
Pipelined SHOPP Projects	$261,782,000	SHOPP Performance Gap	$3,076,456,000		

M — District Breakdown

District	Projected Quantity	Replacement Total Unit Cost	Estimated Value	New Gap	"Add New" Total Unit Cost	Fair Gap	"Fix Fair" Total Unit Cost	Poor Gap	"Fix Poor" Total Unit Cost	Goal Constrained Need
D1	1,180,715	$2,000	$2,361,429,916	0	$2,000	287,642	$540	134,210	$2,000	$423,746,680
D2	1,756,533	$2,000	$3,513,065,888	0	$2,000	349,713	$540	60,010	$2,000	$308,865,020
D3	1,444,956	$2,000	$2,889,912,676	0	$2,000	362,362	$540	223,061	$2,000	$641,797,480
D4	1,784,772	$2,000	$3,569,544,468	0	$2,000	386,436	$540	77,859	$2,000	$364,393,440
D5	2,443,680	$2,000	$4,887,360,215	0	$2,000	511,855	$540	206,051	$2,000	$688,503,700
D6	2,991,424	$2,000	$5,982,848,917	0	$2,000	774,052	$540	369,318	$2,000	$1,156,624,080
D7	920,689	$2,000	$1,841,378,386	0	$2,000	180,257	$540	70,123	$2,000	$237,584,780
D8	1,876,811	$2,000	$3,753,622,518	0	$2,000	360,810	$540	95,441	$2,000	$385,719,400
D9	969,197	$2,000	$1,938,394,655	0	$2,000	183,318	$540	32,303	$2,000	$163,597,720
D10	1,215,005	$2,000	$2,430,010,776	0	$2,000	271,525	$540	88,012	$2,000	$322,647,500
D11	2,935,378	$2,000	$5,870,756,207	0	$2,000	599,545	$540	144,848	$2,000	$613,450,300
D12	755,338	$2,000	$1,510,675,378	0	$2,000	141,634	$540	36,992	$2,000	$150,466,360
HQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Statewide Totals	20,274,500	NA	$40,549,000,000	0	NA	4,409,149	NA	1,538,228	NA	$5,457,396,460

A. Current inventory for physical assets or magnitude of deficiency.
B. Projected inventory or deficiency at the end of the period. Typically equals current numbers.
C. Average annual deterioration rates used in the calculation of the projected condition.
D. The current breakdown of the condition of physical assets. Deficiencies are typically poor.
E. Projected future condition based on a do nothing scenario. Uses projected future inventory.
F. Pipeline of quantities from the SHOPP, PID work plan commitments, and other sources.
G. Established performance targets. These are not constrained targets.
H. The summation of the district level non-negative performance gaps for fair and poor.
I. The average unit costs for repair and associated support ratio.
J. The dollar value of the Maintenance and SHOPP unfunded future commitments.
K. The dollar value necessary to close the performance gap. Split between SHOPP and Maintenance.

L. The total need to achieve the performance target. Includes HM and SHOPP funding.
M. District level breakdown of the inventory, gaps and SHOPP and Maintenance needs.

Notes

A negative gap means that the projected condition and planned pipeline will result in the district surpassing the statewide performance target in a ten-year period.

Bridge Rail Replacement and Upgrade

Current Inventory	
8,226,434	Linear Feet

Projected Inventory (in 2027)	
8,226,434	Linear Feet

Effective Annual Deterioration Rate		
Into Fair	0.00	% per Year
Into Poor	0.00	% per Year

Current Condition		
Good	4,919,050	59.80%
Fair	2,738,586	33.29%
Poor	568,798	6.91%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	4,919,050	59.80%
Fair	2,738,586	33.29%
Poor	568,798	6.91%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	119,968	1.46%
Fix Poor to Good	131,401	1.60%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	8,226,434	100.00%
Fair	0	0.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	2,618,618	31.83%
Fix Poor to Good	437,397	5.32%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$1,375	40.00%
Fix Poor to Good	$1,375	40.00%
Add New	$1,375	40.00%

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$6,197,022,875**
Unfunded Pipelined SHOPP Projects	$314,194,000	SHOPP Performance Gap	$5,882,828,875		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	290,438	$1,925	$559,093,150	0	$1,925	89,832	$1,925	31,117	$1,925	$232,826,825
D2	261,471	$1,925	$503,331,675	0	$1,925	84,499	$1,925	12,212	$1,925	$186,168,675
D3	795,380	$1,925	$1,531,106,500	0	$1,925	313,880	$1,925	47,624	$1,925	$695,895,200
D4	1,645,604	$1,925	$3,167,787,700	0	$1,925	446,459	$1,925	92,783	$1,925	$1,038,040,850
D5	350,405	$1,925	$674,529,625	0	$1,925	110,679	$1,925	42,827	$1,925	$295,499,050
D6	408,027	$1,925	$785,451,975	0	$1,925	100,997	$1,925	22,345	$1,925	$237,433,350
D7	1,774,798	$1,925	$3,416,486,150	0	$1,925	553,741	$1,925	138,146	$1,925	$1,331,882,475
D8	771,528	$1,925	$1,485,191,400	0	$1,925	264,781	$1,925	13,397	$1,925	$535,492,650
D9	46,550	$1,925	$89,608,750	0	$1,925	11,685	$1,925	1,871	$1,925	$26,095,300
D10	371,347	$1,925	$714,842,975	0	$1,925	167,809	$1,925	15,980	$1,925	$353,793,825
D11	945,635	$1,925	$1,820,347,375	0	$1,925	317,172	$1,925	7,612	$1,925	$625,209,200
D12	565,251	$1,925	$1,088,108,175	0	$1,925	157,084	$1,925	11,483	$1,925	$324,491,475
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	8,226,434	N/A	$15,835,885,450	0	N/A	2,618,618	N/A	437,397	N/A	$5,882,828,875

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Collision Severity Reduction

Current Need	
52,483	Injuries

Projected Need (in 2027)	
52,483	Injuries

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	52,483	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	52,483	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	1,410	2.69%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	5,249	10.00%
Fair	N/A	N/A
Poor	47,234	90.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	3,896	7.42%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$105,000	48.00%
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$1,324,406,400**
Unfunded Pipelined SHOPP Projects	$718,968,000	SHOPP Performance Gap	$605,438,400		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	793	N/A	N/A	N/A	N/A	N/A	N/A	-11	$155,400	$0
D2	718	N/A	N/A	N/A	N/A	N/A	N/A	30	$155,400	$4,662,000
D3	3,286	N/A	N/A	N/A	N/A	N/A	N/A	204	$155,400	$31,701,600
D4	10,080	N/A	N/A	N/A	N/A	N/A	N/A	876	$155,400	$136,130,400
D5	2,241	N/A	N/A	N/A	N/A	N/A	N/A	114	$155,400	$17,715,600
D6	2,866	N/A	N/A	N/A	N/A	N/A	N/A	274	$155,400	$42,579,600
D7	14,645	N/A	N/A	N/A	N/A	N/A	N/A	1,287	$155,400	$199,999,800
D8	6,081	N/A	N/A	N/A	N/A	N/A	N/A	207	$155,400	$32,167,800
D9	130	N/A	N/A	N/A	N/A	N/A	N/A	-46	$155,400	$0
D10	2,330	N/A	N/A	N/A	N/A	N/A	N/A	144	$155,400	$22,377,600
D11	4,827	N/A	N/A	N/A	N/A	N/A	N/A	436	$155,400	$67,754,400
D12	4,486	N/A	N/A	N/A	N/A	N/A	N/A	324	$155,400	$50,349,600
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	52,483	N/A	N/A	N/A	N/A	N/A	N/A	3,896	N/A	$605,438,400

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Roadside Safety Improvements

Current Need	
21,706	Locations

Projected Need (in 2027)	
21,706	Locations

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	21,706	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	21,706	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	5,665	26.10%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	21,706	100.00%
Fair	N/A	N/A
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	16,041	73.90%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$46,090	49.43%
Add New	N/A	N/A

Estimated Costs				
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**
Unfunded Pipelined SHOPP Projects	$496,886,100	SHOPP Performance Gap	$1,104,743,670	**$1,601,629,770**

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	214	N/A	N/A	N/A	N/A	N/A	N/A	191	$68,870	$13,154,170
D2	647	N/A	N/A	N/A	N/A	N/A	N/A	610	$68,870	$42,010,700
D3	1,138	N/A	N/A	N/A	N/A	N/A	N/A	827	$68,870	$56,955,490
D4	3,158	N/A	N/A	N/A	N/A	N/A	N/A	2,571	$68,870	$177,064,770
D5	1,010	N/A	N/A	N/A	N/A	N/A	N/A	758	$68,870	$52,203,460
D6	1,568	N/A	N/A	N/A	N/A	N/A	N/A	1,363	$68,870	$93,869,810
D7	6,190	N/A	N/A	N/A	N/A	N/A	N/A	4,910	$68,870	$338,151,700
D8	2,814	N/A	N/A	N/A	N/A	N/A	N/A	1,000	$68,870	$68,870,000
D9	110	N/A	N/A	N/A	N/A	N/A	N/A	96	$68,870	$6,611,520
D10	664	N/A	N/A	N/A	N/A	N/A	N/A	281	$68,870	$19,352,470
D11	2,263	N/A	N/A	N/A	N/A	N/A	N/A	1,830	$68,870	$126,032,100
D12	1,930	N/A	N/A	N/A	N/A	N/A	N/A	1,604	$68,870	$110,467,480
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	21,706	N/A	N/A	N/A	N/A	N/A	N/A	16,041	N/A	$1,104,743,670

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Safety Improvements

Current Need	
N/A	N/A

Projected Need (in 2027)	
N/A	N/A

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$4,210,000,000**
Unfunded Pipelined SHOPP Projects	$1,570,089,800	SHOPP Performance Gap	$2,639,910,200		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Bridge Health

Current Inventory	
245,756,328	SF

Projected Inventory (in 2027)	
245,756,328	SF

Effective Annual Deterioration Rate		
Into Fair	0.45	% per Year
Into Poor	0.75	% per Year

Current Condition		
Good	184,096,588	74.91%
Fair	53,560,236	21.79%
Poor	8,099,504	3.30%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	175,812,240	71.54%
Fair	57,827,565	23.53%
Poor	12,116,523	4.93%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	17,563,465	7.15%
Fix Poor to Good	4,901,702	1.99%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	205,206,534	83.50%
Fair	36,863,449	15.00%
Poor	3,686,345	1.50%

Performance Gap for the Last 5 Years		
Fix Fair to Good	5,829,933	2.37%
Fix Poor to Good	3,590,027	1.46%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$260	32.31%
Fix Poor to Good	$380	27.11%
Add New	$500	27.00%

Estimated Costs				
Unfunded Pipelined Maintenance Work	$102,279,000	Maintenance Performance Gap	$559,673,568	**Total**
Unfunded Pipelined SHOPP Projects	$2,302,570,000	SHOPP Performance Gap	$3,182,138,398	**$6,146,660,966**

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	5,472,154	$635	$3,474,817,790	0	$635	-210,677	$344	-3,086	$483	$0
D2	5,657,505	$635	$3,592,515,675	0	$635	200,791	$344	116,294	$483	$125,242,106
D3	23,052,228	$635	$14,638,164,780	0	$635	141,017	$344	177,547	$483	$134,265,049
D4	53,117,342	$635	$33,729,512,170	0	$635	4,329,213	$344	967,548	$483	$1,956,574,956
D5	7,567,834	$635	$4,805,574,590	0	$635	-30,521	$344	30,807	$483	$14,879,781
D6	10,932,062	$635	$6,941,859,370	0	$635	-5,025	$344	203,038	$483	$98,067,354
D7	63,052,408	$635	$40,038,279,080	0	$635	-683,632	$344	458,977	$483	$221,685,891
D8	21,442,324	$635	$13,615,875,740	0	$635	-247,015	$344	-54,466	$483	$0
D9	984,611	$635	$625,227,985	0	$635	-52,865	$344	-3,999	$483	$0
D10	9,398,629	$635	$5,968,129,415	0	$635	355,640	$344	926,457	$483	$569,818,891
D11	25,492,125	$635	$16,187,499,375	0	$635	803,272	$344	312,820	$483	$427,417,628
D12	19,587,106	$635	$12,437,812,310	0	$635	-1,199,547	$344	396,539	$483	$191,528,337
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	245,756,328	N/A	$156,055,268,280	0	N/A	5,829,933	N/A	3,590,027	N/A	$3,739,479,993

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Drainage Pump Plants

Current Inventory	
290	Locations

Projected Inventory (in 2027)	
290	Locations

Effective Annual Deterioration Rate		
Into Fair	2.57	% per Year
Into Poor	2.71	% per Year

Current Condition		
Good	70	24.14%
Fair	85	29.31%
Poor	135	46.55%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	52	17.93%
Fair	80	27.59%
Poor	158	54.48%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	2	0.69%
Fix Poor to Good	44	15.17%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	232	80.00%
Fair	58	20.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	25	8.62%
Fix Poor to Good	114	39.31%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$580,000	50.00%
Fix Poor to Good	$580,000	50.00%
Add New	$580,000	50.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$164,925,000**
Unfunded Pipelined SHOPP Projects	$43,995,000	SHOPP Performance Gap	$120,930,000		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	0	$870,000	$0	0	$870,000	0	$870,000	0	$870,000	$0
D2	0	$870,000	$0	0	$870,000	0	$870,000	0	$870,000	$0
D3	43	$870,000	$37,410,000	0	$870,000	9	$870,000	20	$870,000	$25,230,000
D4	71	$870,000	$61,770,000	0	$870,000	3	$870,000	31	$870,000	$29,580,000
D5	10	$870,000	$8,700,000	0	$870,000	1	$870,000	6	$870,000	$6,090,000
D6	73	$870,000	$63,510,000	0	$870,000	10	$870,000	13	$870,000	$20,010,000
D7	52	$870,000	$45,240,000	0	$870,000	-4	$870,000	34	$870,000	$29,580,000
D8	2	$870,000	$1,740,000	0	$870,000	1	$870,000	0	$870,000	$870,000
D9	0	$870,000	$0	0	$870,000	0	$870,000	0	$870,000	$0
D10	21	$870,000	$18,270,000	0	$870,000	-1	$870,000	2	$870,000	$1,740,000
D11	5	$870,000	$4,350,000	0	$870,000	1	$870,000	0	$870,000	$870,000
D12	13	$870,000	$11,310,000	0	$870,000	0	$870,000	8	$870,000	$6,960,000
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	290	N/A	$252,300,000	0	N/A	25	N/A	114	N/A	$120,930,000

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Drainage System Restoration

Current Inventory	
10,647,970	Linear Feet

Projected Inventory (in 2027)	
20,274,500	Linear Feet

Effective Annual Deterioration Rate		
Into Fair	2.00	% per Year
Into Poor	2.00	% per Year

Current Condition		
Good	6,923,197	65.02%
Fair	2,499,915	23.48%
Poor	1,224,858	11.50%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	10,545,812	52.02%
Fair	6,444,466	31.79%
Poor	3,284,222	16.20%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	7,867	0.07%
Fix Poor to Good	124,033	1.16%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	16,219,598	80.00%
Fair	2,027,451	10.00%
Poor	2,027,451	10.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	4,409,148	41.41%
Fix Poor to Good	1,132,738	10.64%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$300	86.00%
Fix Poor to Good	$1,300	53.85%
Add New	$1,300	53.85%

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$2,460,304,584	**Total**	**$5,027,201,584**
Unfunded Pipelined SHOPP Projects	$301,421,000	SHOPP Performance Gap	$2,265,476,000		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	1,180,715	$2,000	$2,361,430,000	0	$2,000	287,641	$558	110,595	$2,000	$381,693,678
D2	1,756,533	$2,000	$3,513,066,000	0	$2,000	349,712	$558	24,881	$2,000	$244,901,296
D3	1,444,956	$2,000	$2,889,912,000	0	$2,000	362,362	$558	194,162	$2,000	$590,521,996
D4	1,784,772	$2,000	$3,569,544,000	0	$2,000	386,437	$558	42,164	$2,000	$299,959,846
D5	2,443,680	$2,000	$4,887,360,000	0	$2,000	511,855	$558	157,177	$2,000	$599,969,090
D6	2,991,424	$2,000	$5,982,848,000	0	$2,000	774,052	$558	309,490	$2,000	$1,050,901,016
D7	920,689	$2,000	$1,841,378,000	0	$2,000	180,257	$558	51,709	$2,000	$204,001,406
D8	1,876,811	$2,000	$3,753,622,000	0	$2,000	360,810	$558	57,905	$2,000	$317,141,980
D9	969,197	$2,000	$1,938,394,000	0	$2,000	183,318	$558	12,919	$2,000	$128,129,444
D10	1,215,005	$2,000	$2,430,010,000	0	$2,000	271,524	$558	63,712	$2,000	$278,934,392
D11	2,935,378	$2,000	$5,870,756,000	0	$2,000	599,546	$558	86,140	$2,000	$506,826,668
D12	755,338	$2,000	$1,510,676,000	0	$2,000	141,634	$558	21,884	$2,000	$122,799,772
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	20,274,500	N/A	$40,548,996,000	0	N/A	4,409,148	N/A	1,132,738	N/A	$4,725,780,584

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Lighting Rehabilitation

Current Inventory	
89,829	Each

Projected Inventory (in 2027)	
89,829	Each

Effective Annual Deterioration Rate		
Into Fair	1.79	% per Year
Into Poor	5.26	% per Year

Current Condition		
Good	36,118	40.21%
Fair	12,481	13.89%
Poor	41,230	45.90%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	29,653	33.01%
Fair	12,380	13.78%
Poor	47,796	53.21%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	0	0.00%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	0	0.00%
Fair	89,829	100.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	0	0.00%
Fix Poor to Good	47,796	53.21%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$8,400	50.00%
Fix Poor to Good	$8,400	50.00%
Add New	$8,400	50.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$602,229,600**
Unfunded Pipelined SHOPP Projects	$0	SHOPP Performance Gap	$602,229,600		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	1,339	$12,600	$16,871,400	0	$12,600	-1,205	$12,600	804	$12,600	$10,130,400
D2	2,087	$12,600	$26,296,200	0	$12,600	-1,736	$12,600	702	$12,600	$8,845,200
D3	6,719	$12,600	$84,659,400	0	$12,600	-5,661	$12,600	2,606	$12,600	$32,835,600
D4	21,662	$12,600	$272,941,200	0	$12,600	-19,062	$12,600	13,047	$12,600	$164,392,200
D5	2,864	$12,600	$36,086,400	0	$12,600	-2,497	$12,600	1,572	$12,600	$19,807,200
D6	5,140	$12,600	$64,764,000	0	$12,600	-4,447	$12,600	2,121	$12,600	$26,724,600
D7	24,542	$12,600	$309,229,200	0	$12,600	-22,242	$12,600	16,802	$12,600	$211,705,200
D8	6,951	$12,600	$87,582,600	0	$12,600	-5,916	$12,600	2,682	$12,600	$33,793,200
D9	441	$12,600	$5,556,600	0	$12,600	-375	$12,600	207	$12,600	$2,608,200
D10	2,635	$12,600	$33,201,000	0	$12,600	-2,370	$12,600	1,535	$12,600	$19,341,000
D11	6,574	$12,600	$82,832,400	0	$12,600	-4,600	$12,600	1,746	$12,600	$21,999,600
D12	8,875	$12,600	$111,825,000	0	$12,600	-7,338	$12,600	3,972	$12,600	$50,047,200
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	89,829	N/A	$1,131,845,400	0	N/A	0	N/A	47,796	N/A	$602,229,600

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Major Damage (Emergency Opening)

Current Need	
N/A	N/A

Projected Need (in 2027)	
N/A	N/A

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$1,525,000,000**
Unfunded Pipelined SHOPP Projects	$420,000,000	SHOPP Performance Gap	$1,105,000,000		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Major Damage (Permanent Restoration)

Current Need	
N/A	N/A

Projected Need (in 2027)	
N/A	N/A

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$1,334,930,000**
Unfunded Pipelined SHOPP Projects	$530,930,000	SHOPP Performance Gap	$804,000,000		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Office Buildings

Current Inventory	
2,778,299	SF

Projected Inventory (in 2027)	
2,778,299	SF

Effective Annual Deterioration Rate		
Into Fair	3.09	% per Year
Into Poor	0.29	% per Year

Current Condition		
Good	1,163,096	41.86%
Fair	877,944	31.60%
Poor	737,259	26.54%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	803,480	28.92%
Fair	1,212,174	43.63%
Poor	762,645	27.45%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	0	0.00%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	1,666,980	60.00%
Fair	1,111,319	40.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	651,600	23.45%
Fix Poor to Good	762,645	27.45%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$13	0.00%
Fix Poor to Good	$633	0.00%
Add New	$633	0.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$491,225,085**
Unfunded Pipelined SHOPP Projects	$0	SHOPP Performance Gap	$491,225,085		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	91,456	$769	$70,329,664	0	$769	-32,406	$60	0	$769	$0
D2	47,851	$769	$36,797,419	0	$769	-19,140	$60	47,851	$769	$36,797,419
D3	0	$769	$0	0	$769	0	$60	0	$769	$0
D4	750,000	$652	$489,000,000	0	$652	450,000	$13	0	$652	$5,850,000
D5	41,700	$918	$38,280,600	0	$918	-16,680	$13	41,700	$918	$38,280,600
D6	78,000	$996	$77,688,000	0	$996	-31,200	$13	78,000	$996	$77,688,000
D7	716,200	$652	$466,962,400	0	$652	-286,480	$13	0	$652	$0
D8	336,000	$652	$219,072,000	0	$652	201,600	$13	0	$652	$2,620,800
D9	37,496	$1,736	$65,093,056	0	$1,736	-14,998	$13	37,496	$1,736	$65,093,056
D10	91,174	$716	$65,280,584	0	$716	-36,470	$13	91,174	$716	$65,280,584
D11	0	$652	$0	0	$652	0	$13	0	$652	$0
D12	0	$652	$0	0	$652	0	$13	0	$652	$0
HQ	588,422	$428	$251,844,616	0	$428	-113,371	$9	466,424	$428	$199,629,472
Statewide Totals	2,778,299	N/A	$1,780,348,339	0	N/A	651,600	N/A	762,645	N/A	$491,239,931

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(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Overhead Sign Structures Rehabilitation

Current Inventory	
16,470	Each

Projected Inventory (in 2027)	
16,470	Each

Effective Annual Deterioration Rate		
Into Fair	1.79	% per Year
Into Poor	5.26	% per Year

Current Condition		
Good	12,266	74.47%
Fair	3,584	21.76%
Poor	620	3.76%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	10,069	61.14%
Fair	3,896	23.66%
Poor	2,505	15.21%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	0	0.00%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	0	0.00%
Fair	16,470	100.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	0	0.00%
Fix Poor to Good	2,505	15.21%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$120,000	60.00%
Fix Poor to Good	$120,000	60.00%
Add New	$120,000	60.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$480,960,000**
Unfunded Pipelined SHOPP Projects	$0	SHOPP Performance Gap	$480,960,000		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	74	$192,000	$14,208,000	0	$192,000	-61	$192,000	0	$192,000	$0
D2	117	$192,000	$22,464,000	0	$192,000	-96	$192,000	0	$192,000	$0
D3	1,259	$192,000	$241,728,000	0	$192,000	-1,008	$192,000	62	$192,000	$11,904,000
D4	3,121	$192,000	$599,232,000	0	$192,000	-2,454	$192,000	231	$192,000	$44,352,000
D5	236	$192,000	$45,312,000	0	$192,000	-182	$192,000	24	$192,000	$4,608,000
D6	1,095	$192,000	$210,240,000	0	$192,000	-861	$192,000	78	$192,000	$14,976,000
D7	4,559	$192,000	$875,328,000	0	$192,000	-3,385	$192,000	1,264	$192,000	$242,688,000
D8	1,730	$192,000	$332,160,000	0	$192,000	-1,281	$192,000	308	$192,000	$59,136,000
D9	10	$192,000	$1,920,000	0	$192,000	-8	$192,000	0	$192,000	$0
D10	482	$192,000	$92,544,000	0	$192,000	-377	$192,000	44	$192,000	$8,448,000
D11	2,228	$192,000	$427,776,000	0	$192,000	-1,691	$192,000	280	$192,000	$53,760,000
D12	1,559	$192,000	$299,328,000	0	$192,000	-1,170	$192,000	214	$192,000	$41,088,000
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	16,470	N/A	$3,162,240,000	0	N/A	0	N/A	2,505	N/A	$480,960,000

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Pavement Class I

Current Inventory	
26,014	Lane Miles

Projected Inventory (in 2027)	
26,014	Lane Miles

Effective Annual Deterioration Rate		
Into Fair	9.00	% per Year
Into Poor	2.68	% per Year

Current Condition		
Good	11,726	45.08%
Fair	13,148	50.54%
Poor	1,140	4.38%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	1,178	4.53%
Fair	20,175	77.55%
Poor	4,661	17.92%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	5,855	22.51%
Fix Poor to Good	669	2.57%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	15,609	60.00%
Fair	10,145	39.00%
Poor	260	1.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	4,598	17.68%
Fix Poor to Good	3,732	14.35%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$707,872	15.04%
Fix Poor to Good	$1,167,412	20.00%
Add New	$1,103,000	20.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$67,866,480	**Total**	**$12,619,824,725**
Unfunded Pipelined SHOPP Projects	$3,647,432,450	SHOPP Performance Gap	$8,904,525,795		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	1,063	$1,323,600	$1,406,986,800	0	$1,323,600	415	$891,152	68	$1,155,600	$448,408,880
D2	934	$1,323,600	$1,236,242,400	0	$1,323,600	343	$990,328	91	$1,016,400	$432,174,904
D3	1,792	$1,323,600	$2,371,891,200	0	$1,323,600	652	$994,376	75	$1,274,400	$743,913,152
D4	3,470	$1,323,600	$4,592,892,000	0	$1,323,600	73	$481,292	1,004	$1,363,200	$1,403,787,116
D5	1,170	$1,323,600	$1,548,612,000	0	$1,323,600	440	$868,888	43	$1,188,000	$433,394,720
D6	2,100	$1,323,600	$2,779,560,000	0	$1,323,600	370	$824,360	327	$1,236,000	$709,185,200
D7	4,424	$1,323,600	$5,855,606,400	0	$1,323,600	-423	$412,476	759	$1,662,000	$1,261,458,000
D8	4,212	$1,323,600	$5,575,003,200	0	$1,323,600	368	$714,052	747	$1,254,000	$1,199,509,136
D9	1,435	$1,323,600	$1,899,366,000	0	$1,323,600	705	$699,884	51	$1,178,400	$553,516,620
D10	1,303	$1,323,600	$1,724,650,800	0	$1,323,600	273	$915,440	110	$1,257,600	$388,251,120
D11	2,741	$1,323,600	$3,627,987,600	0	$1,323,600	718	$684,704	171	$1,758,000	$792,235,472
D12	1,370	$1,323,600	$1,813,332,000	0	$1,323,600	241	$689,764	286	$1,539,600	$606,558,724
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	26,014	N/A	$34,432,130,400	0	N/A	4,598	N/A	3,732	N/A	$8,972,393,044

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Pavement Class II

Current Inventory	
16,759	Lane Miles

Projected Inventory (in 2027)	
16,759	Lane Miles

Effective Annual Deterioration Rate		
Into Fair	8.78	% per Year
Into Poor	3.37	% per Year

Current Condition		
Good	5,967	35.60%
Fair	9,657	57.62%
Poor	1,135	6.77%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	730	4.36%
Fair	11,635	69.43%
Poor	4,394	26.22%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	2,809	16.76%
Fix Poor to Good	290	1.73%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	9,215	55.00%
Fair	7,207	43.00%
Poor	337	2.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	2,118	12.64%
Fix Poor to Good	3,767	22.48%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$253,274	15.31%
Fix Poor to Good	$612,184	20.00%
Add New	$595,000	20.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$91,179,900	**Total**	**$5,061,673,301**
Unfunded Pipelined SHOPP Projects	$1,675,788,481	SHOPP Performance Gap	$3,294,704,920		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	732	$714,000	$522,648,000	0	$714,000	160	$282,250	129	$600,000	$122,560,000
D2	1,886	$714,000	$1,346,604,000	0	$714,000	420	$282,250	243	$600,000	$264,345,000
D3	1,848	$714,000	$1,319,472,000	0	$714,000	366	$301,237	299	$904,800	$380,787,942
D4	2,078	$714,000	$1,483,692,000	0	$714,000	-179	$291,519	876	$748,800	$655,948,800
D5	1,374	$714,000	$981,036,000	0	$714,000	77	$284,642	273	$638,400	$196,200,634
D6	1,536	$714,000	$1,096,704,000	0	$714,000	405	$308,712	264	$1,024,800	$395,575,560
D7	1,586	$714,000	$1,132,404,000	0	$714,000	-280	$290,398	512	$730,800	$374,169,600
D8	1,947	$714,000	$1,390,158,000	0	$714,000	103	$283,446	407	$619,200	$281,209,338
D9	627	$714,000	$447,678,000	0	$714,000	252	$282,250	13	$600,000	$78,927,000
D10	1,589	$714,000	$1,134,546,000	0	$714,000	123	$292,939	348	$771,600	$304,548,297
D11	1,041	$714,000	$743,274,000	0	$714,000	212	$289,202	247	$711,600	$237,076,024
D12	515	$714,000	$367,710,000	0	$714,000	-40	$282,624	156	$606,000	$94,536,000
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	16,759	N/A	$11,965,926,000	0	N/A	2,118	N/A	3,767	N/A	$3,385,884,195

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Pavement Class III

Current Inventory	
6,871	Lane Miles

Projected Inventory (in 2027)	
6,871	Lane Miles

Effective Annual Deterioration Rate		
Into Fair	9.00	% per Year
Into Poor	4.34	% per Year

Current Condition		
Good	2,580	37.55%
Fair	3,734	54.34%
Poor	557	8.11%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	259	3.77%
Fair	4,435	64.55%
Poor	2,177	31.68%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	228	3.32%
Fix Poor to Good	22	0.32%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	3,092	45.00%
Fair	3,641	53.00%
Poor	138	2.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	754	10.97%
Fix Poor to Good	2,017	29.36%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$107,000	16.68%
Fix Poor to Good	$400,000	20.00%
Add New	$400,000	20.00%

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$74,193,600	**Total**	**$1,259,455,970**
Unfunded Pipelined SHOPP Projects	$197,159,070	SHOPP Performance Gap	$988,103,300		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	546	$480,000	$262,080,000	0	$480,000	7	$124,850	223	$480,000	$107,913,950
D2	1,181	$480,000	$566,880,000	0	$480,000	200	$124,850	219	$480,000	$130,090,000
D3	699	$480,000	$335,520,000	0	$480,000	19	$124,850	272	$480,000	$132,932,150
D4	366	$480,000	$175,680,000	0	$480,000	-98	$124,850	246	$480,000	$118,080,000
D5	646	$480,000	$310,080,000	0	$480,000	23	$124,850	251	$480,000	$123,351,550
D6	1,399	$480,000	$671,520,000	0	$480,000	146	$124,850	407	$480,000	$213,588,100
D7	247	$480,000	$118,560,000	0	$480,000	-90	$124,850	158	$480,000	$75,840,000
D8	411	$480,000	$197,280,000	0	$480,000	55	$124,850	71	$480,000	$40,946,750
D9	420	$480,000	$201,600,000	0	$480,000	148	$124,850	19	$480,000	$27,597,800
D10	581	$480,000	$278,880,000	0	$480,000	45	$124,850	116	$480,000	$61,298,250
D11	375	$480,000	$180,000,000	0	$480,000	111	$124,850	35	$480,000	$30,658,350
D12	0	$480,000	$0	0	$480,000	0	$124,850	0	$480,000	$0
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	6,871	N/A	$3,298,080,000	0	N/A	754	N/A	2,017	N/A	$1,062,296,900

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Relinquishments

Current Need	
N/A	N/A

Projected Need (in 2027)	
N/A	N/A

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$28,600,000**
Unfunded Pipelined SHOPP Projects	$15,600,000	SHOPP Performance Gap	$13,000,000		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Roadway Protective Betterments

Current Need	
91	Locations

Projected Need (in 2027)	
91	Locations

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	91	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	91	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	19	20.88%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	91	100.00%
Fair	N/A	N/A
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	72	79.12%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$3,369,000	47.82%
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$466,628,000**
Unfunded Pipelined SHOPP Projects	$108,068,000	SHOPP Performance Gap	$358,560,000		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	1	N/A	N/A	N/A	N/A	N/A	N/A	0	$4,980,000	$0
D2	5	N/A	N/A	N/A	N/A	N/A	N/A	2	$4,980,000	$9,960,000
D3	7	N/A	N/A	N/A	N/A	N/A	N/A	2	$4,980,000	$9,960,000
D4	43	N/A	N/A	N/A	N/A	N/A	N/A	43	$4,980,000	$214,140,000
D5	9	N/A	N/A	N/A	N/A	N/A	N/A	6	$4,980,000	$29,880,000
D6	2	N/A	N/A	N/A	N/A	N/A	N/A	1	$4,980,000	$4,980,000
D7	9	N/A	N/A	N/A	N/A	N/A	N/A	8	$4,980,000	$39,840,000
D8	11	N/A	N/A	N/A	N/A	N/A	N/A	10	$4,980,000	$49,800,000
D9	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$4,980,000	$0
D10	4	N/A	N/A	N/A	N/A	N/A	N/A	0	$4,980,000	$0
D11	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$4,980,000	$0
D12	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$4,980,000	$0
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	91	N/A	N/A	N/A	N/A	N/A	N/A	72	N/A	$358,560,000

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Safety Roadside Rest Area (SRRA) Rehabilitation

Current Inventory	
86	Locations

Projected Inventory (in 2027)	
86	Locations

Effective Annual Deterioration Rate		
Into Fair	6.79	% per Year
Into Poor	20.00	% per Year

Current Condition		
Good	28	32.56%
Fair	33	38.37%
Poor	25	29.07%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	9	10.47%
Fair	19	22.09%
Poor	58	67.44%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	8	9.30%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	77	80.00%
Fair	20	20.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	4	4.65%
Fix Poor to Good	50	58.14%
Add New	11	12.79%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$7,840,000	104.08%
Fix Poor to Good	$7,840,000	104.08%
Add New	$18,000,000	43.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$1,192,140,000**
Unfunded Pipelined SHOPP Projects	$45,000,000	SHOPP Performance Gap	$1,147,140,000		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	6	$25,740,000	$154,440,000	0	$25,740,000	-1	$16,000,000	6	$16,000,000	$96,000,000
D2	20	$25,740,000	$514,800,000	0	$25,740,000	0	$16,000,000	14	$16,000,000	$224,000,000
D3	11	$25,740,000	$283,140,000	0	$25,740,000	1	$16,000,000	7	$16,000,000	$128,000,000
D4	3	$25,740,000	$77,220,000	0	$25,740,000	1	$16,000,000	0	$16,000,000	$16,000,000
D5	5	$25,740,000	$128,700,000	0	$25,740,000	1	$16,000,000	2	$16,000,000	$48,000,000
D6	10	$25,740,000	$257,400,000	4	$25,740,000	0	$16,000,000	5	$16,000,000	$182,960,000
D7	0	$25,740,000	$0	0	$25,740,000	0	$16,000,000	0	$16,000,000	$0
D8	15	$25,740,000	$386,100,000	4	$25,740,000	-2	$16,000,000	8	$16,000,000	$230,960,000
D9	4	$25,740,000	$102,960,000	0	$25,740,000	-1	$16,000,000	4	$16,000,000	$64,000,000
D10	6	$25,740,000	$154,440,000	1	$25,740,000	-1	$16,000,000	2	$16,000,000	$57,740,000
D11	6	$25,740,000	$154,440,000	2	$25,740,000	1	$16,000,000	2	$16,000,000	$99,480,000
D12	0	$25,740,000	$0	0	$25,740,000	0	$16,000,000	0	$16,000,000	$0
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	86	N/A	$2,213,640,000	11	N/A	4	N/A	50	N/A	$1,147,140,000

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Transportation Related Facilities

Current Inventory	
3,986,339	SF

Projected Inventory (in 2027)	
4,083,722	SF

Effective Annual Deterioration Rate		
Into Fair	5.00	% per Year
Into Poor	5.00	% per Year

Current Condition		
Good	843,614	21.16%
Fair	600,776	15.07%
Poor	2,541,949	63.77%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	519,187	12.71%
Fair	722,196	17.68%
Poor	2,842,339	69.60%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	15,927	0.40%
Add New	97,383	2.44%

Target Condition (in 2027) - Goal		
Good or New	2,450,232	60.00%
Fair	1,633,490	40.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	1,134	0.03%
Fix Poor to Good	2,826,412	70.90%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$450	78.00%
Fix Poor to Good	$450	78.00%
Add New	$450	78.00%

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$2,387,042,346**
Unfunded Pipelined SHOPP Projects	$122,178,000	SHOPP Performance Gap	$2,264,864,346		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	200,772	$801	$160,818,372	0	$801	-69,938	$801	190,401	$801	$152,511,201
D2	364,294	$801	$291,799,494	0	$801	-94,731	$801	277,040	$801	$221,909,040
D3	491,952	$801	$394,053,552	0	$801	-146,810	$801	414,255	$801	$331,818,255
D4	485,907	$801	$389,211,507	0	$801	-133,296	$801	389,470	$801	$311,965,470
D5	173,263	$801	$138,783,663	0	$801	-51,517	$801	150,893	$801	$120,865,293
D6	284,717	$801	$228,058,317	0	$801	-68,351	$801	204,999	$801	$164,204,199
D7	596,261	$801	$477,605,061	0	$801	-69,952	$801	235,632	$801	$188,741,232
D8	398,480	$801	$319,182,480	0	$801	-76,826	$801	212,948	$801	$170,571,348
D9	156,429	$801	$125,299,629	0	$801	-29,332	$801	120,539	$801	$96,551,739
D10	246,213	$801	$197,216,613	0	$801	-67,335	$801	202,865	$801	$162,494,865
D11	216,712	$801	$173,586,312	0	$801	-6,851	$801	136,878	$801	$109,639,278
D12	212,500	$801	$170,212,500	0	$801	1,134	$801	44,270	$801	$36,368,604
HQ	256,222	$801	$205,233,822	0	$801	-97,489	$801	246,222	$801	$197,223,822
Statewide Totals	4,083,722	N/A	$3,271,061,322	0	N/A	1,134	N/A	2,826,412	N/A	$2,264,864,346

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Water and Wastewater Treatment at SRRAs

Current Inventory	
45	Locations

Projected Inventory (in 2027)	
45	Locations

Effective Annual Deterioration Rate		
Into Fair	6.92	% per Year
Into Poor	20.00	% per Year

Current Condition		
Good	13	28.89%
Fair	6	13.33%
Poor	26	57.78%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	4	8.89%
Fair	9	20.00%
Poor	32	71.11%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	24	53.33%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	35	80.00%
Fair	10	20.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	2	4.44%
Fix Poor to Good	8	17.78%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$1,826,510	60.00%
Fix Poor to Good	$1,826,510	60.00%
Add New	$1,826,510	60.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$95,577,160**
Unfunded Pipelined SHOPP Projects	$66,353,000	SHOPP Performance Gap	$29,224,160		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	3	$2,922,416	$8,767,248	0	$2,922,416	-1	$2,922,416	0	$2,922,416	$0
D2	15	$2,922,416	$43,836,240	0	$2,922,416	0	$2,922,416	3	$2,922,416	$8,767,248
D3	4	$2,922,416	$11,689,664	0	$2,922,416	-1	$2,922,416	0	$2,922,416	$0
D4	0	$2,922,416	$0	0	$2,922,416	0	$2,922,416	0	$2,922,416	$0
D5	4	$2,922,416	$11,689,664	0	$2,922,416	-1	$2,922,416	0	$2,922,416	$0
D6	6	$2,922,416	$17,534,496	0	$2,922,416	0	$2,922,416	0	$2,922,416	$0
D7	0	$2,922,416	$0	0	$2,922,416	0	$2,922,416	0	$2,922,416	$0
D8	9	$2,922,416	$26,301,744	0	$2,922,416	1	$2,922,416	4	$2,922,416	$14,612,080
D9	3	$2,922,416	$8,767,248	0	$2,922,416	0	$2,922,416	1	$2,922,416	$2,922,416
D10	0	$2,922,416	$0	0	$2,922,416	0	$2,922,416	0	$2,922,416	$0
D11	1	$2,922,416	$2,922,416	0	$2,922,416	1	$2,922,416	0	$2,922,416	$2,922,416
D12	0	$2,922,416	$0	0	$2,922,416	0	$2,922,416	0	$2,922,416	$0
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	45	N/A	$131,508,720	0	N/A	2	N/A	8	N/A	$29,224,160

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ADA Pedestrian Infrastructure

Current Need	
208,216	Locations

Projected Need (in 2027)	
208,216	Locations

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	208,216	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	208,216	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	11,209	5.38%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	52,054	25.00%
Fair	N/A	N/A
Poor	156,162	75.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	41,043	19.71%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$7,500	100.00%
Add New	N/A	N/A

Estimated Costs				
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**
Unfunded Pipelined SHOPP Projects	$356,299,000	SHOPP Performance Gap	$615,645,000	**$971,944,000**

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	5,460	N/A	N/A	N/A	N/A	N/A	N/A	1,228	$15,000	$18,420,000
D2	8,180	N/A	N/A	N/A	N/A	N/A	N/A	1,787	$15,000	$26,805,000
D3	18,140	N/A	N/A	N/A	N/A	N/A	N/A	-198	$15,000	$0
D4	48,720	N/A	N/A	N/A	N/A	N/A	N/A	11,359	$15,000	$170,385,000
D5	12,127	N/A	N/A	N/A	N/A	N/A	N/A	2,659	$15,000	$39,885,000
D6	19,494	N/A	N/A	N/A	N/A	N/A	N/A	3,427	$15,000	$51,405,000
D7	36,900	N/A	N/A	N/A	N/A	N/A	N/A	8,248	$15,000	$123,720,000
D8	21,044	N/A	N/A	N/A	N/A	N/A	N/A	4,606	$15,000	$69,090,000
D9	1,741	N/A	N/A	N/A	N/A	N/A	N/A	196	$15,000	$2,940,000
D10	10,600	N/A	N/A	N/A	N/A	N/A	N/A	1,842	$15,000	$27,630,000
D11	12,567	N/A	N/A	N/A	N/A	N/A	N/A	2,679	$15,000	$40,185,000
D12	13,243	N/A	N/A	N/A	N/A	N/A	N/A	3,012	$15,000	$45,180,000
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	208,216	N/A	N/A	N/A	N/A	N/A	N/A	41,043	N/A	$615,645,000

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Advance Mitigation

Current Need	
N/A	N/A

Projected Need (in 2027)	
N/A	N/A

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$300,000,000**
Unfunded Pipelined SHOPP Projects	$40,000,000	SHOPP Performance Gap	$260,000,000		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Bridge Scour Mitigation

Current Need	
1,396,094	SF

Projected Need (in 2027)	
2,423,621	SF

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	1,396,094	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	2,423,621	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	1,074,593	76.97%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	2,181,259	90.00%
Fair	N/A	N/A
Poor	242,362	10.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	1,106,666	79.27%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$400	46.00%
Add New	N/A	N/A

Estimated Costs				
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**
Unfunded Pipelined SHOPP Projects	$201,143,000	SHOPP Performance Gap	$646,292,944	**$847,435,944**

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	166,431	N/A	N/A	N/A	N/A	N/A	N/A	116,474	$584	$68,020,816
D2	47,503	N/A	N/A	N/A	N/A	N/A	N/A	42,753	$584	$24,967,752
D3	753,353	N/A	N/A	N/A	N/A	N/A	N/A	303,122	$584	$177,023,248
D4	125,873	N/A	N/A	N/A	N/A	N/A	N/A	92,802	$584	$54,196,368
D5	215,680	N/A	N/A	N/A	N/A	N/A	N/A	125,438	$584	$73,255,792
D6	91,071	N/A	N/A	N/A	N/A	N/A	N/A	14,377	$584	$8,396,168
D7	284,999	N/A	N/A	N/A	N/A	N/A	N/A	164,468	$584	$96,049,312
D8	476,397	N/A	N/A	N/A	N/A	N/A	N/A	77,047	$584	$44,995,448
D9	10,507	N/A	N/A	N/A	N/A	N/A	N/A	9,456	$584	$5,522,304
D10	52,559	N/A	N/A	N/A	N/A	N/A	N/A	44,483	$584	$25,978,072
D11	20,681	N/A	N/A	N/A	N/A	N/A	N/A	16,815	$584	$9,819,960
D12	178,567	N/A	N/A	N/A	N/A	N/A	N/A	99,431	$584	$58,067,704
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	2,423,621	N/A	N/A	N/A	N/A	N/A	N/A	1,106,666	N/A	$646,292,944

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(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Bridge Seismic Restoration

Current Need	
15,813,181	SF

Projected Need (in 2027)	
18,369,006	SF

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	15,813,181	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	18,369,006	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	3,832,374	24.24%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	12,858,302	70.00%
Fair	N/A	N/A
Poor	5,510,704	30.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	9,174,565	58.02%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$200	43.00%
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$3,089,220,690**
Unfunded Pipelined SHOPP Projects	$465,295,100	SHOPP Performance Gap	$2,623,925,590		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	976,895	N/A	N/A	N/A	N/A	N/A	N/A	208,783	$286	$59,711,938
D2	689,309	N/A	N/A	N/A	N/A	N/A	N/A	482,516	$286	$137,999,576
D3	733,283	N/A	N/A	N/A	N/A	N/A	N/A	155,915	$286	$44,591,690
D4	5,136,395	N/A	N/A	N/A	N/A	N/A	N/A	3,401,736	$286	$972,896,496
D5	441,349	N/A	N/A	N/A	N/A	N/A	N/A	74,872	$286	$21,413,392
D6	217,223	N/A	N/A	N/A	N/A	N/A	N/A	-39,229	$286	$0
D7	6,930,259	N/A	N/A	N/A	N/A	N/A	N/A	4,004,960	$286	$1,145,418,560
D8	1,294,146	N/A	N/A	N/A	N/A	N/A	N/A	605,536	$286	$173,183,296
D9	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$286	$0
D10	1,049,231	N/A	N/A	N/A	N/A	N/A	N/A	-107,275	$286	$0
D11	480,911	N/A	N/A	N/A	N/A	N/A	N/A	240,247	$286	$68,710,642
D12	420,005	N/A	N/A	N/A	N/A	N/A	N/A	-2,133	$286	$0
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	18,369,006	N/A	N/A	N/A	N/A	N/A	N/A	9,174,565	N/A	$2,623,925,590

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Hazardous Waste Mitigation

Current Need	
N/A	N/A

Projected Need (in 2027)	
N/A	N/A

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	N/A	N/A
Fair	N/A	N/A
Poor	N/A	N/A

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	N/A	N/A
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$5,074,000**
Unfunded Pipelined SHOPP Projects	$5,074,000	SHOPP Performance Gap	$0		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Roadside Rehabilitation

Current Inventory	
29,817	Acre

Projected Inventory (in 2027)	
30,417	Acre

Effective Annual Deterioration Rate		
Into Fair	3.87	% per Year
Into Poor	5.83	% per Year

Current Condition		
Good	6,256	20.98%
Fair	10,273	34.45%
Poor	13,288	44.57%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	3,838	12.62%
Fair	7,297	23.99%
Poor	19,282	63.39%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	589	1.98%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	18,248	60.00%
Fair	9,126	30.00%
Poor	3,043	10.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	324	1.09%
Fix Poor to Good	15,651	52.49%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$82,000	48.00%
Fix Poor to Good	$82,000	48.00%
Add New	$82,000	48.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$2,025,242,000**
Unfunded Pipelined SHOPP Projects	$86,516,000	SHOPP Performance Gap	$1,938,726,000		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	85	$121,360	$10,315,600	0	$121,360	-26	$121,360	8	$121,360	$970,880
D2	371	$121,360	$45,024,560	0	$121,360	-111	$121,360	54	$121,360	$6,553,440
D3	1,423	$121,360	$172,695,280	0	$121,360	61	$121,360	672	$121,360	$88,956,880
D4	4,446	$121,360	$539,566,560	0	$121,360	189	$121,360	1,757	$121,360	$236,166,560
D5	1,020	$121,360	$123,787,200	0	$121,360	-7	$121,360	499	$121,360	$60,558,640
D6	2,116	$121,360	$256,797,760	0	$121,360	-14	$121,360	1,056	$121,360	$128,156,160
D7	9,669	$121,360	$1,173,429,840	0	$121,360	-1,485	$121,360	6,518	$121,360	$791,024,480
D8	3,100	$121,360	$376,216,000	0	$121,360	-21	$121,360	1,041	$121,360	$126,335,760
D9	11	$121,360	$1,334,960	0	$121,360	8	$121,360	-1	$121,360	$970,880
D10	726	$121,360	$88,107,360	0	$121,360	66	$121,360	248	$121,360	$38,107,040
D11	4,496	$121,360	$545,634,560	0	$121,360	-470	$121,360	2,641	$121,360	$320,511,760
D12	2,954	$121,360	$358,497,440	0	$121,360	-19	$121,360	1,157	$121,360	$140,413,520
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	30,417	N/A	$3,691,407,120	0	N/A	324	N/A	15,651	N/A	$1,938,726,000

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Storm Water Mitigation

Current Need	
16,500	Acre

Projected Need (in 2027)	
16,500	Acre

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	16,500	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	16,500	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	1,782	10.80%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	16,500	100.00%
Fair	N/A	N/A
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	14,718	89.20%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$135,439	48.00%
Add New	N/A	N/A

Estimated Costs				
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**
Unfunded Pipelined SHOPP Projects	$493,466,000	SHOPP Performance Gap	$2,950,223,100	**$3,443,689,100**

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	750	N/A	N/A	N/A	N/A	N/A	N/A	725	$200,450	$145,326,250
D2	1,080	N/A	N/A	N/A	N/A	N/A	N/A	1,049	$200,450	$210,272,050
D3	780	N/A	N/A	N/A	N/A	N/A	N/A	773	$200,450	$154,947,850
D4	2,700	N/A	N/A	N/A	N/A	N/A	N/A	2,663	$200,450	$533,798,350
D5	130	N/A	N/A	N/A	N/A	N/A	N/A	103	$200,450	$20,646,350
D6	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$200,450	$0
D7	7,780	N/A	N/A	N/A	N/A	N/A	N/A	6,356	$200,450	$1,274,060,200
D8	630	N/A	N/A	N/A	N/A	N/A	N/A	526	$200,450	$105,436,700
D9	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$200,450	$0
D10	220	N/A	N/A	N/A	N/A	N/A	N/A	220	$200,450	$44,099,000
D11	1,760	N/A	N/A	N/A	N/A	N/A	N/A	1,649	$200,450	$330,542,050
D12	670	N/A	N/A	N/A	N/A	N/A	N/A	654	$200,450	$131,094,300
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	16,500	N/A	N/A	N/A	N/A	N/A	N/A	14,718	N/A	$2,950,223,100

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Zero Emission Vehicle Infrastructure

Current Need	
30	Locations

Projected Need (in 2027)	
30	Locations

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	30	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	30	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	0	0.00%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	30	100.00%
Fair	N/A	N/A
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	30	100.00%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$357,000	40.06%
Add New	N/A	N/A

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$15,000,000**
Unfunded Pipelined SHOPP Projects	$0	SHOPP Performance Gap	$15,000,000		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	5	N/A	N/A	N/A	N/A	N/A	N/A	5	$500,000	$2,500,000
D2	5	N/A	N/A	N/A	N/A	N/A	N/A	5	$500,000	$2,500,000
D3	1	N/A	N/A	N/A	N/A	N/A	N/A	1	$500,000	$500,000
D4	3	N/A	N/A	N/A	N/A	N/A	N/A	3	$500,000	$1,500,000
D5	3	N/A	N/A	N/A	N/A	N/A	N/A	3	$500,000	$1,500,000
D6	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$500,000	$0
D7	1	N/A	N/A	N/A	N/A	N/A	N/A	1	$500,000	$500,000
D8	5	N/A	N/A	N/A	N/A	N/A	N/A	5	$500,000	$2,500,000
D9	3	N/A	N/A	N/A	N/A	N/A	N/A	3	$500,000	$1,500,000
D10	1	N/A	N/A	N/A	N/A	N/A	N/A	1	$500,000	$500,000
D11	2	N/A	N/A	N/A	N/A	N/A	N/A	2	$500,000	$1,000,000
D12	1	N/A	N/A	N/A	N/A	N/A	N/A	1	$500,000	$500,000
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	30	N/A	N/A	N/A	N/A	N/A	N/A	30	N/A	$15,000,000

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Commercial Vehicle Enforcement Facilities

Current Inventory	
54	Stations

Projected Inventory (in 2027)	
54	Stations

Effective Annual Deterioration Rate		
Into Fair	6.25	% per Year
Into Poor	5.65	% per Year

Current Condition		
Good	8	14.81%
Fair	46	85.19%
Poor	0	0.00%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	3	5.56%
Fair	25	46.30%
Poor	26	48.15%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	9	16.67%
Fix Poor to Good	0	0.00%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	33	60.00%
Fair	21	40.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	2	3.70%
Fix Poor to Good	26	48.15%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$1,562,667	100.00%
Fix Poor to Good	$1,562,667	100.00%
Add New	$1,562,667	100.00%

Estimated Costs				
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**
Unfunded Pipelined SHOPP Projects	$41,772,000	SHOPP Performance Gap	$87,509,352	**$129,281,352**

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	3	$3,125,334	$9,376,002	0	$3,125,334	0	$3,125,334	2	$3,125,334	$6,250,668
D2	4	$3,125,334	$12,501,336	0	$3,125,334	0	$3,125,334	2	$3,125,334	$6,250,668
D3	5	$3,125,334	$15,626,670	0	$3,125,334	-1	$3,125,334	3	$3,125,334	$9,376,002
D4	13	$3,125,334	$40,629,342	0	$3,125,334	2	$3,125,334	4	$3,125,334	$18,752,004
D5	0	$3,125,334	$0	0	$3,125,334	0	$3,125,334	0	$3,125,334	$0
D6	3	$3,125,334	$9,376,002	0	$3,125,334	-1	$3,125,334	2	$3,125,334	$6,250,668
D7	6	$3,125,334	$18,752,004	0	$3,125,334	-3	$3,125,334	3	$3,125,334	$9,376,002
D8	6	$3,125,334	$18,752,004	0	$3,125,334	0	$3,125,334	2	$3,125,334	$6,250,668
D9	0	$3,125,334	$0	0	$3,125,334	0	$3,125,334	0	$3,125,334	$0
D10	5	$3,125,334	$15,626,670	0	$3,125,334	0	$3,125,334	3	$3,125,334	$9,376,002
D11	7	$3,125,334	$21,877,338	0	$3,125,334	0	$3,125,334	4	$3,125,334	$12,501,336
D12	2	$3,125,334	$6,250,668	0	$3,125,334	-2	$3,125,334	1	$3,125,334	$3,125,334
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	54	N/A	$168,768,036	0	N/A	2	N/A	26	N/A	$87,509,352

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Operational Improvements

Current Need	
1,010,962	Daily Vehicle Hours of Delay

Projected Need (in 2027)	
1,010,962	Daily Vehicle Hours of Delay

Effective Annual Deterioration Rate		
Into Fair	N/A	% per Year
Into Poor	N/A	% per Year

Current Need		
Good	N/A	N/A
Fair	N/A	N/A
Poor	1,010,962	100.00%

Projected Need (in 2027) - Do Nothing Scenario		
Good	N/A	N/A
Fair	N/A	N/A
Poor	1,010,962	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	10,303	1.02%
Add New	N/A	N/A

Target Need (in 2027) - Goal		
Good or New	101,096	10.00%
Fair	N/A	N/A
Poor	909,866	90.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	91,776	9.08%
Add New	N/A	N/A

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$4,968	40.00%
Add New	N/A	N/A

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$933,002,080**
Unfunded Pipelined SHOPP Projects	$294,700,000	SHOPP Performance Gap	$638,302,080		

District Breakdown

District	Projected Need	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$6,955	$0
D2	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$6,955	$0
D3	40,000	N/A	N/A	N/A	N/A	N/A	N/A	1,351	$6,955	$9,396,205
D4	215,000	N/A	N/A	N/A	N/A	N/A	N/A	20,432	$6,955	$142,104,560
D5	5,564	N/A	N/A	N/A	N/A	N/A	N/A	209	$6,955	$1,453,595
D6	8,136	N/A	N/A	N/A	N/A	N/A	N/A	814	$6,955	$5,661,370
D7	460,000	N/A	N/A	N/A	N/A	N/A	N/A	44,539	$6,955	$309,768,745
D8	77,000	N/A	N/A	N/A	N/A	N/A	N/A	5,201	$6,955	$36,172,955
D9	0	N/A	N/A	N/A	N/A	N/A	N/A	0	$6,955	$0
D10	5,262	N/A	N/A	N/A	N/A	N/A	N/A	-983	$6,955	$0
D11	90,000	N/A	N/A	N/A	N/A	N/A	N/A	8,388	$6,955	$58,338,540
D12	110,000	N/A	N/A	N/A	N/A	N/A	N/A	10,842	$6,955	$75,406,110
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	1,010,962	N/A	N/A	N/A	N/A	N/A	N/A	91,776	N/A	$638,302,080

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Sign Panel Replacement

Current Inventory	
86,877	Each

Projected Inventory (in 2027)	
86,877	Each

Effective Annual Deterioration Rate		
Into Fair	6.67	% per Year
Into Poor	20.00	% per Year

Current Condition		
Good	0	0.00%
Fair	0	0.00%
Poor	86,877	100.00%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	0	0.00%
Fair	0	0.00%
Poor	86,877	100.00%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	0	0.00%
Fix Poor to Good	7,811	8.99%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	0	0.00%
Fair	86,877	100.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	0	0.00%
Fix Poor to Good	79,066	91.01%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$6,200	30.00%
Fix Poor to Good	$6,200	30.00%
Add New	$6,200	30.00%

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$700,472,960**
Unfunded Pipelined SHOPP Projects	$63,201,000	SHOPP Performance Gap	$637,271,960		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	4,185	$8,060	$33,731,100	0	$8,060	-4,185	$8,060	4,185	$8,060	$33,731,100
D2	7,407	$8,060	$59,700,420	0	$8,060	-7,407	$8,060	7,087	$8,060	$57,121,220
D3	6,864	$8,060	$55,323,840	0	$8,060	-6,864	$8,060	6,253	$8,060	$50,399,180
D4	13,894	$8,060	$111,985,640	0	$8,060	-13,894	$8,060	12,670	$8,060	$102,120,200
D5	4,607	$8,060	$37,132,420	0	$8,060	-4,607	$8,060	3,443	$8,060	$27,750,580
D6	7,702	$8,060	$62,078,120	0	$8,060	-7,702	$8,060	7,192	$8,060	$57,967,520
D7	17,373	$8,060	$140,026,380	0	$8,060	-17,373	$8,060	16,703	$8,060	$134,626,180
D8	8,533	$8,060	$68,775,980	0	$8,060	-8,533	$8,060	7,432	$8,060	$59,901,920
D9	917	$8,060	$7,391,020	0	$8,060	-917	$8,060	917	$8,060	$7,391,020
D10	4,608	$8,060	$37,140,480	0	$8,060	-4,608	$8,060	4,468	$8,060	$36,012,080
D11	6,878	$8,060	$55,436,680	0	$8,060	-6,878	$8,060	4,915	$8,060	$39,614,900
D12	3,909	$8,060	$31,506,540	0	$8,060	-3,909	$8,060	3,801	$8,060	$30,636,060
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	86,877	N/A	$700,228,620	0	N/A	0	N/A	79,066	N/A	$637,271,960

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Transportation Management Systems

Current Inventory	
18,837	Each

Projected Inventory (in 2027)	
20,483	Each

Effective Annual Deterioration Rate		
Into Fair	NA	% per Year
Into Poor	4.73	% per Year

Current Condition		
Good	11,081	58.83%
Fair	N/A	N/A
Poor	7,756	41.17%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	7,486	36.55%
Fair	N/A	N/A
Poor	12,997	63.45%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	2,300	12.21%
Add New	1,646	8.74%

Target Condition (in 2027) - Goal		
Good or New	19,364	90.00%
Fair	N/A	N/A
Poor	2,153	10.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	N/A	N/A
Fix Poor to Good	8,544	45.36%
Add New	1,034	5.49%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	N/A	N/A
Fix Poor to Good	$85,176	37.00%
Add New	$85,176	37.00%

Estimated Costs

Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$1,809,994,398**
Unfunded Pipelined SHOPP Projects	$692,328,000	SHOPP Performance Gap	$1,117,666,398		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	284	$116,691	$33,140,244	21	$116,691	N/A	N/A	98	$116,691	$13,886,229
D2	400	$116,691	$46,676,400	19	$116,691	N/A	N/A	200	$116,691	$25,555,329
D3	2,252	$116,691	$262,788,132	82	$116,691	N/A	N/A	364	$116,691	$52,044,186
D4	4,451	$116,691	$519,391,641	225	$116,691	N/A	N/A	1,581	$116,691	$210,743,946
D5	1,134	$116,691	$132,327,594	55	$116,691	N/A	N/A	393	$116,691	$52,277,568
D6	1,002	$116,691	$116,924,382	84	$116,691	N/A	N/A	541	$116,691	$72,931,875
D7	4,174	$116,691	$487,068,234	195	$116,691	N/A	N/A	2,115	$116,691	$269,556,210
D8	2,080	$116,691	$242,717,280	129	$116,691	N/A	N/A	992	$116,691	$130,810,611
D9	183	$116,691	$21,354,453	9	$116,691	N/A	N/A	82	$116,691	$10,618,881
D10	1,324	$116,691	$154,498,884	67	$116,691	N/A	N/A	504	$116,691	$66,630,561
D11	1,598	$116,691	$186,472,218	74	$116,691	N/A	N/A	832	$116,691	$105,722,046
D12	1,601	$116,691	$186,822,291	74	$116,691	N/A	N/A	842	$116,691	$106,888,956
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	20,483	N/A	$2,390,181,753	1,034	N/A	N/A	N/A	8,544	N/A	$1,117,666,398

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

Bridge Goods Movement Upgrades

Current Inventory	
245,756,328	SF

Projected Inventory (in 2027)	
245,756,328	SF

Effective Annual Deterioration Rate		
Into Fair	0.00	% per Year
Into Poor	0.00	% per Year

Current Condition		
Good	193,664,987	78.80%
Fair	20,757,365	8.45%
Poor	31,333,976	12.75%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	193,664,987	78.80%
Fair	20,757,365	8.45%
Poor	31,333,976	12.75%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	571,024	0.23%
Fix Poor to Good	1,008,440	0.41%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	184,317,245	75.00%
Fair	36,863,449	15.00%
Poor	24,575,634	10.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	233,202	0.09%
Fix Poor to Good	10,142,453	4.13%
Add New	0	0.00%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$300	40.00%
Fix Poor to Good	$400	40.00%
Add New	$400	40.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$5,907,195,320**
Unfunded Pipelined SHOPP Projects	$129,476,800	SHOPP Performance Gap	$5,777,718,520		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	5,472,154	$560	$3,064,406,240	0	$560	-510,047	$420	35,327	$560	$19,783,120
D2	5,657,506	$560	$3,168,203,360	0	$560	-596,320	$420	-211,909	$560	$0
D3	23,052,229	$560	$12,909,248,240	0	$560	233,202	$420	586,477	$560	$426,371,960
D4	53,117,342	$560	$29,745,711,520	0	$560	-3,765,127	$420	4,337,012	$560	$2,428,726,720
D5	7,567,833	$560	$4,237,986,480	0	$560	-605,365	$420	42,813	$560	$23,975,280
D6	10,932,061	$560	$6,121,954,160	0	$560	-950,769	$420	489,534	$560	$274,139,040
D7	63,052,408	$560	$35,309,348,480	0	$560	-3,279,742	$420	4,651,290	$560	$2,604,722,400
D8	21,442,325	$560	$12,007,702,000	0	$560	-2,137,376	$420	-1,657,241	$560	$0
D9	984,610	$560	$551,381,600	0	$560	-84,519	$420	-71,810	$560	$0
D10	9,398,628	$560	$5,263,231,680	0	$560	-546,165	$420	-256,980	$560	$0
D11	25,492,126	$560	$14,275,590,560	0	$560	-2,457,955	$420	-861,896	$560	$0
D12	19,587,106	$560	$10,968,779,360	0	$560	-1,976,925	$420	-1,332,715	$560	$0
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	245,756,328	N/A	$137,623,543,680	0	N/A	233,202	N/A	10,142,453	N/A	$5,777,718,520

(*) The unit costs represent a multi-year programmatic average of a number of activities included within this objective. These costs should not be used for project level estimates.
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Weigh-In-Motion Scales

Current Inventory	
176	Stations

Projected Inventory (in 2027)	
176	Stations

Effective Annual Deterioration Rate		
Into Fair	6.00	% per Year
Into Poor	5.26	% per Year

Current Condition		
Good	5	2.84%
Fair	171	97.16%
Poor	0	0.00%

Projected Condition (in 2027) - Do Nothing Scenario		
Good	2	1.14%
Fair	84	47.73%
Poor	90	51.14%

Pipelined Projects (in any SHOPP or 2018 PID Workplan)		
Fix Fair to Good	12	6.82%
Fix Poor to Good	0	0.00%
Add New	0	0.00%

Target Condition (in 2027) - Goal		
Good or New	163	90.00%
Fair	17	10.00%
Poor	0	0.00%

Performance Gap for the Last 5 Years		
Fix Fair to Good	55	31.25%
Fix Poor to Good	90	51.14%
Add New	4	2.27%

Average Unit Cost*		Support Ratio**
Fix Fair to Good	$1,232,667	100.00%
Fix Poor to Good	$1,232,667	100.00%
Add New	$1,232,667	100.00%

Estimated Costs					
Unfunded Pipelined Maintenance Work	$0	Maintenance Performance Gap	$0	**Total**	**$378,874,766**
Unfunded Pipelined SHOPP Projects	$11,540,000	SHOPP Performance Gap	$367,334,766		

District Breakdown

District	Projected Quantity	Replacement Total Unit Cost*	Estimated Value	New Gap	"Add New" Total Unit Cost*	Fair Gap	"Fix Fair" Total Unit Cost*	Poor Gap	"Fix Poor" Total Unit Cost*	Goal Constrained Need
D1	3	$2,465,334	$7,396,002	0	$2,465,334	1	$2,465,334	2	$2,465,334	$7,396,002
D2	10	$2,465,334	$24,653,340	0	$2,465,334	2	$2,465,334	5	$2,465,334	$17,257,338
D3	15	$2,465,334	$36,980,010	0	$2,465,334	4	$2,465,334	6	$2,465,334	$24,653,340
D4	36	$2,465,334	$88,752,024	4	$2,465,334	10	$2,465,334	18	$2,465,334	$78,890,688
D5	3	$2,465,334	$7,396,002	0	$2,465,334	1	$2,465,334	2	$2,465,334	$7,396,002
D6	11	$2,465,334	$27,118,674	0	$2,465,334	3	$2,465,334	6	$2,465,334	$22,188,006
D7	22	$2,465,334	$54,237,348	0	$2,465,334	8	$2,465,334	11	$2,465,334	$46,841,346
D8	29	$2,465,334	$71,494,686	0	$2,465,334	9	$2,465,334	15	$2,465,334	$59,168,016
D9	1	$2,465,334	$2,465,334	0	$2,465,334	0	$2,465,334	1	$2,465,334	$2,465,334
D10	13	$2,465,334	$32,049,342	0	$2,465,334	5	$2,465,334	7	$2,465,334	$29,584,008
D11	21	$2,465,334	$51,772,014	0	$2,465,334	7	$2,465,334	11	$2,465,334	$44,376,012
D12	12	$2,465,334	$29,584,008	0	$2,465,334	5	$2,465,334	6	$2,465,334	$27,118,674
HQ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Totals	176	N/A	$433,898,784	4	N/A	55	N/A	90	N/A	$367,334,766

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(**) The support ratios represent a multi-year cost-weighted average of a number of activities included within this objective. These ratios should not be used for project level estimates.

APPENDIX C: GLOSSARY

ADA	Americans with Disabilities Act
BMP	Best Management Practice
BAT	Budget Allocation Tool
Caltrans	California Department of Transportation
CFMP	California Freight Mobility Plan
CHCI	California Highway Construction Index
CSFAP	California Sustainable Freight Action Plan
Commission	California Transportation Commission
CAPM	Capital Preventive Maintenance
CVEF	Commercial Vehicle Enforcement Station
CUs	Compliance Units
CIAs	Cooperative Implementation Agreements
EV	Electric Vehicles
CWA	Clean Water Act
Trust Fund	Federal Highway Trust Fund
FAST	Fixing America's Surface Transportation
FASTLANE	Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies
FCO	Funding Contribution Only
GHG	Greenhouse Gas
GPR	Ground Penetration Radar
HM	Highway Maintenance
HUTA	Highway Users Tax Account
ICM	Integrated Corridor Management
IRI	International Roughness Index
LOS	Level of Service
MVFA	Motor Vehicle Fuel Account
MAP-21	Moving Ahead for Progress in the 21st Century
MODA	Multi-Objective Decision Analysis
NHFP	National Highway Freight Program
NPDES	National Pollutant Discharge Elimination System
NSHFP	National Significant Highway and Freight Projects
PaveM	Pavement Management System
PID	Project Initiation Document
RTPA	Regional Transportation Planning Agency
RWQCB	Regional Water Quality Control Board
SRRA	Safety Roadside Rest Area
SHA	State Highway Account

SHOPP	State Highway Operation and Protection Program
SHS	State Highway System
SHSMP	State Highway System Management Plan
STIP	State Transportation Improvement Program
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
TMS	Transportation Management System
TOSNET	Traffic Operations Systems Network
TAMP	Transportation Asset Management Plan
TMC	Transportation Management Center
TRF	Transportation Related Facility
USEPA	United States Environmental Protection Agency
WIM	Weigh-In-Motion
ZEV	Zero-Emission Vehicle

Our Mission

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

Safety and Health

Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities.

Stewardship and Efficiency

Money counts. Responsibly manage California's transportation-related assets.

Sustainability, Livability and Economy

Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.

System Performance

Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

Organizational Excellence

Be a national leader in delivering quality service through excellent employee performance, public communication, and accountability.

Our Vision

A performance-driven, transparent and accountable organization that values its people, resources and partners, and meets new challenges through leadership, innovation and teamwork.

Integrity ■ Commitment ■ Teamwork ■ Innovation

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California Department of Transportation
1120 N Street, MS 49
Sacramento, CA 95814
www.dot.ca.gov