



# California Department of Transportation

Its Maintenance Division's Allocations and Spending for Field Maintenance Do Not Match Key Indicators of Need

Report 2015-120

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March 17, 2016

2015-120

The Governor of California  
President pro Tempore of the Senate  
Speaker of the Assembly  
State Capitol  
Sacramento, California 95814

Dear Governor and Legislative Leaders:

As requested by the Joint Legislative Audit Committee, the California State Auditor presents this audit report concerning the methods used by the California Department of Transportation (Caltrans) to make spending decisions related to the Maintenance Program (program) and to assess the timeliness and effectiveness of the program's funding.

This report concludes that the Caltrans division of maintenance's (maintenance division) allocations and spending for field maintenance do not match key indicators of maintenance need. Specifically, the maintenance division developed a budget model (model) for allocating field maintenance funding based on key indicators of maintenance need such as traffic volume and climate. However, we found that the maintenance division abandoned this approach, and instead has based funding allocations to the 12 Caltrans districts on a simple average of historical spending rather than using level of maintenance performance (service scores) or other information about maintenance need, despite reporting to the Legislature that it was using a more sophisticated method. Additionally, the maintenance division's current process for evaluating service scores does not provide the same in-depth information as the model would have provided. The maintenance division also does not use the information regarding service scores to strategically plan its work or to inform its funding allocations. Further, the maintenance division cannot demonstrate that it promptly performs certain field maintenance work. Specifically, data indicate that more than 30,000 service requests received by the three districts we audited in fiscal years 2010–11 through 2014–15 remained unresolved for more than 90 days.

Not surprisingly, we found that the maintenance division's actual spending for field maintenance in the three districts we reviewed was not consistent with key indicators of need—climate and traffic volume. To better align allocations with field maintenance needs we recommend that the Legislature include language in the Budget Act that requires the maintenance division to develop and implement a budget model that takes into account key indicators of field maintenance need, such as traffic volume, climate, service scores, and any other factors it deems necessary. We made additional recommendations to the maintenance division to ensure that it performs field maintenance work consistently on highways with similar needs.

Respectfully submitted,



ELAINE M. HOWLE, CPA  
State Auditor

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## Summary

### Results in Brief

The California Department of Transportation (Caltrans) is responsible for constructing, improving, and maintaining California's highway system (state highway system). This report focuses on Caltrans' maintenance activities. *Maintenance* is defined by state law as the preservation and upkeep of roadway structures in the safe and usable condition to which they have been improved or constructed. Caltrans' division of maintenance (maintenance division) administers the maintenance program, which focuses on preventative work to correct small problems before they grow to require more costly repairs. The maintenance program consists of two types of work: highway maintenance and field maintenance. Highway maintenance includes more significant work that contractors perform to repair pavement, bridges, and drainage culverts. Field maintenance, on the other hand, is generally performed by maintenance division staff and includes activities such as repairing minor pavement damage, clearing vegetation, and picking up litter. Although we reviewed the maintenance division's processes for both highway maintenance and field maintenance, the concerns we identified relate primarily to field maintenance. We were asked to review district 7 (Los Angeles) and two other districts; we selected district 4 (Oakland) and district 6 (Fresno).

Although it developed a logical approach for addressing field maintenance needs, the maintenance division abandoned the approach. Specifically, the maintenance division never implemented a budget model (model) that it paid \$250,000 to develop in 2009. Use of that model would have allowed the maintenance division to identify the resources needed to maintain highways with similar conditions at a similar level of maintenance performance (known as a *service score*). The model categorized sections of the state highway system into zones based on climate and on traffic levels, and it took into consideration the service scores for several maintenance activities and the inventory of road elements, such as bridges and tunnels. The maintenance division asserted to us that the model produced funding allocations that were unreasonable, such as the need to reduce more than 100 staff positions at district 7 (Los Angeles); but instead of trying to determine why the model produced such allocations, the maintenance division decided to abandon it.

We found that the maintenance division did not implement the zone-level evaluation of service scores but instead samples conditions broadly across each district, which does not provide the same level of information. The maintenance division also does not establish goals for all categories of maintenance activities

### Audit Highlights . . .

*Our audit concerning the methods used by the California Department of Transportation (Caltrans) to make spending decisions related to its maintenance program revealed the following:*

- » *Caltrans' division of maintenance (maintenance division) paid \$250,000 for development of a budget model (model) for allocating field maintenance funding based on key indicators of maintenance need, however it abandoned it.*
- » *Although the model was not implemented, Caltrans reported to the Legislature that it is using the model to allocate funding to its districts.*
- » *The maintenance division's process for evaluating maintenance performance scores (service scores) is lacking:*
  - *It does not provide the same in-depth information as the model would have provided.*
  - *It does not weight districts' service scores to account for differences in traffic volume.*
  - *It only sets performance goals for improving three of the many categories of maintenance activities it evaluates.*
- » *The maintenance division does not use information from districts' service scores to strategically plan its work or to allocate funding.*
- » *Spending for field maintenance was not consistent with key indicators of need—traffic volume and climate.*
- » *The maintenance division cannot demonstrate that it promptly performs field maintenance work.*
- » *Caltrans' weak cost controls over field maintenance work orders create opportunities for fraud, waste, and abuse.*

it evaluates and does not use the information it gathers about maintenance needs to meet its service goals or to plan its work. For example, some districts' service scores, which indicate the level of maintenance need, have remained generally low over the last five fiscal years. A low service score means the district has a high maintenance need. While the maintenance division averages the districts' service scores to calculate a statewide score, it does not weight the districts' scores according to traffic volumes, which misrepresents the status of the majority of the state's most heavily used roads. When we adjusted the service scores to account for traffic volumes, the statewide scores fell several points.

The maintenance division also could not demonstrate that it uses the information on low service scores to strategically plan its work to address maintenance needs and improve the scores. Instead of holding districts accountable for improving their scores, the maintenance division establishes spending goals for some field maintenance activities. While we found that the districts we reviewed sometimes exceeded their spending targets, the corresponding service scores generally remained stagnant or even worsened. In addition, the three districts we reviewed could provide only short-term plans for activities they intended to complete, and these plans did not adequately establish priorities or facilitate the monitoring of progress toward improving the districts' scores. For example, some of the plans consisted of emails from supervisors that listed brief descriptions of selected activities to complete over the ensuing week. The maintenance division did have robust requirements for planning work, but it decided to do away with these requirements because it believed the requirements demanded too much time. Without adequate plans for completing field maintenance work, district staff have little accountability for how well they meet maintenance needs.

In addition, although the maintenance division never implemented its model, the division has been reporting to the Legislature that it is using this sophisticated model to allocate field maintenance funding to its districts that takes into account key maintenance need indicators, such as traffic volume and climate. However, the maintenance division informed us that instead of using the model, it has actually been distributing funding based on a simple historical average of each district's spending. In fact, we found the districts' allocations remained largely unchanged from fiscal years 2010–11 through 2014–15. As a result, the Legislature and other decision makers may have believed that headquarters was using a more robust approach to allocate funding to the districts than it actually was, causing those decision makers to be less likely to question the allocations.

We found that simply using historical averages to allocate field maintenance funding to the districts does not align with key indicators of field maintenance needs. For example, the two districts that handle the biggest percentage of the state's traffic volume (43 percent) only receive 27 percent of the funding. Additionally, although some districts had low service scores, headquarters did not adjust its overall allocations to those districts to better align with their needs. As a result, districts may not be able to fully address such needs, which could delay maintenance work and result in more costly repairs in the future. These effects may also be exacerbated because headquarters is potentially underfunding the districts with relatively greater traffic volume.

Because Caltrans did not implement the budget model and instead based its allocations of field maintenance funding on historical averages, it is not surprising to find that the three Caltrans districts we reviewed spent significantly different amounts for field maintenance on highways with similar indicators of maintenance need. For example, in comparing highway sections based on climate and traffic levels, we found the maintenance division spent significantly less per mile for field maintenance on some sections of highway in each district than it did on other similar sections of highways in those same districts. These results further indicate that Caltrans needs to assess whether districts are using funds in a manner commensurate with need.

The maintenance division also cannot demonstrate that it promptly performs certain field maintenance work. Specifically, the maintenance division does not establish time frames for completing maintenance service requests (service requests) it receives from the public, so we calculated how long each service request had been outstanding. Data from Caltrans' online service request system indicate that more than 30,000 service requests that were received through the online system by the three districts from fiscal years 2010–11 through 2014–15 remained unresolved after more than 90 days. Caltrans was unable to tell whether those service requests still remained incomplete or whether it had acted on the request and simply failed to update the system. In addition, districts receive service requests via methods other than Caltrans' website, but the districts have poor processes for tracking whether they complete them. Failure to perform or delay of needed maintenance work can create unsafe conditions.

Moreover, we found that the maintenance division has weak cost controls over field maintenance work orders, which creates opportunities for fraud, waste, and abuse. Specifically, our review of work orders found limited evidence to support whether the costs and resources used were reasonable and appropriate. Despite requirements to review and approve work orders, district

supervisors do not document their review and approval that the resources used to complete field maintenance work orders were necessary and appropriate and that costs were reasonable. Additionally, audits of field maintenance work orders that Caltrans' internal auditors conducted in 2013 and 2015 found instances in which physical inventory counts of the chemicals used to control vegetation did not match recorded amounts and staff time sheets were not promptly reviewed and approved and had errors. These weak controls make resources and equipment susceptible to theft or misuse.

Finally, although the maintenance division is generally managing highway maintenance projects appropriately, the backlog of pavement and drainage culverts that need maintenance work is increasing. The maintenance division allocates funding for highway maintenance proportionally to the districts based on the condition of pavement and bridges. In contrast, Caltrans asserts that it generally distributes funds for culverts equitably among the districts because the budget is relatively small compared to the identified needs of the districts. Our review of pavement and bridge projects found that the maintenance division generally ensured that contractors completed the projects on time and within budget. However, since 2011 the number of highway lane miles that need maintenance has increased from 11,053 to 15,272, and the number of culverts that need maintenance has increased from an estimated 13,185 to 27,346. Although the maintenance division's goal given its current funding level is to repair only 2,100 lane miles of pavement and 140 culverts each year, Caltrans has reported that even if it were to receive additional funding it would prioritize more significant rehabilitation work ahead of this maintenance backlog. Without further action, the backlog of pavement and drainage culverts that need maintenance work will likely grow.

### **Recommendations**

To better align the maintenance division's allocations with districts' maintenance needs, the Legislature should include language in the Budget Act that requires the maintenance division to develop and implement a budget model for field maintenance by June 30, 2017, that takes into account key indicators of maintenance need, such as traffic volume, climate, service scores, and any other factors the maintenance division deems necessary to ensure that the model adequately considers field maintenance need. Once the model is developed, Caltrans should use it to inform appropriate allocations to the districts.

Caltrans should revise the language in its future five-year maintenance plans to accurately describe the method it uses to allocate field maintenance funding to its districts.

To ensure that it performs field maintenance work consistently on highways with similar needs, the maintenance division should do the following:

- Assess whether districts are using funds in a manner commensurate with indicators of need included in its new budget model.
- Implement the zone-level evaluation of service scores contemplated in the earlier budget model that it abandoned.
- Establish zone-specific service score goals for all of the field maintenance activities it deems critical to ensuring a safe and usable state highway system and require districts to meet those goals for all the zones within their borders.
- Implement requirements for strategically planning field maintenance work that it believes are feasible and ensure that supervisors plan and schedule field maintenance work in accordance with those requirements to monitor progress toward improving service scores.

Caltrans should require its staff to verify and update the status of all outstanding service requests. Additionally, Caltrans should require supervisors to monitor completion of service requests by reviewing the data from the service request system monthly to identify service requests not completed after a period of time that Caltrans deems appropriate, such as 30 days. For all service requests outstanding after this period, Caltrans should require its supervisors to determine the status of the service requests and ensure the work is appropriately prioritized.

To prevent and detect fraud, waste, and abuse and to ensure costs are appropriate, the maintenance division should strengthen its controls over reviewing and approving work order costs by requiring its supervisors and superintendents to document their review and approval of work orders.

### **Agency Comments**

The California State Transportation Agency and Caltrans agreed with our findings and indicated they will implement our recommendations.

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# Introduction

## Background

The California Department of Transportation (Caltrans) is responsible for constructing, improving, and maintaining California's highway system (state highway system). The state highway system is composed of more than 50,000 lane miles, more than 13,100 bridges, and an estimated 205,000 drainage culverts.<sup>1</sup> It includes interstate highways, U. S. highways, and state highways. These highways are also referred to as *routes*. For example, the state highway system includes State Highway 50, which runs from Sacramento to the Nevada state line, and Interstate 5, which runs north and south through California. The state highway system does not include county highways and local roads.

Caltrans mainly cares for the existing state highway system through two programs: the state highway operation and protection program (SHOPP) and the maintenance program. Caltrans rehabilitates and reconstructs the state highway system through the SHOPP. Projects in this program include capital improvements for safety and the rehabilitation of state highways and bridges. These projects do not add capacity to the state highway system; adding capacity is the responsibility of Caltrans' state transportation improvement program (STIP). Multiyear plans for both SHOPP and STIP projects are adopted by the California Transportation Commission (commission). According to its 2015 annual report, the commission approved allocations of approximately \$1.6 billion for SHOPP projects and \$531.3 million for STIP projects for fiscal year 2014–15.

Our review focused on the maintenance program, which Caltrans' division of maintenance (maintenance division) administers. Unlike the SHOPP, which handles more significant and costly rehabilitation projects, the maintenance program focuses on preventative work and corrects small problems before they worsen and require more costly repairs. State law defines *maintenance* as the preservation and upkeep of roadway structures in the safe and usable condition to which they have been improved or constructed. The maintenance program includes pavement, bridges, roadside and drainage, traffic guidance, and electrical maintenance. Maintenance also includes the special or emergency maintenance or repair necessitated by accidents, weather conditions, slides, settlements, or other unusual or unexpected damage of a roadway, structure, or facility. Maintenance does not include construction of new assets

<sup>1</sup> A *lane mile* is a unit of measure for pavement measuring one mile long and one lane wide. A mile stretch of a two-lane road equals two lane miles, and a segment of road one mile long and four lanes wide is four lane miles.

or rehabilitation or reconstruction of roadways. However, according to Caltrans, adequate maintenance can significantly reduce future SHOPP costs for roadway rehabilitation.

The maintenance program consists of two types of maintenance work: highway maintenance and field maintenance. Highway maintenance includes more significant work to repair pavement, bridges, and drainage culverts, among other things. For example,

highway maintenance work includes different types of surface treatments to extend the service life of a segment of pavement. These treatments keep the roadway safe and in usable condition, but they do not include structural capacity improvement or reconstruction. Caltrans generally hires contractors to perform this work.

Field maintenance, on the other hand, is generally performed by maintenance division staff and includes activities such as repairing minor pavement damage, clearing vegetation, picking up litter, removing graffiti, and other activities as listed in the text box. Districts generally identify field maintenance work in two ways: maintenance personnel travel all highways to observe conditions and identify maintenance needs, or the public submits service requests notifying the maintenance division of needed maintenance.

#### Examples of Field Maintenance Activities

- Sealing cracks and patching potholes on pavement
- Clearing vegetation and drainage
- Picking up litter and debris
- Removing graffiti
- Maintaining and painting bridges
- Replacing highway lighting and traffic signals
- Preserving roadway striping, signs, and guardrails
- Removing snow, patrolling for storms, controlling floods and slides

Source: California Department of Transportation's *Maintenance Manual, volume II*.

### Funding for the Maintenance Program

In the state budget each year, the Legislature appropriates funding for Caltrans' programs, including the maintenance program. California's budget process generally uses incremental budgeting, which employs a department's current level of funding as a base amount. State law requires Caltrans to prepare a five-year maintenance plan (maintenance plan), which it must update every two years, as the basis for its budget request. The plan addresses the maintenance needs of the state highway system but includes only maintenance activities that could result in increased SHOPP costs if not performed. The maintenance plan attempts to balance resources between SHOPP and maintenance activities to achieve identified milestones and goals at the lowest possible long-term cost. State law also requires Caltrans to develop a budget model to achieve this balance of resources.<sup>2</sup> Additionally, if the maintenance

<sup>2</sup> Caltrans includes the statutorily required budget model in its maintenance plan in the section titled "Analysis of Alternative Levels of Maintenance Investment," not to be confused with the section of the maintenance plan titled "Maintenance Program Budget Model," which is discussed in more detail in the Audit Results.

plan recommends increases in maintenance spending, the maintenance plan is supposed to identify projected future SHOPP costs that would be avoided by implementing that increased maintenance spending.

As Table 1 shows, the maintenance program received approximately \$1.4 to \$1.5 billion in funding in each fiscal year from 2010–11 through 2014–15. This amount represented approximately 14 percent of Caltrans’ total annual funding in fiscal year 2014–15. The maintenance program receives nearly all of its funding from the state highway account, the fund in which the State accumulates most of the revenues from gasoline taxes. Other funding sources for the maintenance program include federal funds that the maintenance division uses for pavement projects and bridge inspections, which make up approximately 8 percent of its total funding, and reimbursements for work that the maintenance program performs for local agencies.<sup>3</sup>

**Table 1**  
**California Department of Transportation Maintenance Program**  
**Appropriations, Expenditures, and Unspent Funds**  
**Fiscal Years 2010–11 Through 2014–15**  
**(in Millions)**

	FISCAL YEAR				
	2010–11	2011–12	2012–13	2013–14*	2014–15*
<b>State Highway Account</b>					
Appropriation	\$1,259	\$1,406	\$1,321	\$1,366	\$1,413
Expenditures	1,259	1,395	1,311	1,327	988
Unspent	0	11	10	39	425
<b>Federal Trust Fund</b>					
Appropriation	103	105	117	118	119
Expenditures	92	102	111	97	23
Unspent	11	3	6	21	96
<b>Total appropriations</b>	<b>\$1,362</b>	<b>\$1,511</b>	<b>\$1,438</b>	<b>\$1,484</b>	<b>\$1,532</b>
<b>Total expenditures</b>	<b>1,351</b>	<b>1,497</b>	<b>1,422</b>	<b>1,424</b>	<b>1,011</b>
<b>Total unspent</b>	<b>\$11</b>	<b>\$14</b>	<b>\$16</b>	<b>\$60</b>	<b>\$521</b>
<b>Percentage of appropriations expended</b>	<b>99%</b>	<b>99%</b>	<b>99%</b>	<b>96%</b>	<b>66%</b>

Sources: State Controller’s Appropriation Control Ledger and Budgetary/Legal Reporting System for fiscal years 2010–11 through 2014–15.

\* The California Department of Transportation still has additional fiscal years to spend against its appropriations for fiscal years 2013–14 and 2014–15.

<sup>3</sup> For example, Caltrans personnel may perform routine maintenance of traffic control systems or facilities on county-owned roads or city-owned streets through cooperative agreements.

Caltrans has one year to spend or commit all or part of an appropriation for future expenditures and then two additional years to pay off such expenditures from its appropriation of funds. After this three-year period, any unspent funds revert to the originating fund for future reappropriation. The maintenance division spent most of its maintenance program funding that was appropriated in fiscal years 2010–11 through 2012–13, but it still has time to spend amounts appropriated in the most recent two fiscal years. We noted that approximately \$144 million appropriated in the two years before our audit period had reverted to the state highway account during our audit period. The reverted funds generally resulted from the effects of the economic downturn: cost-savings the maintenance division achieved on projects as prices decreased, an influx of funding from the American Recovery and Reinvestment Act of 2009 (recovery act), and funds it did not spend when it complied with the governor's 2009 executive order to halt purchases of new vehicles.

In each of the first three fiscal years of our audit period (2010–11 through 2012–13), the maintenance division spent 99 percent of its total appropriation. During the last five fiscal years, the maintenance division has spent about one-fourth of its appropriations on contracts, primarily for highway maintenance.

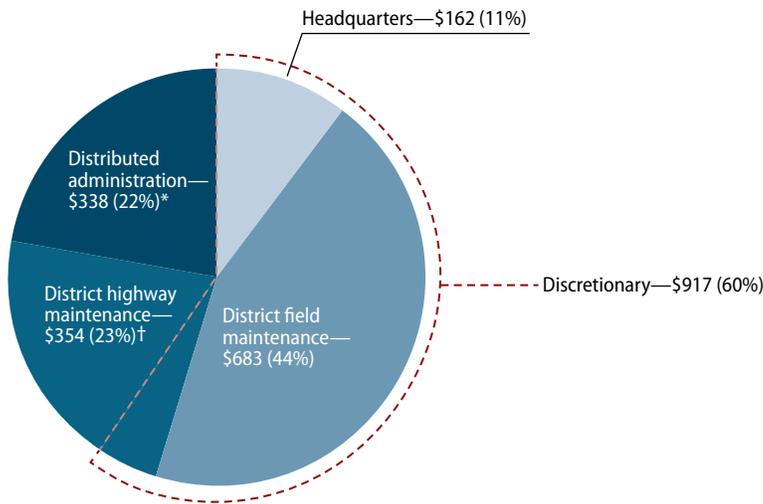
The maintenance division has discretion in distributing the major part of its maintenance program appropriation. Figure 1 shows how headquarters allocated the roughly \$1.5 billion the maintenance program received in fiscal year 2014–15. Included in the total is an appropriation of approximately \$338 million for distributed administration and equipment programs (administration program).<sup>4</sup> The Budget Act of 2014 specified amounts that must be spent for certain highway maintenance program items, including major highway maintenance pavement contracts and storm water discharge: \$231.7 million and \$50.6 million, respectively. The remaining \$917 million is discretionary. From these discretionary funds, the maintenance division allocated an additional \$72 million for highway maintenance and \$682.7 million for field maintenance to Caltrans' 12 districts, and \$161.9 million for headquarters in fiscal year 2014–15.

The \$161.9 million the maintenance division allocated was for overhead and other costs to the following four headquarters divisions: maintenance, engineering services, procurement and contracts (specifically, warehouse), and audits and investigations. The allocation was primarily for employee costs, external and

<sup>4</sup> Administration program costs are the indirect costs of a program, typically a share of the costs of the administrative units serving the entire department (for example, legal, personnel, and accounting). Distributed administration costs represent the distribution of the indirect costs to the program activities of a department.

interdepartmental contracts, and other general expenses. Specifically, in fiscal year 2014–15, the maintenance division retained \$128.4 million and allocated \$17.5 million to the division of engineering services, \$15.6 million to the warehouse, and \$317,000 to audits and investigations. In fiscal years 2010–11 through 2014–15, the allocation for these other headquarters’ functions ranged between 14 and 20 percent of program funding, excluding distributed administration program costs.

**Figure 1**  
**California Department of Transportation Maintenance Program Funding Allocation for Fiscal Year 2014–15**  
 (in Millions)



Source: California Department of Transportation’s financial system.

\* Administration program costs are the indirect costs of a program, typically a share of the costs of the administrative units serving the entire department (for example, legal, personnel, and accounting). Distributed administration costs represent the distribution of the indirect costs to the various program activities of the department.

† Highway maintenance includes \$231.7 million for major maintenance pavement contracts and \$50.6 million for storm water discharge, appropriated separately in the Budget Act of 2014.

Caltrans received \$2.5 billion in federal funds in 2009 through the recovery act, including \$56.2 million that the California Department of Finance approved for the maintenance program. According to reports from the California Division of the Federal Highway Administration as of September 30, 2015—the last day recovery act funds were available—Caltrans has spent 99.7 percent of recovery act funds, including the funds approved for the maintenance program. Caltrans asserted that the unspent \$7.9 million represented savings from projects for other programs that were completed under budget.

### Examples of the Maintenance Division's Offices at Headquarters

- Pavement Management and Performance
- Structure (bridge) Maintenance and Investigations
- Roadway Maintenance
- Maintenance Equipment and Training
- Budgets and Planning
- Maintenance Management Systems and Studies
- Administration Management
- Emergency Management

Source: California Department of Transportation headquarters division of maintenance organization chart.

### The Maintenance Program's Organizational Structure

The maintenance division has staff at Caltrans' headquarters located in Sacramento and at Caltrans' 12 districts. The districts and their counties are shown in Figure 2. The maintenance division is divided into several offices at headquarters, including those shown in the text box. Headquarters is responsible for establishing policies, providing technical assistance to the districts, and reviewing districts' compliance with standards and policies. At headquarters, the chief of the maintenance division (division chief) has overall responsibility for the statewide maintenance program. The division chief is responsible for establishing goals, developing justification for and documenting resource needs, and determining resource allocations among the districts.

The maintenance division structures its management according to geographic areas within each of Caltrans' 12 districts. Specifically, a deputy district director of maintenance (district maintenance deputy) directs maintenance efforts at each of the 12 districts. District maintenance deputies oversee district activities and communications, engineering, and region manager operations; they are also responsible for allocating resources within their respective districts, updating district plans to achieve expected goals, and reviewing and approving region work plans. Each district is divided into regions, and region managers are responsible for field operations and activities within each region. Regions are further divided into areas. Area superintendents are responsible for activities within their assigned areas, and they oversee the supervisors of maintenance staff crews. Each supervisor is also responsible for specific segments of the state highway system and specific field maintenance activities within a superintendent's area, such as landscaping. Figure 3 on page 14 illustrates the management structure using district 7 (Los Angeles) as an example.

The maintenance division has provided a manual of guidance and a computer system to help its staff manage maintenance work. The maintenance manual presents general practices and procedures intended to provide for a uniform approach to maintaining the state highway system. The maintenance division's maintenance staff use its integrated maintenance management computer system (maintenance management system) to plan, perform, record, and manage maintenance work. The maintenance management system allows supervisors and managers to inventory assets, track work performed and the associated costs, manage materials and equipment, and provide decision-making tools to managers

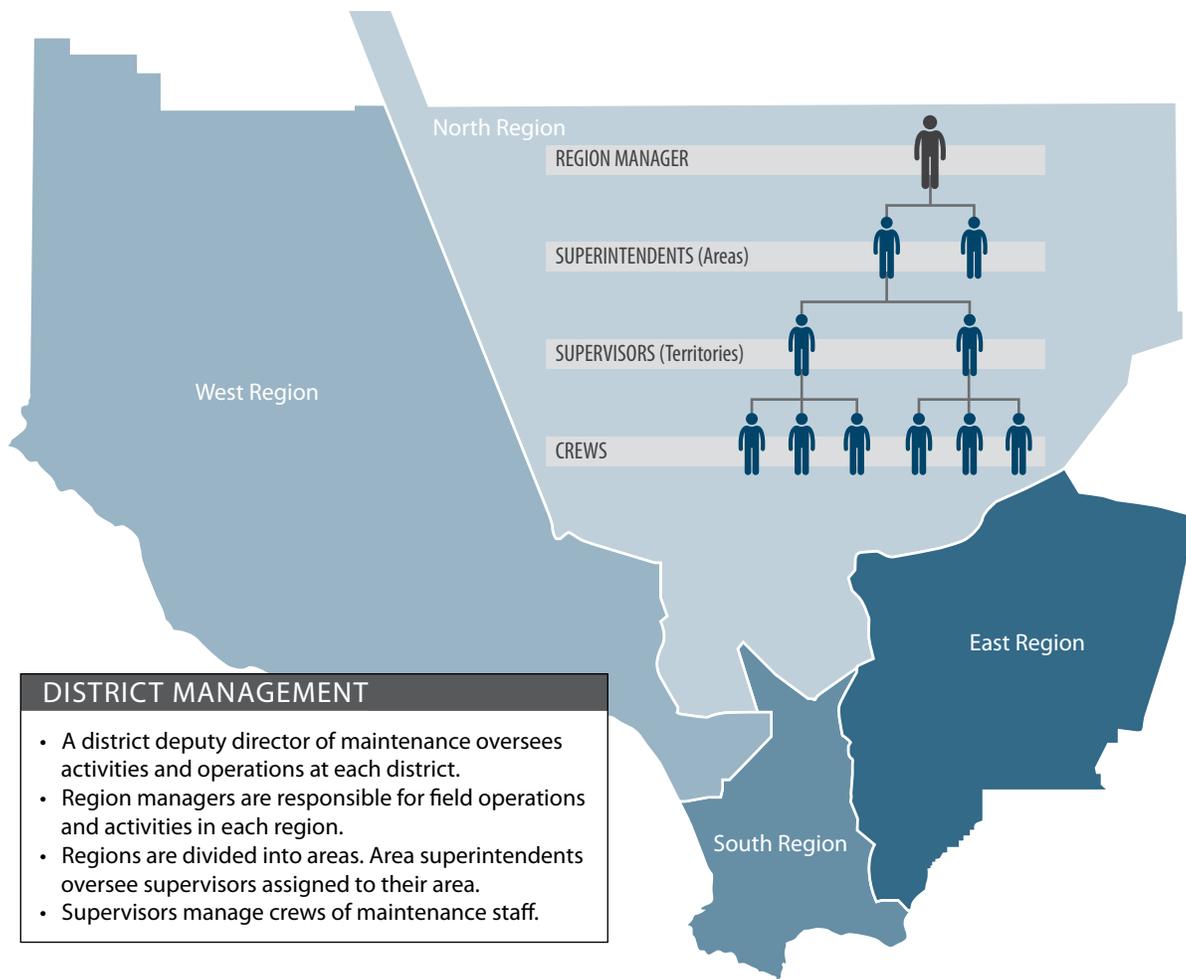
**Figure 2**  
California Department of Transportation Districts



Source: California Department of Transportation.

and supervisors. For example, a maintenance supervisor must fill out a work order in the maintenance management system for field maintenance work. The work order records the expenditures of labor, production units, vehicles, and materials, and the location where the crew performed the work.

**Figure 3**  
 Example of California Department of Transportation Division of Maintenance Region Boundaries and Management Structure Within District 7 (Los Angeles)



Sources: California Department of Transportation's maintenance manual and district 7 (Los Angeles) maintenance region boundary map.

## System for Evaluating Maintenance Performance

The maintenance division has a program for evaluating the maintenance level of service or performance that helps determine how well it maintains the state highway system under the maintenance program. The maintenance division annually conducts maintenance performance evaluations (service evaluations) for several categories of maintenance activities, representing a snapshot of the roadway conditions. These evaluations are separate from the general reviews maintenance personnel perform to identify needed maintenance work mentioned previously. Some examples of the categories are shown in Table 2 on the following page. The maintenance division calculates maintenance performance scores (service scores) for these categories. However, the maintenance division has set service score goals only for picking up litter and debris, maintaining lane striping, and repairing guardrails. According to the maintenance performance reports, these goals apply only to the state overall, not to the individual districts.

To perform the service evaluations, the maintenance division divides the state highway system into one-mile segments. It annually conducts service evaluations on a random sample of 20 percent of the one-mile segments within each district. Evaluators visually observe highway attributes to determine whether conditions are deficient and to determine the overall needs of each segment. Specifically, evaluators inspect a one-mile segment using a rating system such as the one shown in the text box and provide a score for that segment. Evaluators total and average the points for all the evaluated segments to calculate that district's service score. Low service scores indicate that the district has a high maintenance need. The maintenance division then averages all of the districts' service scores to calculate an overall statewide score for each category, with the exception of storm water. Rather than using the established service score goals to measure district performance, the maintenance division has established spending goals for five maintenance activities, shown in Table 2, that it requires each district to meet. We discuss the maintenance division's approaches for evaluating maintenance performance further in the Audit Results.

### Level of Service Rating System for Litter

- Pass (100): no deficiency
- Need 1 (50): one small area
- Need 2 (0): more than one area

Source: California Department of Transportation's *Fiscal Year 2014–15 Maintenance Level of Service Statewide Report Executive Summary*.

**Table 2**  
Examples of Service Score Categories and Goals

SERVICE SCORE CATEGORY	SERVICE SCORE IS CALCULATED	SERVICE SCORE GOAL HAS BEEN SET	SPENDING GOAL HAS BEEN SET
<b>Flexible Travelway</b>			
Cracks	✓	✗	✓
Potholes	✓	✗	✗
Paved shoulders	✓	✗	✗
<b>Rigid Travelway</b>			
Joint separation	✓	✗	✗
Slab failure	✓	✗	✗
Ramps	✓	✗	✗
<b>Drainage</b>			
Surface drains	✓	✗	✗
Ditches	✓	✗	✗
Slopes	✓	✗	✗
<b>Roadside</b>			
Vegetation	✓	✗	✗
Fences	✓	✗	✗
Litter and debris	✓	✓	✓
Graffiti	✓	✗	✗
<b>Traffic Guidance</b>			
Lane striping	✓	✓	✓
Raised markers	✓	✗	✗
Signs	✓	✗	✗
Guardrails	✓	✓	✓*
<b>Landscaping</b>			
Weed control	✓	✗	✗
Mulch	✓	✗	✗
Irrigation system	✓	✗	✗
<b>Storm Water</b>			
Storm water	NA	NA	✓

Sources: California Department of Transportation's (Caltrans) *Fiscal Year 2014–15 Maintenance Level of Service Statewide Report Executive Summary* and maintenance division expenditures dashboards.

✓ = Yes

✗ = No

NA: While the maintenance division has set a spending goal for storm water, storm water represents funding Caltrans receives that is not for any particular maintenance activity so the maintenance division does not calculate a service score or set a service score goal for storm water.

\* Caltrans set a spending goal for safety barriers, which include guardrails.

## Scope and Methodology

The Joint Legislative Audit Committee (audit committee) directed the California State Auditor to review the methods Caltrans used to make spending decisions related to the maintenance program. Table 3 lists the objectives that the audit committee approved and methods we used to address those objectives.

**Table 3**  
**Audit Objectives and the Methods Used to Address Them**

AUDIT OBJECTIVE	METHOD
1 Review and evaluate the laws, rules, and regulations significant to the audit objectives.	Reviewed relevant laws, rules, regulations, and other background materials related to the maintenance program.
2 Identify the actual, estimated, and proposed statewide expenditures for the program. Additionally, identify any trends in expenditures and reasons for the trends.	For our audit period of July 1, 2010, through June 30, 2015, we did the following: <ul style="list-style-type: none"> <li>• Reviewed budget documents and accounting records from the State Controller’s Office (State Controller) Appropriation Control Ledger, which shows cash expenditures for each fiscal year by fund, agency, and program.</li> <li>• Reviewed budgeted and actual expenditure amounts and compared year-over-year increases and decreases to identify trends. Interviewed relevant staff to determine reasons for the trends.</li> </ul>
3 Identify the sources of funding for the program and assess the method used by the California Department of Transportation (Caltrans) to determine the total amount of funding allocated to the statewide program each year. Additionally, determine whether Caltrans has taken advantage of all opportunities to maximize funding for the program and whether any additional sources of funding exist.	<ul style="list-style-type: none"> <li>• Reviewed annual budget documents to identify funding sources.</li> <li>• Reviewed Caltrans’ five-year maintenance plans and other relevant documentation of Caltrans’ process for determining the total amount of funding for the statewide program.</li> <li>• Reviewed budget documents and State Controller’s accounting records to determine whether Caltrans was using all the funds it received. Identified funds that reverted to the state highway account during our audit period and gathered evidence of the reasons for the reversions.</li> <li>• Interviewed staff and reviewed relevant documentation of Caltrans’ efforts to identify and secure additional funding from the federal government.</li> </ul>
4 Review and assess Caltrans’ method of allocating program funding throughout the State and determine whether the distribution of funding is fair and reasonable.	<ul style="list-style-type: none"> <li>• Interviewed staff about the process for determining allocations for positions and operating expenses.</li> <li>• Interviewed staff and reviewed documentation regarding the budget model the division of maintenance (maintenance division) developed to allocate field maintenance funding to the 12 districts but later abandoned.</li> <li>• Reviewed memorandums from fiscal years 2010–11 through 2014–15 that the maintenance division used to notify the 12 districts of their annual allocations. Compared the amounts in the memorandums with reports from Caltrans’ accounting system showing final allocations to identify any adjustments Caltrans may have made during the year.</li> <li>• Compared each district’s allocation with its traffic volume and maintenance performance scores to determine whether the distribution was commensurate with these indicators of maintenance needs and therefore fair and reasonable.</li> <li>• Reviewed the maintenance division’s processes for allocating funding for pavement, bridge, and culvert projects to determine whether they were needs-based, fair, and reasonable.</li> </ul>

*continued on next page...*

AUDIT OBJECTIVE	METHOD
5 To the extent possible, identify the current socioeconomic demographics of each district receiving funding. Additionally, determine the amounts received by those districts in each of the years reviewed.	<ul style="list-style-type: none"> <li>• Determined that all 12 districts received funding in each of the five fiscal years we reviewed. We determined the amounts received by each district, as described in objective 4. However, to analyze more precisely where the districts spent their field maintenance funding, we focused on the three districts we selected under objective 6.</li> <li>• Retained a geographic information systems consultant (consultant), ENPLAN, to identify socioeconomic demographics and determine where funds were spent in the three districts. We selected median income and race/ethnicity as the socioeconomic demographics we would review. The consultant used data from the U.S. Census Bureau's American Community Survey Five-Year Estimate (2009–2013). The consultant used census tract-level data to create the demographic map layer.</li> <li>• Compiled data related to the maintenance division's spending associated with field maintenance. Using data obtained from Caltrans' Integrated Maintenance Management System (IMMS), we filtered the IMMS data to arrive at the universe we used to complete our analysis. Specifically, the original IMMS data table contained a total of 17,348,866 records with work order cost details. We removed 7,465 records that contained illogical data. In addition, we identified only those work order cost details that were completed during the period July 2010 through June 2015 and were associated with work orders for specific roadway activity expenses—labor, vehicle, and materials—further reducing our universe to 11,296,096 records, which was the starting point of our analysis.</li> <li>• The consultant plotted spending data on maps to identify where spending occurred within each of the three selected districts.</li> <li>• Using Caltrans' climate and traffic zone data, the consultant identified areas of low spending (less than 50 percent of the average spending per mile in each zone) and high spending (more than 150 percent of the average spending per mile in each zone).</li> <li>• Compared areas of low and high spending with socioeconomic demographic information for the three districts. We found no clear correlation between the spending and demographics. We include the information in the Appendix to provide additional context for the areas of high and low spending.</li> </ul>
6 For three districts, including District 7 (Los Angeles and Ventura counties), perform the following to determine whether program funding is used in an effective and timely manner:	Selected two additional districts—district 4 (Oakland) and district 6 (Fresno)—based on geographic location, traffic volumes, population, socioeconomic demographics, and maintenance performance levels.
a. Evaluate the methodology used to estimate and propose maintenance expenditures pertaining to the district.	Confirmed with district deputy directors of maintenance at the three selected districts that they do not estimate and propose district maintenance expenditures. Rather, the maintenance division at headquarters determines the districts' allocations.
b. Review and assess the method used to identify and prioritize maintenance projects.	<ul style="list-style-type: none"> <li>• Interviewed relevant staff to determine what processes they had in place to identify and prioritize maintenance projects.</li> <li>• Reviewed the maintenance division's process for identifying and prioritizing field maintenance work and pavement, bridge, and culvert projects.</li> <li>• For both pavement and bridge projects at each of the three selected districts, compared projects identified in multiyear plans with the report in which the maintenance division prioritizes the projects it commits to complete each fiscal year.</li> <li>• Reviewed the process for addressing maintenance service requests submitted to each of the selected districts during the last five fiscal years.</li> </ul>
c. Determine the extent to which the program is properly managed and meeting its goals and objectives.	<ul style="list-style-type: none"> <li>• Interviewed relevant staff to determine whether they set goals for the districts.</li> <li>• Reviewed maintenance performance goals and analyzed them to determine whether districts were meeting the goals. Interviewed staff to determine whether maintenance performance was used to manage maintenance activities.</li> <li>• Obtained reports regarding pavement, bridge, and culvert maintenance that is backlogged. Interviewed relevant staff to understand the reasons for the backlogs.</li> <li>• Reviewed Caltrans' five-year maintenance plans, which contain goals for repairing pavement, bridges, and drainage culverts. We compared outstanding bridge maintenance recommendations with completed bridge projects to ensure the maintenance division was completing the bridge work it reported. We found that the number of pavement lane miles requiring maintenance is increasing and that the maintenance division is not making significant progress in repairing drainage culverts, as we discuss further in the Audit Results.</li> </ul>

AUDIT OBJECTIVE	METHOD
<p>d. For a selection of maintenance projects, determine whether the costs of the projects are reasonable, the completion is timely, and the reasons for any backlogs that exist.</p>	<ul style="list-style-type: none"> <li>• At each of the three districts, judgmentally selected five highway maintenance projects (four pavement projects and one bridge project). For each project performed the following:                             <ul style="list-style-type: none"> <li>– Compared bid amounts to final cost to determine whether costs were reasonable.</li> <li>– Compared number of working days proposed in the bid to actual working days to determine whether projects were completed in a timely manner.</li> </ul> </li> <li>• Selected four field maintenance work orders at district 4 and attempted to obtain supporting documentation for the labor, materials, and equipment costs but found that supporting documentation does not exist. Reviewed compensating controls that the maintenance division has put in place to ensure costs are reasonable. Reviewed Caltrans' internal audits related to field maintenance labor, materials, and equipment costs to identify issues.</li> <li>• Obtained data from Caltrans' maintenance service request system and calculated the number of days service requests remained open and unresolved.</li> <li>• Reviewed documentation related to goals for backlogged projects as described in objective 6c.</li> </ul>
<p>e. For a selection of program expenditures, determine whether they were reasonable and allowable.</p>	<ul style="list-style-type: none"> <li>• Selected the five largest expenditures for highway maintenance projects and five largest expenditures for field maintenance activities at each of the three selected districts. Reviewed the expenditures to determine whether Caltrans complied with applicable provisions in its maintenance manual and contract manager's handbook for approving expenditures and to determine whether the expenditures were reasonable and allowable.</li> <li>• Our review found that the expenditures were generally reasonable and allowable. Specifically, payments were supported by invoices and Caltrans staff had reviewed and approved the invoices for payment.</li> </ul>
<p>f. Determine the extent to which the district hires, monitors, and evaluates contractors.</p>	<ul style="list-style-type: none"> <li>• Obtained data from the maintenance division regarding the amount it spent for contracts in fiscal years 2010–11 through 2014–15.</li> <li>• For the 15 highway maintenance projects reviewed in objective 6d, reviewed relevant documentation to determine whether districts monitored and evaluated contractors. Our review found Caltrans generally had monitored and evaluated contractors appropriately.</li> </ul>
<p>g. Identify total available and filled positions, employees, and vacancies in the program and the impact vacancies have on the program.</p>	<ul style="list-style-type: none"> <li>• Obtained data from Caltrans' personnel system. Caltrans' data for the first two fiscal years of our audit period (2010–11 and 2011–12) did not identify maintenance program positions. Analyzed the data for fiscal years 2012–13 through 2014–15 to identify authorized, filled, and vacant positions and to calculate a vacancy rate for the three selected districts. We also reviewed blanket hiring authority and calculated how the vacancy rate increased when considering these data.</li> <li>• Interviewed relevant staff to obtain their perspective on the vacancies.</li> </ul>
<p>7 Determine if Caltrans is on track to spend the remaining American Recovery and Reinvestment Act (recovery act) funding before it reverts to the federal government and the extent to which these funds can and are being used for the program.</p>	<ul style="list-style-type: none"> <li>• Obtained reports related to recovery act funding from Caltrans.</li> <li>• Obtained reports from the California division of the Federal Highway Administration that show the total recovery act amounts awarded to Caltrans and the total amounts spent as of the last day the funding was available—September 30, 2015. Calculated the amount that reverted to the federal government.</li> </ul>
<p>8 Review and assess any other issues that are significant to the audit.</p>	<p>Reviewed projects included in the 2000 through 2012 State Highway Operation and Protection Program (SHOPP) plans to determine whether projects had been performed on highways with low and high spending for field maintenance in the districts we reviewed.</p>

Sources: California State Auditor's analysis of the Joint Legislative Audit Committee's audit request 2015-120 and information and documentation identified in the table column titled *Method*.

### Assessment of Data Reliability

In performing this audit, we obtained electronic data files extracted from the information systems listed in Table 4 on the following page. The U.S. Government Accountability Office, whose standards we are statutorily required to follow, requires us to assess the sufficiency and appropriateness of the computer-processed

information that we use to support our findings, conclusions, and recommendations. Table 4 describes the analyses we conducted using the data from these information systems, our methods for testing them, and the results of our assessments. Although these determinations may affect the precision of the numbers we present, there is sufficient evidence in total to support our audit findings, conclusions, and recommendations.

**Table 4**  
**Methods Used to Assess Data Reliability**

INFORMATION SYSTEM	PURPOSE	METHODS AND RESULTS	CONCLUSION
California Department of Transportation (Caltrans)  Integrated Maintenance Management System (IMMS)  Maintenance work data from July 1, 2010, through June 30, 2015	<ul style="list-style-type: none"> <li>To quantify the costs and labor hours for roadway field maintenance work orders completed by location.</li> <li>To make a selection of field maintenance work orders completed in Caltrans districts 4, 6, and 7.</li> </ul>	<ul style="list-style-type: none"> <li>We performed data-set verification procedures and found no issues. Further, we performed electronic testing of key data elements. We identified a number of records with illogical data. In some instances, we removed these records from our analysis as discussed in Table 3.</li> <li>We reviewed existing information to determine what is already known about the data and found that prior audit results indicate there are pervasive weaknesses in Caltrans' general controls.</li> </ul>	Not sufficiently reliable for these audit purposes. Although this determination may affect the precision of the numbers we present, there is sufficient evidence in total to support our audit findings, conclusions, and recommendations.
Position Tracking Automated System (PTAS)  Position data from July 1, 2011, through June 30, 2015	<ul style="list-style-type: none"> <li>To determine the average yearly authorized and vacant full-time equivalent maintenance program positions for Caltrans districts 4, 6, and 7 for the period from July 2012 through June 2015.</li> <li>To determine the average vacancy rates for authorized and blanket maintenance program positions in Caltrans districts 4, 6, and 7 in fiscal year 2014–15.</li> </ul>	<ul style="list-style-type: none"> <li>We performed data-set verification procedures and electronic testing of key data elements and did not identify any significant issues.</li> <li>We reviewed existing information to determine what is already known about the data, and found that prior audit results indicate there are pervasive weaknesses in Caltrans' general controls.</li> </ul>	
Environmental Systems Research Institute (ESRI) Arc Map system  Postmile latitude and longitude coordinates as of September 22, 2015	To identify the latitude and longitude coordinates for postmile points on California state highways.	<ul style="list-style-type: none"> <li>We performed data-set verification procedures and electronic testing of key data elements and did not identify any significant issues.</li> <li>We reviewed existing information to determine what is already known about the data and found that prior audit results indicate there are pervasive weaknesses in Caltrans' general controls.</li> <li>To gain some assurance of the completeness of ESRI Arc Map data, we traced 29 haphazardly selected latitude and longitude coordinates on California state highways to the ESRI Arc Map data and found no errors.</li> </ul>	

INFORMATION SYSTEM	PURPOSE	METHODS AND RESULTS	CONCLUSION
<p>Maintenance Service Request System</p> <p>Maintenance service requests submitted from July 1, 2010, through June 30, 2015, for Caltrans districts 4, 6, and 7</p>	<p>To determine the status of maintenance service requests submitted through Caltrans' online system for Caltrans districts 4, 6, and 7.</p>	<ul style="list-style-type: none"> <li>• We performed data-set verification procedures and electronic testing of key data elements and did not identify any significant issues.</li> <li>• We reviewed existing information to determine what is already known about the data and found that prior audit results indicate there are pervasive weaknesses in Caltrans' general controls.</li> </ul>	<p>Not sufficiently reliable for these audit purposes. Although this determination may affect the precision of the numbers we present, there is sufficient evidence in total to support our audit findings, conclusions, and recommendations.</p>
<p>A Caltrans-generated data file containing climate and traffic volume data for state highways as of 2010.</p>	<p>To determine the climate and traffic zones of the state highway system in Caltrans districts 4, 6, and 7.</p>	<ul style="list-style-type: none"> <li>• We performed data-set verification procedures and electronic testing of key data elements and did not identify any significant issues.</li> <li>• We reviewed existing information to determine what is already known about the data and found that prior audit results indicate there are pervasive weaknesses in Caltrans' general controls.</li> </ul>	<p>Complete for these audit purposes.</p>
<p>Consultants to Government and Industry Advantage system (Advantage)</p> <p>Financial data from July 1, 2010, through June 30, 2015</p>	<p>To make a selection of highway maintenance program expenditures, bridge projects, and pavement projects in Caltrans districts 4, 6, and 7.</p>	<ul style="list-style-type: none"> <li>• We performed data-set verification procedures and electronic testing of key data elements and did not identify any significant issues.</li> <li>• These purposes did not require a data reliability assessment. Instead, we gained assurance that the population was complete. To test the completeness of Caltrans' Advantage system, we haphazardly selected 29 maintenance program expenditures from the 2014 and 2015 source documents located at Caltrans' headquarters and five maintenance program expenditures from Caltrans' archived source documents. We then traced the maintenance program expenditures back to the Advantage data and found the data to be complete.</li> </ul>	<p>Complete for these audit purposes.</p>
<p>Advantage</p>	<ul style="list-style-type: none"> <li>• To determine allocations of maintenance program funding to Caltrans' 12 districts and headquarters.</li> <li>• To determine the amounts the maintenance division spent on contracts.</li> </ul>	<ul style="list-style-type: none"> <li>• We performed data-set verification procedures and electronic testing of key data elements and did not identify any significant issues.</li> <li>• We reviewed existing information to determine what is already known about the data and found that prior audit results indicate there are pervasive weaknesses in Caltrans' general controls.</li> </ul>	<p>Not sufficiently reliable for these audit purposes. Although this determination may affect the precision of the numbers we present, there is sufficient evidence in total to support our audit findings, conclusions, and recommendations.</p>
<p>U.S. Census Bureau, 2013 American Community Survey Five-Year Estimates (2009–2013)</p> <p>Socioeconomic information related to median income and race/ethnicity by census tract</p>	<p>To determine the median income and race/ethnicity that composes the majority of each census tract in Caltrans districts 4, 6, and 7.</p>	<p>We did not assess the reliability of these data because, according to standards of the U.S. Government Accountability Office, it is not necessary to conduct procedures to verify information that is used for widely accepted purposes and is obtained from sources generally recognized as appropriate, such as the U.S. Census.</p>	<p>Undetermined reliability for this audit purpose.</p>
<p>State Controller's Office Appropriation Control Ledger</p>	<p>To determine the maintenance division's expenditures for each fiscal year from July 2010 through June 2015.</p>	<p>We assessed the reliability of these expenditure records by reviewing testing of the appropriation control ledger system's major control features performed as part of the State's financial and federal compliance audits.</p>	<p>Sufficiently reliable for the purposes of presenting data on expenditures.</p>

Sources: California State Auditor's analysis of various documents, interviews, data obtained from Caltrans, and data from State Controller's Office Appropriation Control Ledger.

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## Audit Results

### **After Beginning to Develop a Logical Approach for Addressing Field Maintenance Needs, the Maintenance Division Abandoned It**

Through its prior budget model (model) and other planning documents, the California Department of Transportation (Caltrans) had laid out a logical approach for assessing and addressing field maintenance needs.<sup>5</sup> This included categorizing all state highways into specific zones based on climate and traffic volume. It also included calculating maintenance performance scores (service scores) for maintenance activities in each zone and setting goals for improving them. In concept this information should logically inform where maintenance needs are greatest and therefore how funding should be allocated and prioritized. However, the maintenance division abandoned this approach. In practice the maintenance division identifies field maintenance work based primarily on physical observations made by maintenance personnel who drive along sections of district roads and the division's reactions to public complaints. Further, instead of using the more localized zone approach for evaluating service scores, it uses a much higher-level evaluation by calculating an overall service score for certain maintenance activity categories each district is responsible for and averaging the district scores to derive statewide scores. In addition, the maintenance division only sets performance goals for improving three of the many categories of maintenance activities it reports on annually. It also has based annual funding allocations to the 12 districts on a simple average of historical spending rather than using service scores or zone-level information, despite reporting to the Legislature that it was using a more sophisticated method. Thus, it is not surprising that we found actual spending has not improved service scores and has been inconsistent among roadways in similar zones.

### ***The Maintenance Division Does Not Use Key Indicators and Performance Information to Strategically Plan Field Maintenance Activities***

The Federal Highway Administration, other state departments of transportation, and additional entities have established that traffic volume, climate, and environmental factors are key factors that influence highway maintenance needs. Further, Caltrans'

<sup>5</sup> This budget model is not the same as the statutorily required budget model described in the Introduction. The maintenance division intended to use the field maintenance budget model to allocate field maintenance funding among the 12 districts. In contrast, the statutorily required budget model is intended to balance resources between the State Highway Operation and Protection Program and the Maintenance Program. Caltrans includes the statutorily required budget model in the section of its five-year maintenance plan titled "Analysis of Alternative Levels of Maintenance Investment."

maintenance manual states that the need for maintenance activities, such as routine litter removal and road sweeping frequencies, is very sensitive to traffic volumes. In 2009 the maintenance division developed a budget model for its field maintenance program that accounted for some of these key factors. Specifically, that model would have allowed the maintenance division to identify the resources needed to maintain highways with similar climate and traffic volume at a given maintenance performance level. However, despite paying a consultant roughly \$250,000 to develop the model, the maintenance division never implemented it. According to the deputy director for maintenance and operations (deputy director)—who was the chair of the steering committee responsible for overseeing the consultant’s efforts in developing and implementing the model—the model suggested unreasonable allocations to the districts, such as reducing district 7’s (Los Angeles) staff by roughly 100 positions, so the maintenance division abandoned it.

### Highway Zone Climate and Traffic Categories

#### Climate Region

- Inland Valley
- Desert
- Low Mountain
- High Mountain
- North Coast
- South Coast

#### Traffic Volume (average daily traffic)

- Level 1: 0–2,500
- Level 2: 2,501–10,000
- Level 3: 10,001–25,000
- Level 4: 25,001–100,000
- Level 5: 100,001 +

Source: California Department of Transportation’s budget model *User Manual and Technical Guide*.

In concept, the model would have shifted the maintenance division’s assessment of maintenance need from a district-level analysis to a more granular and informative route-level analysis. After dividing all state highways, or routes, into segments by county, the model grouped these segments into one of five climate regions and six traffic volume categories, as shown in the text box. Generally, roads with higher traffic volume have greater field maintenance needs. For example, the model categorized the segment of Interstate 80 in Sacramento County as having inland valley climate and the highest traffic volume, level 5 (Inland-5). The model referred to each combination of climate region and traffic volume category, such as Inland-5, as *zones*. The model established service scores at the zone level and, using historical trends of expenditures and labor hours, estimated the resources needed to maintain those scores. Finally, using this zone-level information and data about the inventory of assets subject to maintenance activities, the model would have established baseline funding needs and allocations to maintain similar highways within the state to a specified service score.<sup>6</sup>

<sup>6</sup> *Inventory* refers to individual elements of statewide infrastructure that include lane miles of roads, bridges, tunnels, etc.

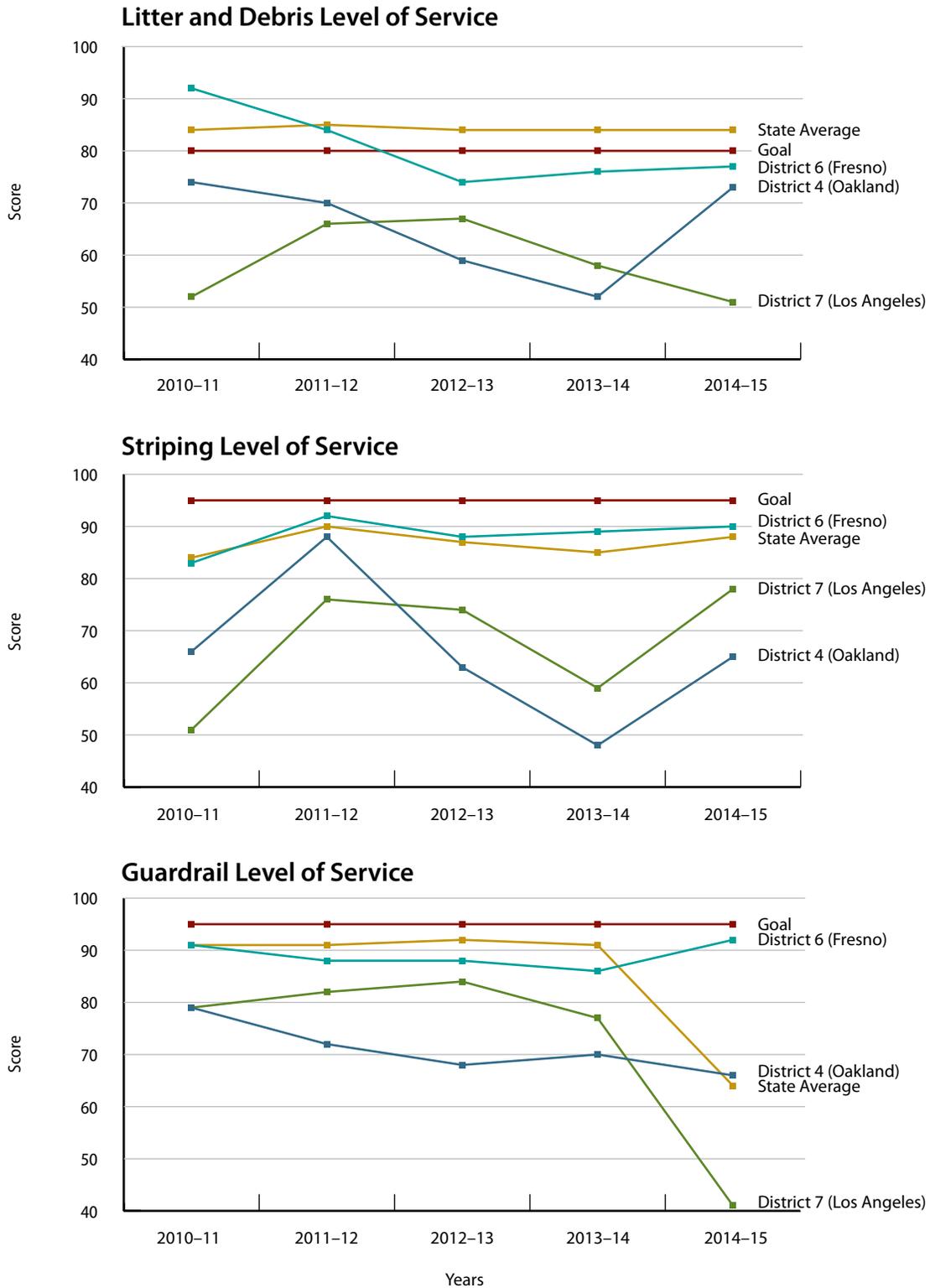
However, the maintenance division did not implement the zone-level evaluation of service scores it had envisioned in its abandoned budget model. While that approach would have allowed it to monitor each district's maintenance performance by zone, its current methodology of sampling roads for evaluation does not provide this level of information. Specifically, the current methodology gathers information only for each district as a whole and does not accurately identify differences in maintenance needs that exist within each district. As mentioned in the Introduction, the maintenance division calculates service scores for many maintenance activities but only sets service score goals for three of them: litter and debris, guardrails, and striping. In addition, these goals apply only to overall statewide performance, not to individual districts.

In Figure 4 on the following page we present the statewide service goals and service scores for the categories of maintenance activities for which the maintenance division has established service score goals. We also include the service scores for each of the three districts we reviewed: district 4 (Oakland), district 6 (Fresno), and district 7 (Los Angeles). The maintenance division calculates the statewide service scores by averaging the respective scores of each district. From fiscal year 2010–11 through 2014–15, the state average service score was below the goal for striping and guardrails, but was above the goal for litter and debris. However, the service scores for the three districts we reviewed were generally below the state average. Moreover, although service scores for these districts have been volatile, scores for districts 4 and 7 have generally been well under the state average, as Figure 4 shows.

However, the maintenance division does not weight districts' service scores to account for differences in traffic, terrain, or climate, even though the maintenance performance statewide report for fiscal year 2014–15 stated that readers should consider these characteristics when comparing scores for each district. For example, districts 4 (Oakland) and 7 (Los Angeles), which handle almost 43 percent of the State's traffic volume, have the same impact on the overall state service score as do districts 1 (Eureka) and 9 (Bishop), which together handle about 1 percent of the State's traffic. Evaluating maintenance performance without including traffic volume allows the several small districts with minimal traffic to outweigh the few large districts with the majority of the State's traffic, skewing the statewide score higher. When we weighted the score for fiscal year 2014–15 to reflect the traffic volume in each district, we found that although the statewide score for guardrails did not change, the scores for striping and litter and debris worsened by between five and nine points.

*Evaluating maintenance performance without including traffic volume allows the several small districts with minimal traffic to outweigh the few large districts with the majority of the State's traffic, skewing the statewide score higher.*

**Figure 4**  
Service Scores for Categories With Service Goals for Districts 4 (Oakland), 6 (Fresno), and 7 (Los Angeles)  
Fiscal Years 2010–11 Through 2014–15



Sources: California Department of Transportation's *Maintenance Level of Service Statewide Reports Executive Summaries* for fiscal years 2010–11 through 2014–15.

Instead of holding individual districts accountable for meeting service score goals for field maintenance activities, the maintenance division established spending goals for specific activities that the districts monitor as indicators of performance. When we inquired as to how these spending goals were derived, the division was unable to support how the spending goals were originally established—it only asserted that they are adjusted based on past expenditures and service scores. According to the assistant maintenance division chief for the office of administration and budgets (assistant division chief), these spending goals provide direction to the districts on improving service scores. Although there is value in monitoring spending, this approach alone does not account for the actual activities that need to be completed or the outcomes from that spending that would result in improved service scores. In fact, our review found instances where the districts' service scores decreased even though the districts sometimes exceeded their spending targets. For example, despite spending more than its target for litter and debris since fiscal year 2012–13, district 7's (Los Angeles) service scores for this category declined.

Despite the fact that the service scores for the districts we reviewed have generally not met the statewide goals, the maintenance division could not demonstrate that it is using this information to strategically plan its work to address maintenance needs and improve service scores. While the maintenance division's service score evaluation guide states that managers can use service scores in conjunction with their own knowledge and other evaluation data to develop plans and set priorities, we found that districts do not use the service scores to identify and prioritize their field maintenance work. Deputy district directors of maintenance (district maintenance deputies) we spoke with stated that they do not use service scores to inform how they plan or prioritize the field maintenance work they perform. Because districts are not using information regarding field maintenance needs to plan and prioritize, their field maintenance work appears to be performed on an impromptu basis and is not consistent with need.

In addition, the three districts we reviewed generally create only short-term plans for activities they intend to complete during the following one or two weeks; such plans do not adequately establish priorities or facilitate the monitoring of progress toward improving service scores. For example, district 6 (Fresno) provided us with emails that supervisors sent to superintendents that briefly described activities they intended to complete over the next week. In the 2005 version of its maintenance manual, the maintenance division included requirements for districts to formally plan and monitor field maintenance work using the maintenance management system and requirements for region managers and

***Because districts are not using information regarding field maintenance needs to plan and prioritize their field maintenance work, the work appears to be performed on an impromptu basis and is not consistent with need.***

***Without adequate plans for completing field maintenance work, district staff are not being held accountable for how well they address field maintenance needs.***

district maintenance deputies to review annual workload plans. The manual also required districts to take into account service scores at the route level when developing plans.

These plans would have enabled management to establish and document priorities and develop a baseline by which to measure progress. For example, the maintenance manual specifies that districts are to establish routine litter removal and sweeping frequencies for each highway segment based on the rate at which litter, debris, and sediment accumulate. However, according to the division chief, the maintenance division subsequently removed the field planning requirements from the maintenance manual because districts determined that using the planning and scheduling module in the maintenance management system was very time-consuming. Despite the significant benefits of formally planning field maintenance work, the maintenance division did not develop alternate planning methods that it believed were more feasible. Without adequate plans for completing field maintenance work, district staff are not being held accountable for how well they address field maintenance needs, as evidenced by the low service scores and the inconsistent spending discussed in a later section.

The division chief also asserted that maintenance crews cannot always adhere to work plans because they are regularly redirected from completing planned work to address emergency work, such as clearing accident scenes and addressing other urgent highway issues. However, we do not agree with that rationale for not planning work. If crews cannot strictly follow their plan because of the responsive nature of maintenance work, these deviations from the plan will shed light on what work activity is not getting accomplished and what changes to resource allocations should be made. While we agree that the maintenance division must respond to emergencies and may need to interrupt or reschedule routine work, those interruptions make it especially important to plan and prioritize the maintenance division's other work to ensure that it is adequately addressing field maintenance needs.

***The Maintenance Division Does Not Allocate Field Maintenance Funding to Its Districts Based on Key Indicators of Need***

The maintenance division does not use key indicators of field maintenance need, such as traffic volume and service scores, to allocate funding to the districts. Thus, some districts may not be receiving adequate funding to meet their field maintenance needs, which may delay the work and result in more costly future repairs. We found that the proportion of maintenance funds the maintenance division allocated to each district remained roughly the same for fiscal years 2010–11 through 2014–15, as Table 5 shows.

**Table 5**  
**California Department of Transportation Division of Maintenance Allocations of Maintenance Program Funding to the Districts and Headquarters**  
**Fiscal Years 2010–11 Through 2014–15**

	FISCAL YEAR 2010–11	FISCAL YEAR 2011–12	FISCAL YEAR 2012–13	FISCAL YEAR 2013–14	FISCAL YEAR 2014–15
District 1 (Eureka)	\$43,029,662	\$32,867,925	\$47,611,739	\$45,393,086	\$42,266,069
District 2 (Redding)	66,373,821	61,677,143	61,817,647	64,908,119	70,069,479
District 3 (Marysville)	115,878,610	100,368,446	92,961,662	109,275,871	116,896,285
District 4 (Oakland)*	154,851,477	150,110,958	172,561,926	151,492,677	160,405,815
District 5 (San Luis Obispo)	52,509,804	53,308,742	36,521,774	47,253,414	57,951,401
District 6 (Fresno)*	80,203,232	81,585,820	81,710,979	81,469,870	93,469,564
District 7 (Los Angeles)*	164,458,341	173,443,490	145,577,384	151,959,677	167,490,827
District 8 (San Bernardino)	107,998,998	108,706,246	93,875,323	85,494,829	106,996,691
District 9 (Bishop)	30,340,056	27,484,149	30,572,337	31,253,822	33,158,160
District 10 (Stockton)	64,175,575	64,369,844	57,533,387	61,511,945	69,905,348
District 11 (San Diego)	77,077,839	66,541,799	57,718,317	65,765,906	75,703,342
District 12 (Irvine)	47,130,705	47,533,874	43,821,146	45,119,848	42,691,895
Headquarters†	244,176,880	172,298,564	208,315,953	210,704,765	161,870,124
<b>Totals</b>	<b>\$1,248,205,000</b>	<b>\$1,140,297,000</b>	<b>\$1,130,599,574</b>	<b>\$1,151,603,829</b>	<b>\$1,198,875,000</b>
	<b>100%‡</b>	<b>100%‡</b>	<b>100%‡</b>	<b>100%‡</b>	<b>100%‡</b>

Source: California Department of Transportation's financial system.

\* We selected district 4 (Oakland), district 6 (Fresno), and district 7 (Los Angeles) for detailed review as part of our audit.

† The maintenance division's allocation of maintenance funding to headquarters was primarily to the following four divisions: division of maintenance, division of engineering services, division of procurement and contracts (specifically, warehouse), and division of audits and investigations.

‡ Percentages do not add to exactly 100 percent for all fiscal years due to rounding.

At most, the percentage of allocations to each of the districts changed by zero to two percentage points year to year. The allocations for headquarters had slightly wider swings; its allocations ranged from a high of 20 percent in fiscal year 2010–11 to a low of 14 percent in fiscal year 2014–15. Although these allocations generally aligned with the number of lane miles in each district, they were not commensurate with other indicators of maintenance need. One key indicator of each district's maintenance need is traffic volume, which was a key element of the abandoned budget model and, as previously mentioned, a key indicator used by several other governmental entities.

Figure 5 shows that although some districts have a significantly higher proportion of traffic volume, the maintenance division does not allocate a commensurate proportion of funding to those districts. For example, as previously mentioned, together districts 4 (Oakland) and 7 (Los Angeles) handle 43 percent of the State's traffic volume, but these two districts together received only 27 percent of maintenance program's funding in fiscal year 2014–15. On the other hand, multiple districts with significantly lower traffic volume received disproportionately large allocations. For instance, districts 1 (Eureka), 2 (Redding), and 9 (Bishop) together received 13 percent of total program funding in fiscal year 2014–15, despite only handling 3 percent of the state's traffic volume. Although traffic volume is not the only indicator of maintenance need, the large differences between districts' proportions of traffic volume and allocations suggest that the maintenance division should revise its allocation methodology.

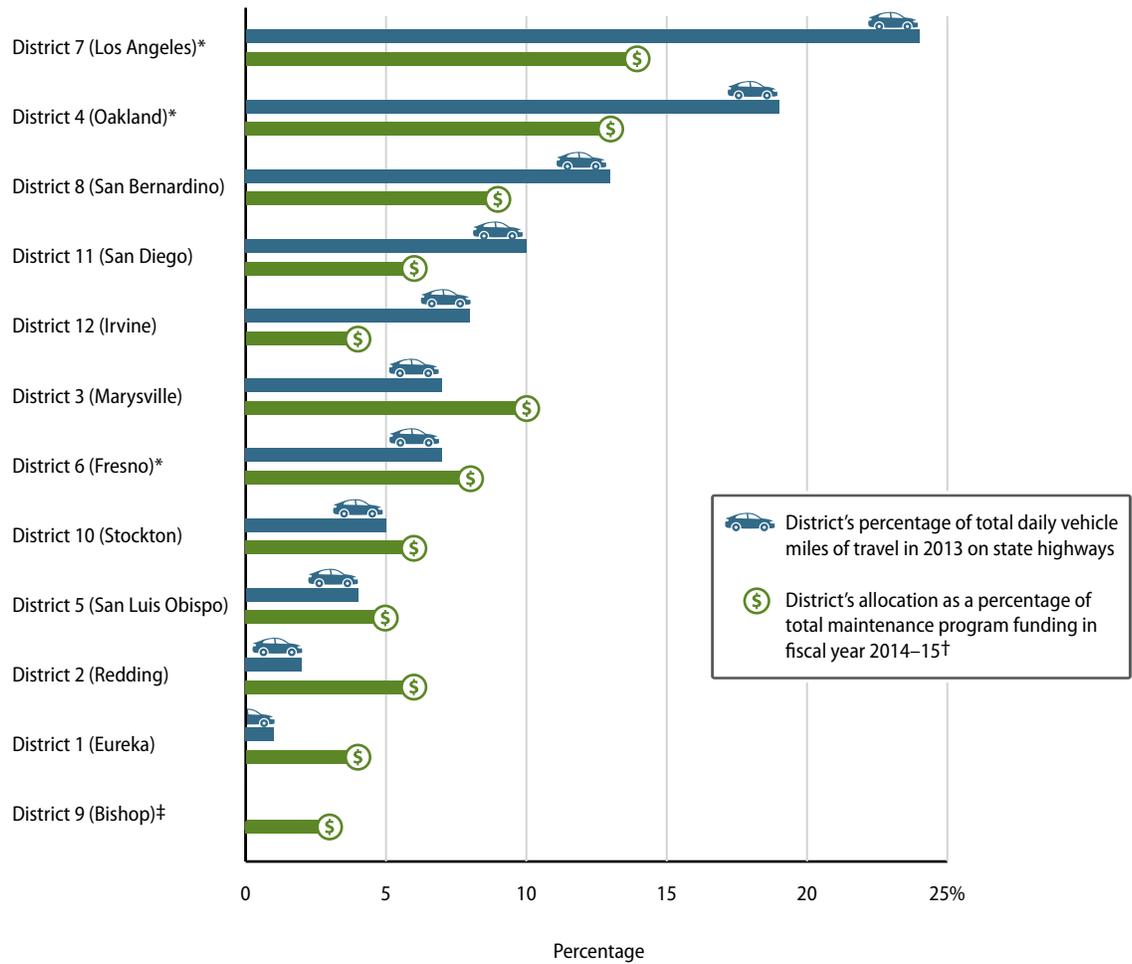
***The maintenance division does not allocate funding based on districts' service scores. Consequently, some districts may not have the resources to improve those scores.***

The maintenance division also does not allocate funding based on districts' service scores. Consequently, some districts may not have the resources to improve those scores. As we describe in the Introduction, the maintenance division annually determines service scores to measure districts' field maintenance performance. The maintenance division's performance evaluation guide states that one important objective of evaluating performance is to assess statewide maintenance needs. However, although service scores at some districts were generally low over the last five fiscal years, the maintenance division did not revise those districts' overall allocations to address those low service scores. For example, from fiscal year 2010–11 through 2014–15, service scores for litter and debris, striping, and guardrails at districts 4 (Oakland) and 7 (Los Angeles) have, for the most part, been significantly below both the state goal and the state average.

Because the maintenance division does not allocate its funding commensurate with key indicators of maintenance needs, some districts may not be able to fully address these needs, which can delay maintenance work and result in more costly repairs in the

future. This effect is exacerbated because headquarters is potentially underfunding those districts where a significant portion of the State’s highway traffic is occurring and that have low service scores.

**Figure 5**  
**Percentages of Maintenance Program Funding Districts Received in Fiscal Year 2014–15 Compared to Districts’ Percentages of 2013 Daily Vehicle Miles of Travel on State Highways**



Sources: California State Auditor’s analysis of allocation data for fiscal year 2014–15 from California Department of Transportation’s (Caltrans) financial system and daily vehicle miles of travel on state highways data from Caltrans’ 2013 California Public Road Data report.

\* We selected district 7 (Los Angeles), district 4 (Oakland), and district 6 (Fresno) for detailed review as part of our audit.

† Caltrans headquarters received 14 percent of maintenance program funding in fiscal year 2014–15.

‡ District 9 (Bishop) handles 0.4 percent of the State’s daily vehicle miles of travel on state highways.

***The Maintenance Division Has Mischaracterized the Sophistication of the Method It Uses to Allocate Field Maintenance Funding to the Districts***

Although it did not implement the model that it developed for its field maintenance activities, the maintenance division has been reporting to the Legislature and other decision makers that it was using the model's sophisticated methodology for allocating field maintenance funds. As we previously noted, the maintenance division has continued to allocate funding in roughly the same proportions from fiscal year 2010–11 to 2014–15. For example, district 7 (Los Angeles) has received between 13 and 15 percent of the total allocation in each of the last five fiscal years. Although the maintenance division's process for allocating funding to the districts is not well documented, the maintenance division asserted that it has allocated field maintenance funding to the districts using the number of positions in each district and averaging the districts' historical expenditures. The maintenance division annually informs districts of their allocations and instructs districts not to exceed them. We verified with the three districts we reviewed that they do not estimate and propose allocations to the maintenance division. The deputy director and the division chief stated that they do not know when the maintenance division originally started using this allocation methodology or how it originally determined the number of staff positions and the funding allocations for field activities for each district.

**Excerpt from the California Department of Transportation's 2015 Five-Year Maintenance Plan**

The Maintenance Program Budget Model was developed to enhance budget management capabilities on an annual basis. The performance-based model uses a combination of historical expenditures, Level of Service performance measures, and inventory data to project future resource needs with performance-level expectations for the entire State Highway System. While the budget model does include all resources, the model is used primarily to determine a performance-based budget for field maintenance activities.

Historically, the budget model grouped Caltrans' 12 districts into sets of comparable units using geographic, population, and traffic volume characteristics. Current versions of the model have shifted the focus from district-level analysis to route-level analysis by grouping all routes based on traffic volumes and geographic locations. Through route-level analysis, the budget model provides detailed comparative analysis for determining relationships between performance and resource needs for each highway inventory unit which creates standardized allocation and efficiency rates for each route.

**The budget model is used:**

- To measure the direct relation between funding and Level of Service, and the effects of changes to either.
- To measure an efficiency curve at the route level for statewide comparisons.
- To measure a standardized allocation process for inventory items at a route level for life-cycle cost and asset management practices.
- To assist decision makers in determining the best course of action relative to budgetary and performance issues.
- To predict funding needs based on project delivery actions and decisions.

Source: California Department of Transportation's 2015 Five-Year Maintenance Plan (maintenance plan).

Note: The 2011 and 2013 maintenance plans contained the same descriptions of the budget model, except for minor word changes.

However, Caltrans consistently reported that it was using the model "to determine a performance-based budget for field maintenance activities" in the 2011, 2013, and 2015 updates to its five-year maintenance plans (maintenance plan). As shown in the text box, in these plans Caltrans also provided additional details and reported that "through route-level analysis, the budget model provided detailed comparative analysis for determining relationships between performance and resource needs for each highway inventory unit which created standardized allocation and efficiency rates for each route." However, as previously mentioned, according to the deputy director, the maintenance division has never used the model to calculate route-level allocations to the districts for the entire field maintenance budget. Consequently, the Legislature and other decision makers may have believed that the maintenance division was using a more sophisticated approach to allocate funding to the districts than it actually

has, and thus they may have been less willing to challenge or question the allocations. The division chief stated that his staff will revise the language in the subsequent maintenance plans to more accurately depict how the maintenance division currently allocates funding for field activities to the districts.

Although the division chief agreed that allocating funding for field activities using traffic volume and service scores would result in allocations commensurate with districts' needs, he stated it would not improve large urban districts' service scores because these districts would not be able to spend their increased allocations. According to the deputy director and the division chief, large urban districts—such as districts 4 (Oakland) and 7 (Los Angeles)—cannot fill many of their field staff positions because of staff turnover resulting from the high cost of living, terms in union agreements that affect how the program advertises field positions, and the department's lengthy hiring process. However, if indicators of maintenance need show that funding allocations should be adjusted, we believe the maintenance division needs to work on resolving any challenges that it encounters. In addition, our analysis showed that the vacancy rates in the three districts that we reviewed remained consistently low. Specifically, the average vacancy rate for authorized positions was 3 percent or less from fiscal year 2012–13 through 2014–15. In fiscal year 2014–15, districts 4 (Oakland), 6 (Fresno), and 7 (Los Angeles) on average had 912, 325, and 876 authorized positions, respectively. Additionally, Caltrans asserted that it allocates blanket positions to the districts, and when we considered that information, average vacancy rates at the reviewed districts did not increase significantly and ranged from 4 percent to 10 percent in fiscal year 2014–15.<sup>7</sup> According to the assistant division chief, Caltrans is reviewing its existing hiring processes and policies to expedite the hiring process for field maintenance staff.

### ***The Maintenance Division Does Not Spend Its Field Maintenance Funds Consistent With Some Indicators of Need***

Given the shortcomings with the maintenance division's approach to planning and allocating funds we discussed in previous sections, we were not surprised to find that actual spending for field maintenance work was not consistent with key indicators of need. Our review of Caltrans districts 4 (Oakland), 6 (Fresno),

<sup>7</sup> In its March 2012 *Budget Letter 12-03*, the Department of Finance stated that departments can use blanket hiring authority to fill positions beyond approved position authority on a temporary basis for operational needs. Specifically, it stated that departments can use blanket authority for temporary issues, such as hiring retired annuitants or seasonal staff, or payment of leave balances. According to this budget letter, departments also may hire permanent employees within the blanket authority if no vacant positions exist; however, permanent employees must be moved from the blanket authority once authorized positions become vacant.

***The maintenance division's inconsistent spending for field maintenance suggests that it should assess whether it is effectively addressing maintenance needs.***

and 7 (Los Angeles) found that each district spent different amounts for field maintenance on highways with similar maintenance needs based on key indicators Caltrans identified—traffic volume and climate. For example, each of the three districts spent different average amounts per mile on certain highways that had similar field maintenance needs. In addition, we found that each district spent significantly less on some highways in its district than it spent on others with similar maintenance needs. While other indicators of maintenance need may also affect spending, the inconsistent spending we identified suggests that the maintenance division should assess whether it is effectively addressing maintenance needs. By potentially underspending, it increases the personal safety and environmental risks posed by unmet maintenance needs, such as excess litter or graffiti, guardrails in need of repair, unfilled potholes, and untended landscaping. Further, unperformed maintenance activities can result in more significant future repair costs.

When we used the abandoned model's zone methodology to compare average spending per mile during our audit period, we found districts sometimes spent significantly different amounts for field maintenance on highways with similar maintenance needs. For example, each of the three districts we reviewed has highways in an inland valley climate with traffic volume levels 1 through 4. Table 6 shows that district 7 spent roughly twice as much per mile on highways classified as Inland-3 as did districts 4 and 6: \$154,000 compared to \$71,000 and \$62,000, respectively. In addition, district 7 spent more than \$1 million per mile to maintain its four-mile-long section of Inland-2 highway, while it spent only \$334,000 per mile to maintain its Inland-5 highways. According to the district maintenance deputy for district 7 (Los Angeles), the high spending along this section of Inland-2 highway was driven by work including landscaping, highway sweeping, and removal of debris and graffiti, which required costly lane closures. Table A in the Appendix shows the average spending per mile for each zone in the three Caltrans districts we reviewed. Because highways with similar characteristics should give an indication of similar maintenance and resource needs regardless of which district they are in, these spending variances among the districts may mean that the districts are not spending sufficient resources to meet maintenance needs, not receiving sufficient resources, or they are not spending their resources efficiently.

For the three reviewed districts, we plotted the maintenance division's field maintenance expenditure data from fiscal years 2010–11 through 2014–15 on highway zone maps to see how each district's field maintenance spending corresponded to maintenance need. Specifically, we first calculated the average dollars that each district spent per mile in each of the zones. Then we compared sections of highways that are in similar zones and identified those sections where the district spent below 50 percent of the average. We considered

this to be *low spending*. We also identified *high spending* for each zone as more than 150 percent of the average spent per mile in the respective zone. As part of our analysis, we reviewed SHOPP projects planned since 2000 that rehabilitated the pavement and might have reduced the amount of spending for field maintenance needed on the highways we identified. We found that SHOPP projects had been performed on some roads with low spending as well as on some roads with high spending; thus, it appears that the inconsistent spending is not entirely explained by those projects.

**Table 6**  
**Average Spending per Mile in Inland Valley Climate Zones**  
**Fiscal Years 2010–11 Through 2014–15**

CLIMATE / TRAFFIC ZONE		AVERAGE DOLLARS SPENT PER MILE PER ZONE		
CLIMATE	TRAFFIC VOLUME*	DISTRICT 4 (OAKLAND)	DISTRICT 6 (FRESNO)	DISTRICT 7 (LOS ANGELES)
Inland Valley	1 (0–2,500)	\$22,000	\$47,000	\$79,000
Inland Valley	2 (2,501–10,000)	41,000	32,000	1,007,000
Inland Valley	3 (10,001–25,000)	71,000	62,000	154,000
Inland Valley	4 (25,001–100,000)	90,000	115,000	107,000
Inland Valley	5 (100,001+)	159,000	NA	334,000

Sources: California Department of Transportation’s (Caltrans) integrated maintenance management system and Caltrans’ climate region and traffic volume data.

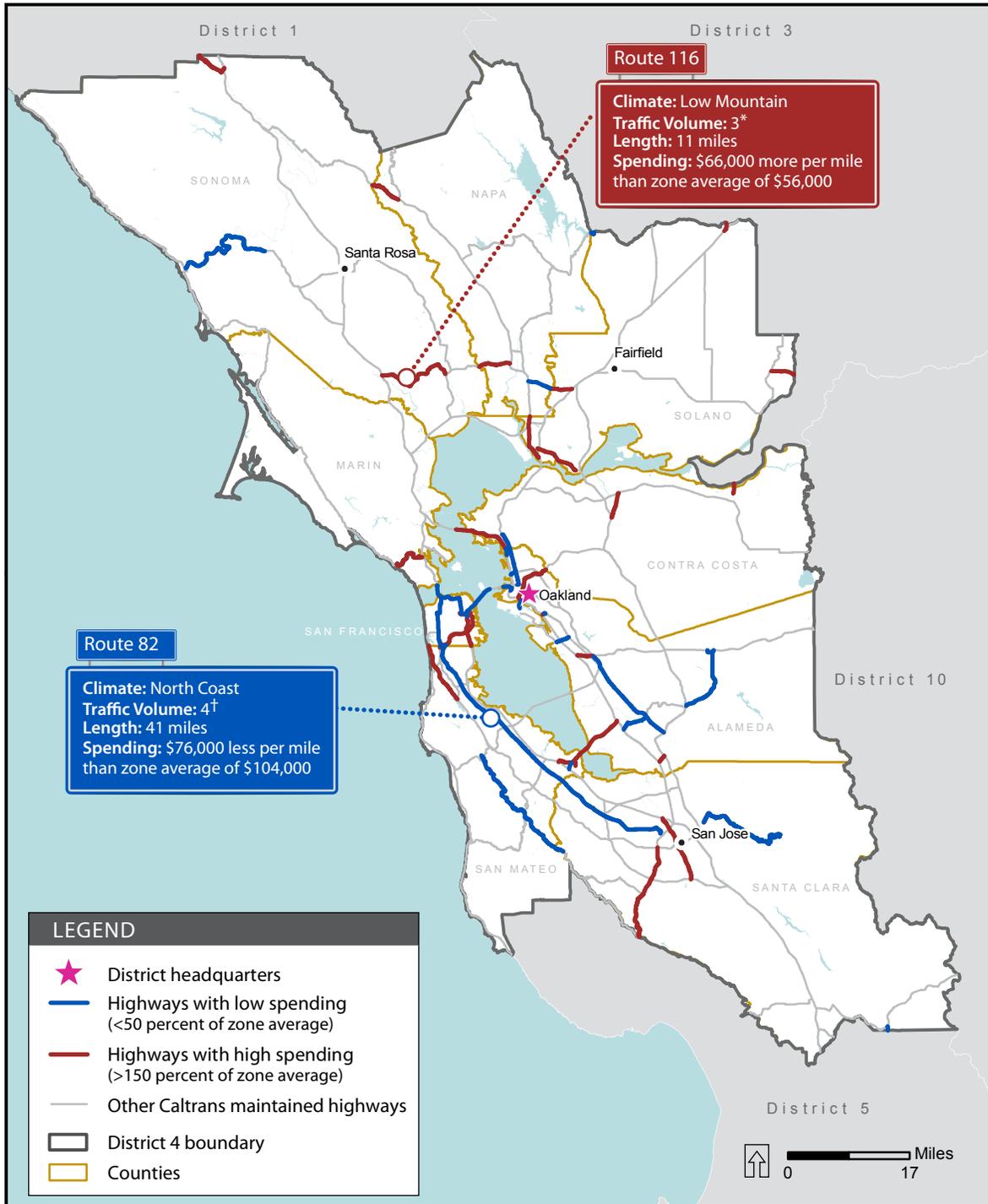
Note: Average dollars spent per mile are weighted for mileage and rounded to the nearest thousand.

NA = District 6 (Fresno) does not have any highways in the inland valley climate with a traffic volume 5.

\* Traffic volume indicates average daily traffic.

Figure 6 on the following page identifies in blue the sections of highways on which district 4 spent less for field maintenance than it spent on other highways in the same district with similar maintenance needs. For example, the blue text box in Figure 6 shows a section of an approximately 41-mile stretch of Route 82 in district 4 that is in the North Coast-4. On average, district 4 spent \$104,000 per mile to maintain North Coast-4 roads. However, it spent only an average of \$28,000 per mile for field maintenance on this particular section of Route 82, despite this section having maintenance needs similar to the district’s other North Coast-4 roads. This is a difference of 73 percent—or almost \$76,000 less per mile in spending—compared to other similar roads in district 4. Similarly, Figure 6 shows in red the sections of highways in district 4 with high spending. In particular, the red text box in Figure 6 shows district 4 spent \$66,000 more per mile than the average of \$56,000 for its Low Mountain-3 highways, or \$122,000 per mile on an 11-mile section of Route 116 in Sonoma County, which is more than twice the average. Both district 6 and district 7 also spent field maintenance funds inconsistently on highways with similar maintenance needs. Figures 7 and 8 on pages 37 and 38 show sections of highways in districts 6 and 7, respectively, on which these districts spent more than 150 percent of the average or more than 50 percent below the average.

**Figure 6**  
Field Maintenance Per-Mile Spending, District 4 (Oakland) Highways

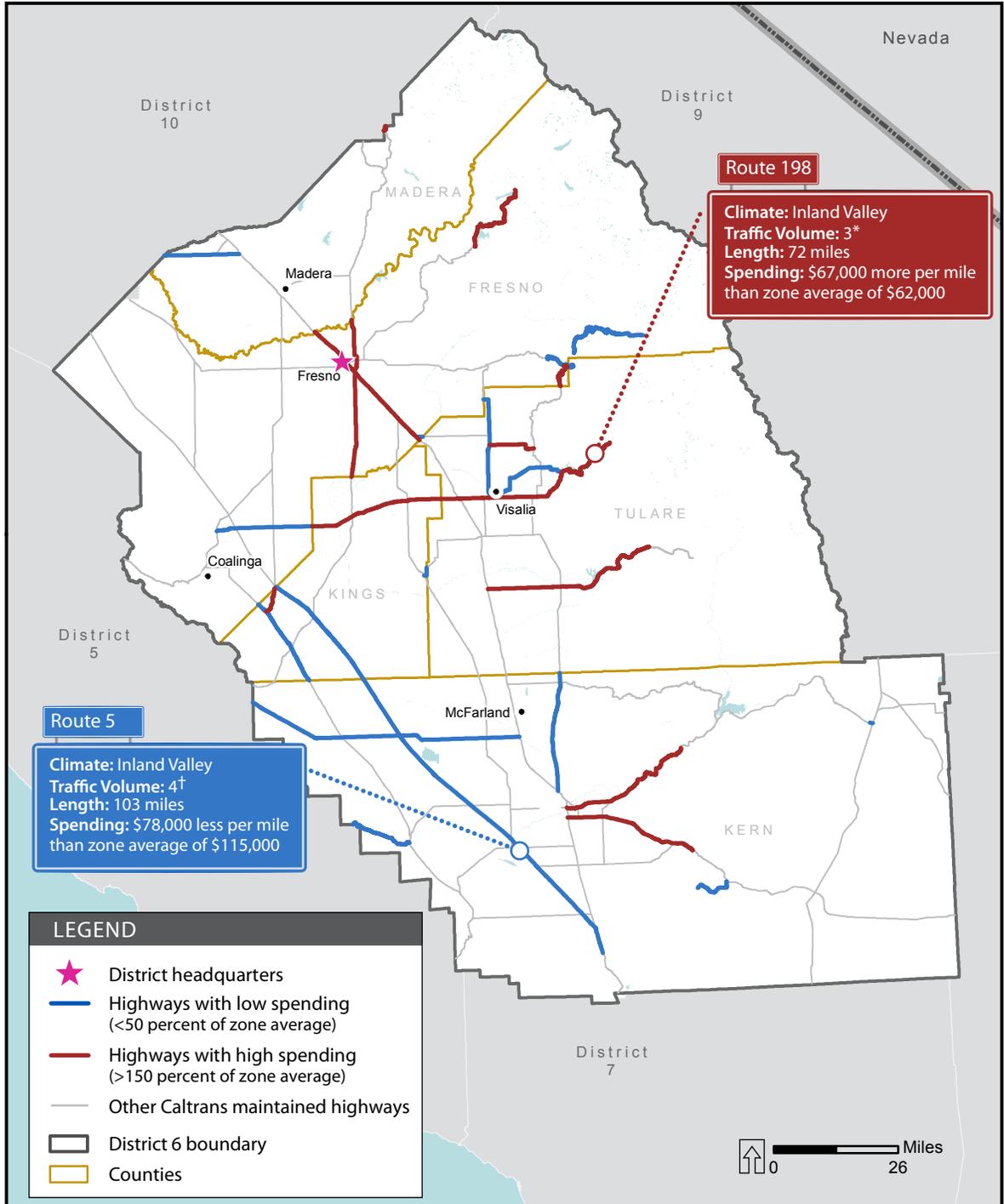


Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data.

\* Traffic volume 3 indicates average daily traffic of 10,001–25,000.

† Traffic volume 4 indicates average daily traffic of 25,001–100,000.

**Figure 7**  
 Field Maintenance Per-Mile Spending, District 6 (Fresno) Highways

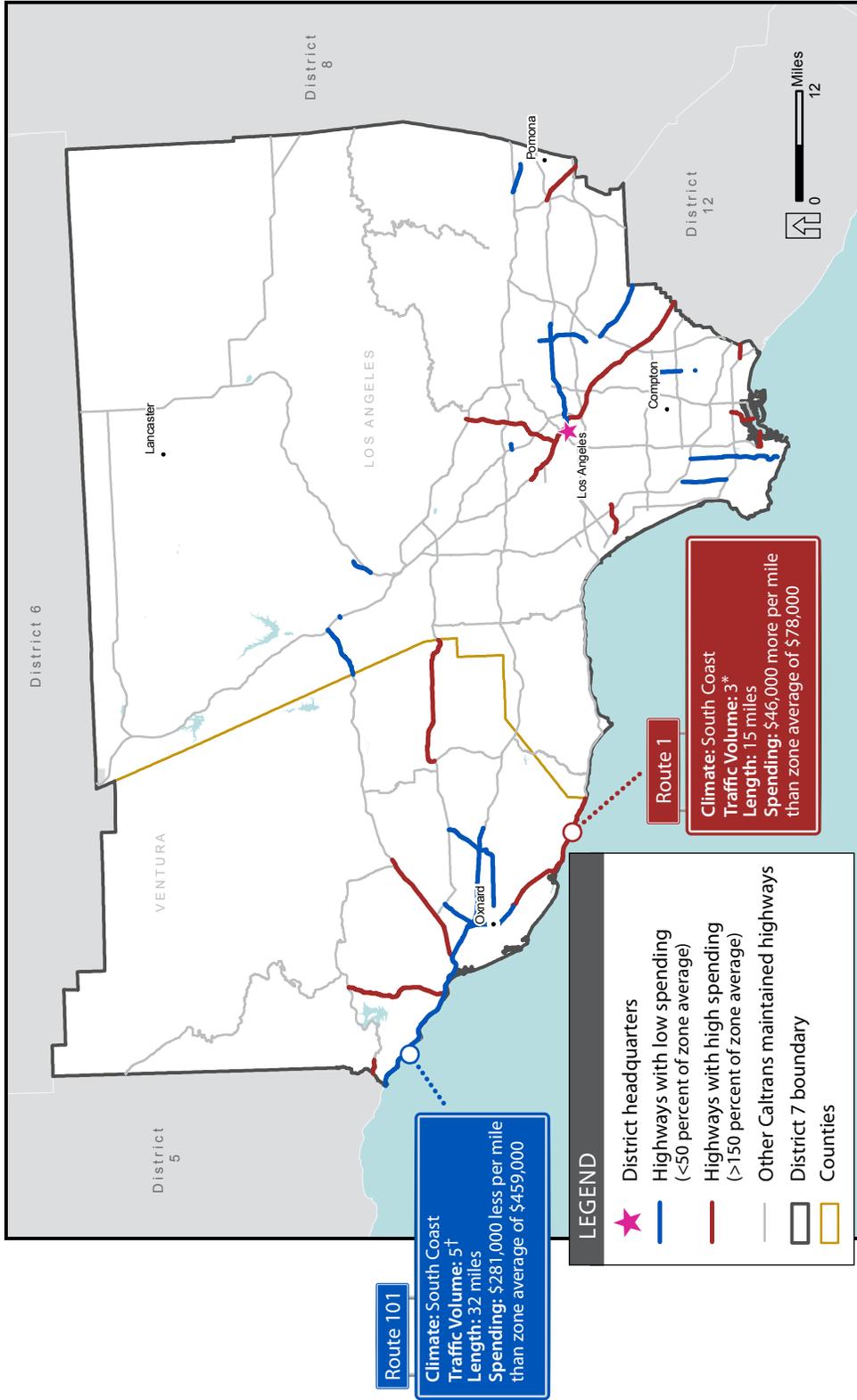


Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data.

\* Traffic volume 3 indicates average daily traffic of 10,001 – 25,000.

† Traffic volume 4 indicates average daily traffic of 25,001 – 100,000.

**Figure 8**  
Field Maintenance Per-Mile Spending, District 7 (Los Angeles) Highways



Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data

\* Traffic volume 3 indicates average daily traffic of 10,001–25,000.

† Traffic volume 5 indicates average daily traffic of 100,001+.

We also compared the three districts' spending with their median income and their race and ethnicity demographics and found there was no clear correlation. In the Appendix beginning on page 49, we describe our analysis and present the socioeconomic demographic information as additional context for the districts' spending. Specifically, in the Appendix, Figures A–C on pages 52 to 54 show the median income and Figures D–F on pages 55 to 57 show the demographics for the predominant racial and ethnic makeup for the three districts we reviewed.

As part of our review, we brought the field maintenance spending discrepancies to the attention of the districts, and we asked for their perspective on why field maintenance spending varied among highways with similar needs in their respective district. The district maintenance deputies indicated that several factors could be affecting the spending, such as previous SHOPP projects that reduced the need for field maintenance, the age of the road, whether the road is in a rural or urban area, the number and cost of lane closures required to perform the field maintenance work, the number of service requests received for a particular road, and the amount of landscaping on a particular road. However, as we described previously, the maintenance division does not consider these factors in its planning or allocating for field maintenance work. Although we are not suggesting that Caltrans spent money on projects that were not worthwhile or where there was no indicator of need, we are concerned that there are many highways in each district on which average spending per mile over a five-year period was inconsistent with the maintenance needs indicated by the nature of the climate and traffic volumes in those zones.

### **The Maintenance Division Cannot Demonstrate That It Promptly Performs Field Maintenance Work**

The three districts we reviewed do not effectively manage the service requests they receive from the public to ensure that they appropriately prioritize and address them in a timely manner. Specifically, data indicate that more than 30,000 service requests received by the three districts in fiscal years 2010–11 through 2014–15 remained unresolved after more than 90 days. Although these districts asserted that many of those service requests have been completed, neither we nor the districts' management could easily verify this assertion. Unperformed maintenance work can create safety risks and can also result in increased future repair costs.

The public can identify needed maintenance work by using an electronic form on Caltrans' website that allows the public to notify the maintenance program of a specific maintenance issue—for

*More than 30,000 service requests received by the three districts in fiscal years 2010–11 through 2014–15 remained unresolved after more than 90 days.*

example, graffiti, litter, or a pothole—and its location. The maintenance division tracks these service requests in its statewide maintenance service request system (service request system). After receiving a service request from the public, a district assesses the request to decide how it should respond. Specifically, the district determines whether the reported issue occurred on the state highway system and if the district needs to address it. After conducting this assessment, the district responds to the individual who submitted the service request, stating whether the district commits to perform the work or stating the reasons why it is not going to perform the work. Although the maintenance division has not established a time frame for completing service requests, we analyzed the service requests that the maintenance division had committed to addressing by grouping them in 30-day increments to determine how long they had been outstanding. Data from the service request system suggests that two of the three districts we reviewed frequently let service requests remain outstanding for more than 90 days, as shown in Table 7. For example, from fiscal year 2010–11 through 2014–15, more than 16,000 service requests submitted to district 7 remained outstanding for more than 90 days. Similarly, during the same time period, the system data showed that more than 15,000 service requests submitted to district 4 had not been addressed after more than 90 days.

**Table 7**  
**Status of Maintenance Service Requests Received by California Department of Transportation Districts 4 (Oakland), 6 (Fresno), and 7 (Los Angeles)**  
**Fiscal Years 2010–11 Through 2014–15**

	DISTRICT 4 (OAKLAND)		DISTRICT 6 (FRESNO)		DISTRICT 7 (LOS ANGELES)	
	NUMBER OF SERVICE REQUESTS*	PERCENT OF DISTRICT'S SERVICE REQUESTS	NUMBER OF SERVICE REQUESTS*	PERCENT OF DISTRICT'S SERVICE REQUESTS	NUMBER OF SERVICE REQUESTS*	PERCENT OF DISTRICT'S SERVICE REQUESTS
<b>Completed service requests:</b>						
Completed in 30 or fewer days	14,893	41%	1,103	77%	1,400	7%
Completed in 31 to 60 days	3,116	9	57	4	121	1
Completed in 61 to 90 days	823	2	51	4	62	0.3
Completed in more than 90 days	1,295	4	148	10	184	1
<b>Outstanding service requests:</b>						
Outstanding for 30 or fewer days as of June 30, 2015	413	1	2	0.1	327	2
Outstanding for 31 to 60 days as of June 30, 2015	377	1	2	0.1	227	1
Outstanding for 61 to 90 days as of June 30, 2015	376	1	5	0.3	388	2
Outstanding for more than 90 days as of June 30, 2015	15,288	42	61	4.3	16,783	86
<b>Totals</b>	<b>36,581</b>	<b>100%†</b>	<b>1,429</b>	<b>100%†</b>	<b>19,492</b>	<b>100%†</b>

Source: California State Auditor's analysis of data from California Department of Transportation's maintenance service request system.

\* In this analysis we included only those service requests for which the districts committed to perform the work.

† Percentages do not add to exactly 100 percent for all fiscal years due to rounding.

The districts' current processes for tracking service requests make it difficult and time-consuming to determine whether maintenance staff have completed service requests and if data in the service request system are accurate. Districts use the service request system to track service requests from the public while district maintenance staff use the maintenance management system to record that they completed the work associated with these service requests. However, the two systems do not automatically exchange information between one another, and the districts have to manually update the service request system to show which service requests were completed. Otherwise, the data on the status of service requests could be inaccurate. District maintenance deputies could not verify whether the large number of service requests that were outstanding for more than 90 days had been completed, and they indicated that doing so would require a significant effort. Nevertheless, we believe the maintenance division should have a process for following up on those service requests that it does not promptly address.

Furthermore, the districts we reviewed do not capture in the service request system those service requests they receive via methods other than Caltrans' website, making it even more difficult to monitor the progress of addressing those additional service requests. The district maintenance deputies at the three districts we reviewed confirmed that their districts do not have documented policies that describe how they should handle service requests received by phone, mail, or email. Although some districts have tools to record such service requests, none of the districts we reviewed record such requests in one central repository. For example, some regions in district 4 (Oakland) use paper logs to record phone calls. In another example, according to the district maintenance deputy for district 6 (Fresno), the district does not have any process to record and monitor service requests it receives by phone, mail, or email. As a result of the districts' poor processes for recording service requests they receive via methods other than Caltrans' website, neither we nor the three districts' staff could ensure that such service requests were addressed in a timely way or addressed at all.

Similarly, the maintenance program does not have processes to ensure that maintenance staff complete work orders in a timely manner. As we described in the Introduction, the maintenance manual requires maintenance staff to create work orders in the maintenance management system for all field maintenance work they perform. The system has fields to record the dates when a work order is initiated and when it is completed, and these dates can be used to determine how long it took to complete the work. However, according to the office chief of management systems and studies within the maintenance division, supervisors do not consistently

***As a result of the districts' poor processes for recording service requests they receive via methods other than Caltrans' website, neither we nor the three districts' staff could ensure that such service requests were addressed timely or addressed at all.***

create work orders as soon as they identify field maintenance needs; rather, they often create work orders after their crews start the work. Thus, the true length of time it takes from the date the work is identified to the date it is completed is not captured, and the maintenance division cannot accurately monitor whether it is addressing field maintenance needs in a timely manner.

### **Weak Controls Over Field Maintenance Work Orders Create Opportunities for Fraud, Waste, and Abuse**

Caltrans' weak controls over field maintenance do not adequately ensure that work order costs are reasonable and allowable and that the resources used were necessary and appropriate. Our review of field maintenance work orders found that the integrated maintenance management system is paperless and no supporting documentation is maintained for work order costs, such as labor, equipment, and materials used to complete field maintenance work. We reviewed the compensating internal controls the maintenance division has developed to ensure that costs are reasonable and allowable. The maintenance manual describes controls including superintendent reviews of work orders, which are intended to monitor work order costs. Internal controls are essential to ensure that the maintenance division achieves its objectives and mitigates the risk of fraud, waste, and abuse. Maintenance supervisors record on each work order all costs incurred to complete the work. For example, a supervisor records in the work order how many hours each staff member works and the costs of all materials and vehicles used to complete maintenance activities. Although the maintenance manual requires superintendents to review work orders for material usage and accurate time reporting, there is no evidence that they do so. In particular, according to the office chief of management systems and studies, the current maintenance management system does not allow reviewers to document that they have reviewed a work order. Without such evidence, the maintenance division cannot ensure that the labor, equipment, and materials used are reasonable and appropriate.

*Although the maintenance manual requires superintendents to review work orders for material usage and accurate time reporting, there is no evidence that they do so.*

We also reviewed Caltrans' internal division of audits and investigations' (internal audits) reviews or audits of these costs and found that the internal auditors had identified weaknesses. For example, a 2015 Caltrans internal review of district 8 (San Bernardino) found weaknesses in controls over materials such as the chemicals used for controlling vegetation. Specifically, internal audits' review noted variances in 20 of 40 inventory counts between the count and the inventory records for those items. The review indicated that when physical inventory levels are not reconciled to balances recorded in the maintenance management system, theft or misuse of the chemicals can go undetected. Internal

audits made recommendations to address these issues but has not yet followed up to determine whether the recommendations have been implemented. Additionally, an internal audit released in 2013 found that some maintenance staff entered erroneous time sheets into the system, including time sheets that exceeded available leave balances and time sheets showing total numbers of hours worked that did not match the employees' work schedules. The audit also found that staff failed to promptly correct errors and that superintendents did not review and approve time sheets until the end of the month, which, according to the internal auditors, could result in errors and misuse of leave. Caltrans' internal auditors made recommendations for these findings that the maintenance division has reported addressing.

### **The Maintenance Division Appropriately Manages Highway Maintenance Projects, but Some Backlogged Maintenance Work Is Increasing**

In contrast to the field maintenance activities, the maintenance division currently uses a needs-based approach to allocate funding for the majority of highway maintenance activities and to identify highway maintenance projects. The maintenance division allocates funding for highway maintenance proportionally to the districts based on the condition of the pavement and bridges in each district. For example, it allocates funding for bridge projects based on each district's portion of outstanding bridge maintenance work that regular bridge inspections identify. Similarly, it determines districts' allocations for pavement projects using data about the amount and condition of the pavement in each district. In contrast, according to the office chief for storm water and environmental compliance, the maintenance division generally allocates highway maintenance funds for drainage and culverts equally among the districts because the budget is relatively small compared to the identified needs of the districts. Currently, the maintenance division generally identifies projects to repair pavement by conducting field reviews and considering data from the pavement condition survey, which uses customized vehicles fitted with sensing equipment traveling on the roadway at or near highway speeds to collect pavement condition data. Based on these pavement surveys, each lane mile is rated as good, fair, or poor. Further, the maintenance division stated that it is in the process of implementing a new technology called PaveM that it indicates will optimize the project selection process by targeting future repairs that provide the best value for the least amount of money. According to the 2015 *State of the Pavement* report, PaveM will make suggestions based on pavement condition, pavement type, climate, and project history. However, the division has not set a final implementation date for this new technology.

*The maintenance division currently uses a needs-based approach to allocate funding for the majority of highway maintenance activities and to identify highway maintenance projects.*

Our review of highway maintenance projects for pavement and bridges found that generally the maintenance division ensured that contractors completed projects within budget and on time. While the maintenance division lacks strong controls for field maintenance, controls for highway maintenance projects to contain costs generally appear to be adequate. For highway maintenance projects that contractors perform, Caltrans' resident engineers review contract payment requests before authorizing contractor payments, which entails comparing completed work with the contract. We found that contractors generally completed the 15 projects we reviewed at an actual cost that was reasonably close to their bid amounts and within the number of days estimated in the bid.

However, the maintenance division's goals to repair pavement statewide fail to address its growing backlog of needed pavement maintenance. Specifically, pavement that is in fair condition with minor surface distress, such as minor cracking and potholes, but that still requires corrective maintenance has increased. According to Caltrans' *State of the Pavement* reports, the backlog of lane miles in need of corrective maintenance has increased from 11,053 in 2011 to 15,272 in 2015 due to the increase in construction costs and a greater percentage of higher-cost maintenance strategies. In Caltrans' 2015 maintenance plan, the maintenance division established a goal to repair 2,100 lane miles a year based on the funding it received, although Caltrans reported that it did not meet this goal.

***The maintenance division is not sufficiently addressing backlogged inspections and repairs of drainage culverts, even though culvert damage or failure can seriously damage roadways, cause extensive repairs, and threaten the mobility and safety of travelers.***

The maintenance division is also not sufficiently addressing backlogged inspections and repairs of drainage culverts even though culvert damage or failure can seriously damage roadways, create the need for extensive repairs, and threaten the mobility and safety of the traveling public. In the 2015 maintenance plans, Caltrans set goals to inspect 12,000 culverts and repair 140 culverts annually. Caltrans reported that it inspected 13,168 culverts in fiscal year 2013–14, which exceeded its goal. Although Caltrans has generally met its culvert repair goals during our audit period, the goal to repair 140 culverts annually does not sufficiently address the significant increase in backlogged maintenance needs. The number of culverts Caltrans reported as needing repair has consistently grown since fiscal year 2010–11, from an estimated amount of 13,185 to 27,346 as of June 2015. The backlog is increasing in part because Caltrans' culvert inspection program has identified and assessed the condition of 107,000 of the estimated 205,000 culverts in the State. As this process continues, Caltrans is identifying more culverts in need of repair. Additionally, Caltrans reports that a large percentage of culvert inspections and repairs it identified through previous maintenance plans have included "easier" access and

repairs, and it anticipates that the remaining culvert inspections and repairs will be more difficult to address and will require additional time and planning to complete.

According to the division chief, Caltrans has taken an approach of developing SHOPP projects that focus on repairing pavement and culverts that are in the worst condition first. In fact, Caltrans reported in its 2015 maintenance plan that if it were to receive additional revenue, it would prioritize SHOPP pavement rehabilitation ahead of preventative maintenance. Caltrans also reported that it would recommend funding both maintenance and SHOPP to manage and maintain backlogged culverts. Given the need to balance resources between SHOPP and maintenance, we believe Caltrans should continue to monitor and report on its backlogged maintenance work to ensure that the backlogged work does not deteriorate to such a degree that it results in increased future SHOPP costs.

In contrast to its lack of progress on pavement and culverts, in its 2015 *Five-Year Maintenance Plan* Caltrans reports that it is reducing its backlogged highway maintenance projects for bridges. During our audit period Caltrans set a goal to reduce the number of bridges with backlogged maintenance needs to 8 to 10 percent of the total inventory of bridges. The bridge inventory reportedly varied between 12,900 and 13,100 during our audit period. Caltrans defines bridge maintenance needs as backlogged if two years pass without completion of the maintenance after a bridge inspector recommends maintenance work. During our audit period, Caltrans reported that bridges with backlogged maintenance needs decreased from 2,575 in the beginning of fiscal year 2010–11 to 1,771 in the beginning of fiscal year 2013–14. Caltrans reports it is consistently reducing the backlog and estimates that the backlog will continue to decrease at the current level of funding. In 2015 Caltrans set a goal to reduce the number of backlogged bridges to 1,090 over the next five years.

### **Recommendations**

To better align the maintenance division's allocations with districts' maintenance needs, the Legislature should include language in the Budget Act that requires the maintenance division to develop and implement a budget model for field maintenance by June 30, 2017, that takes into account key indicators of maintenance need, such as traffic volume, climate, service scores, and any other factors the maintenance division deems necessary to ensure that the model adequately considers field maintenance need. Once the model is developed, Caltrans should use it to inform appropriate allocations to the districts.

Caltrans should revise the language in its future five-year maintenance plans to accurately describe the method it uses to allocate field maintenance funding to its districts.

To ensure that it performs field maintenance work consistently on highways with similar needs, the maintenance division should do the following:

- Assess whether districts are using funds in a manner commensurate with indicators of need included in its new budget model.
- Implement the zone-level evaluation of service scores contemplated in the earlier budget model that it abandoned.
- Establish zone-specific service score goals for all of the field maintenance activities it deems critical to ensuring a safe and usable state highway system and require districts to meet those goals for all the zones within their borders.
- Implement the requirements for strategically planning field maintenance work that it previously included in its maintenance manual or develop similar requirements that it believes are feasible and ensure that supervisors plan and schedule field maintenance work based on service scores. Caltrans should require superintendents and regional managers to approve those plans. Caltrans should also require supervisors and superintendents to monitor progress toward improving service scores.

Caltrans should require its staff to verify and update the status of all outstanding service requests. Additionally, Caltrans should require supervisors to monitor completion of service requests by reviewing the data from the service request system monthly to identify service requests not completed after a period of time that Caltrans deems appropriate, such as 30 days. For all service requests outstanding after this period, Caltrans should require its supervisors to determine the status of the service request by reviewing the related work order that records what work Caltrans completed and ensure the work is appropriately prioritized. Also, Caltrans should require its staff to record all service requests it receives via methods other than Caltrans' website, such as by phone, mail, or email, in its service request system to ensure it captures all service requests in one central repository.

To detect and prevent fraud, waste, and abuse and to ensure costs are appropriate, the maintenance division should strengthen its controls over reviewing and approving work order costs by requiring its supervisors and superintendents to document

their review and approval of work orders in the maintenance management system. For example, supervisors or superintendents could include a note in the comment field of the work order indicating their review and approval. The maintenance division could also establish a reasonable dollar threshold for those work orders that would require documented review and approval.

To ensure that field maintenance work orders are completed in a timely manner, the maintenance division should require supervisors to initiate work orders in the integrated maintenance management system at the time that they identify field maintenance work that needs to be performed and record the date that work was started and the date the work was completed. Superintendents should periodically review work orders to ensure that identified work is completed in a timely manner.

We conducted this audit under the authority vested in the California State Auditor by Section 8543 et seq. of the California Government Code and according to generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives specified in the Scope and Methodology section of the report. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Respectfully submitted,



ELAINE M. HOWLE, CPA  
State Auditor

Date: March 17, 2016

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Legal Counsel: Heather Kendrick, Sr. Staff Counsel

Geographic Information System Consultant: ENPLAN

For questions regarding the contents of this report, please contact Margarita Fernández, Chief of Public Affairs, at 916.445.0255.

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## Appendix

### SPENDING BY ZONE AND DEMOGRAPHICS IN DISTRICTS WE REVIEWED

The Joint Legislative Audit Committee requested that the California State Auditor, to the extent possible, identify the current socioeconomic demographics of each district receiving funding and determine the amounts received by those districts in each of the fiscal years from 2010–11 through 2014–15. Our review found that all 12 of Caltrans' districts received funding in each of the five years we reviewed, as we show in Table 5 on page 29 in the Audit Results. However, to analyze more precisely where the districts spent their field maintenance funding, we focused on three selected districts: district 4 (Oakland), district 6 (Fresno), and district 7 (Los Angeles). Table A on the following page shows the amounts that these districts spent by zone—that includes information on the respective district's climate and average daily traffic volume—for field maintenance during those fiscal years.

Additionally, we retained a geographic information systems consultant (consultant) to plot on maps each of the three districts' spending for field maintenance activities. Because we had this detailed spending information for the three districts, we attempted to focus our review of socioeconomic demographics in the three districts as well. Specifically, the consultant identified median income, race, and ethnicity using tract-level data from the U.S. Census Bureau and displayed that information on maps of each of the three districts. The consultant then overlaid the spending information on the socioeconomic demographic information to allow for comparison. However, when compared with the areas of high and low spending, which we described more fully in the Audit Results, we found no clear correlation between the levels of spending and income levels or race and ethnicity. In particular, we found there were areas of both high and low spending in each of the three districts on highway sections that pass through areas where the income level and race and ethnicity of the majority of the population varies. Figures A, B, and C beginning on page 52 show the median income by census tract for districts 4, 6, and 7, respectively, as well as the sections of highway with high and low spending. Figures D, E, and F beginning on page 55 show the race and ethnicity that make up the majority of the population by census tract and also show sections of highway with high and low spending for districts 4, 6, and 7, respectively.

**Table A**  
Average Field Maintenance Spending for All Zones, Fiscal Years 2010–11 Through 2014–15

CLIMATE/TRAFFIC VOLUME ZONE		DISTRICT 4 (OAKLAND)				
CLIMATE	TRAFFIC VOLUME	TOTAL DOLLARS SPENT PER ZONE	AVERAGE DOLLARS PER MILE PER ZONE*	LOW SPENDING†	HIGH SPENDING‡	MILES PER ZONE
Inland Valley	1 (0–2,500)	\$375,710.45	\$22,287.45	\$11,143.73	\$33,431.18	16.86
Inland Valley	2 (2,501–10,000)	944,121.07	40,713.21	20,356.61	61,069.82	23.19
Inland Valley	3 (10,001–25,000)	4,845,630.08	71,484.97	35,742.48	107,227.45	67.79
Inland Valley	4 (25,001–100,000)	6,941,588.39	90,478.41	45,239.20	135,717.61	76.72
Inland Valley	5 (100,001 +)	19,891,237.73	159,026.46	79,513.23	238,539.69	125.08
Low Mountain	1 (0–2,500)	–	–	–	–	–
Low Mountain	2 (2,501–10,000)	3,531,767.55	52,872.49	26,436.25	79,308.74	66.80
Low Mountain	3 (10,001–25,000)	3,638,269.71	55,509.59	27,754.80	83,264.39	65.54
Low Mountain	4 (25,001–100,000)	11,375,363.86	72,260.75	36,130.37	108,391.12	157.42
Low Mountain	5 (100,001 +)	7,799,224.64	269,418.77	134,709.39	404,128.16	28.95
High Mountain	1 (0–2,500)	–	–	–	–	–
High Mountain	2 (2,501–10,000)	–	–	–	–	–
High Mountain	3 (10,001–25,000)	–	–	–	–	–
High Mountain	4 (25,001–100,000)	–	–	–	–	–
High Mountain	5 (100,001 +)	–	–	–	–	–
North Coast	1 (0–2,500)	1,320,531.03	69,575.17	34,787.59	104,362.76	18.98
North Coast	2 (2,501–10,000)	5,753,410.81	35,380.75	17,690.37	53,071.12	162.61
North Coast	3 (10,001–25,000)	4,348,776.18	34,858.65	17,429.33	52,287.98	124.75
North Coast	4 (25,001–100,000)	21,129,074.56	103,678.39	51,839.20	155,517.59	203.79
North Coast	5 (100,001 +)	60,365,108.91	206,707.77	103,353.88	310,061.65	292.03
Desert	1 (0–2,500)	–	–	–	–	–
Desert	2 (2,501–10,000)	–	–	–	–	–
Desert	3 (10,001–25,000)	–	–	–	–	–
Desert	4 (25,001–100,000)	–	–	–	–	–
Desert	5 (100,001 +)	–	–	–	–	–
South Coast	1 (0–2,500)	–	–	–	–	–
South Coast	2 (2,501–10,000)	–	–	–	–	–
South Coast	3 (10,001–25,000)	–	–	–	–	–
South Coast	4 (25,001–100,000)	–	–	–	–	–
South Coast	5 (100,001 +)	–	–	–	–	–

Total miles with low or high spending: 304.29

Percentage of miles in district with low or high spending: 21%

Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data.

\* Calculations of average dollars per mile per zone are weighted for number of miles in each section of the highway.

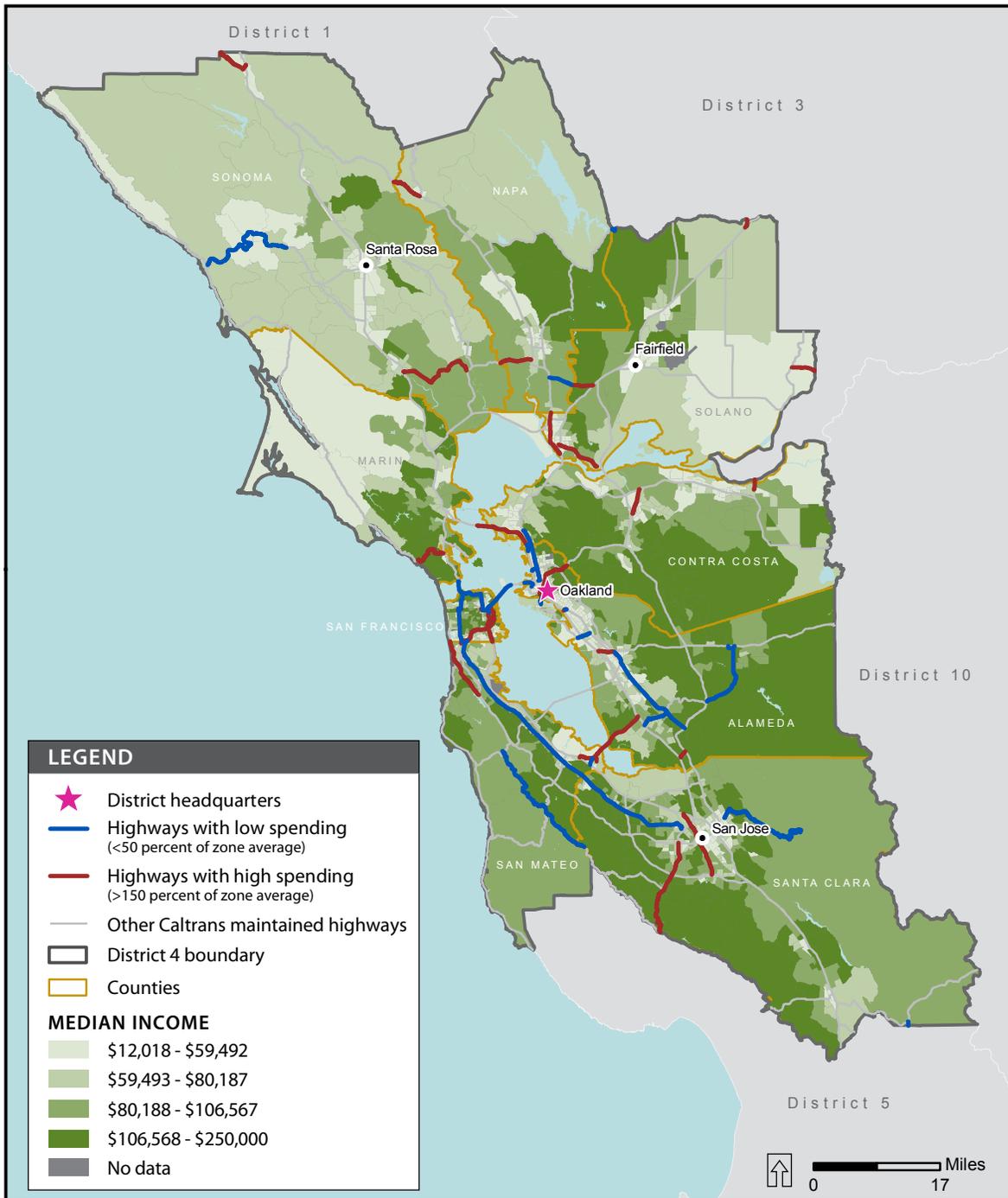
† Low spending is field maintenance spending more than 50 percent below the average per-mile spending for the zone.

‡ High spending is field maintenance spending more than 150 percent of the average per-mile spending for the zone.

– District does not have highways in this zone.

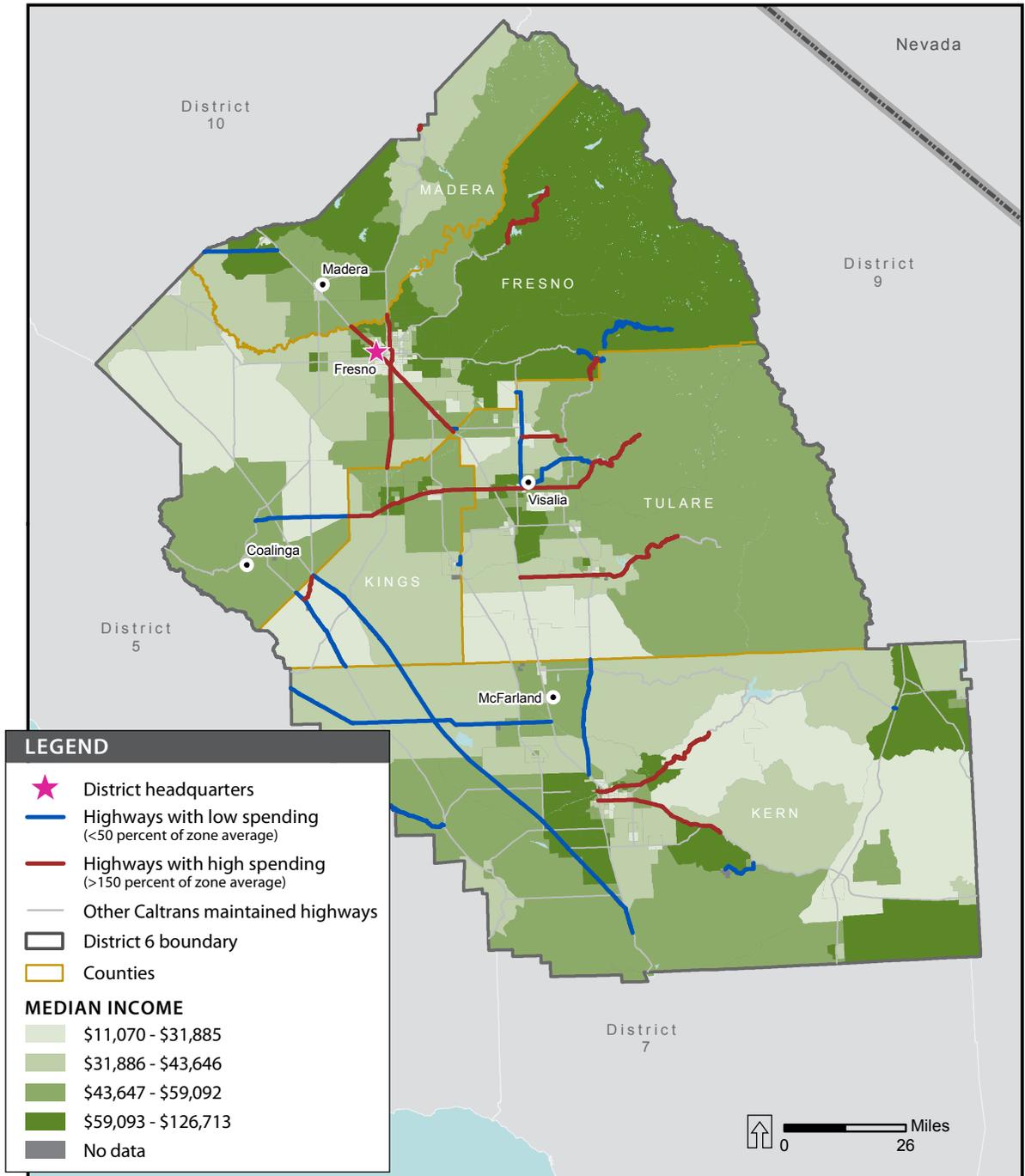
DISTRICT 6 (FRESNO)					DISTRICT 7 (LOS ANGELES)				
TOTAL DOLLARS SPENT PER ZONE	AVERAGE DOLLARS PER MILE PER ZONE*	LOW SPENDING†	HIGH SPENDING‡	MILES PER ZONE	TOTAL DOLLARS SPENT PER ZONE	AVERAGE DOLLARS PER MILE PER ZONE*	LOW SPENDING†	HIGH SPENDING‡	MILES PER ZONE
\$3,666,054.71	\$47,208.53	\$23,604.26	\$70,812.79	77.66	\$259,193.54	\$79,239.62	\$39,619.81	\$118,859.43	3.27
25,433,601.30	31,791.50	15,895.75	47,687.25	800.01	4,069,583.12	1,006,514.37	503,257.19	1,509,771.56	4.04
20,074,759.03	62,147.17	31,073.59	93,220.76	323.02	3,740,766.02	153,715.30	76,857.65	230,572.96	24.34
45,667,935.76	114,704.49	57,352.25	172,056.74	398.14	11,748,779.09	106,949.49	53,474.75	160,424.24	109.85
-	-	-	-	-	83,071,283.38	334,360.57	167,180.29	501,540.86	248.45
-	-	-	-	-	-	-	-	-	-
1,957,977.08	58,868.65	29,434.32	88,302.97	33.26	-	-	-	-	-
1,004,738.56	42,658.46	21,329.23	63,987.70	23.55	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
1,629,771.50	43,966.07	21,983.04	65,949.11	37.07	1,598,298.95	68,962.35	34,481.18	103,443.53	23.18
3,755,295.38	29,519.39	14,759.70	44,279.09	127.21	1,631,350.60	38,086.00	19,043.00	57,128.99	42.83
2,252,342.02	61,383.75	30,691.88	92,075.63	36.69	5,599,175.72	82,278.42	41,139.21	123,417.63	68.05
3,348,310.01	326,445.69	163,222.85	489,668.54	10.26	1,672,756.96	80,457.81	40,228.91	120,686.72	20.79
-	-	-	-	-	3,153,884.31	113,928.26	56,964.13	170,892.39	27.68
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
3,805,550.52	72,276.70	36,138.35	108,415.05	52.65	120,105.24	26,004.91	13,002.45	39,007.36	4.62
4,045,807.77	39,869.42	19,934.71	59,804.13	101.48	1,626,026.53	30,268.86	15,134.43	45,403.29	53.72
-	-	-	-	-	1,012,904.02	51,328.44	25,664.22	76,992.66	19.73
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	303,194.93	34,605.00	17,302.50	51,907.50	8.76
-	-	-	-	-	3,125,485.66	64,012.32	32,006.16	96,018.48	48.83
-	-	-	-	-	4,503,036.79	78,138.87	39,069.44	117,208.31	57.63
-	-	-	-	-	13,898,230.08	104,498.70	52,249.35	156,748.05	133.00
-	-	-	-	-	107,138,000.23	458,915.41	229,457.71	688,373.12	233.46
<b>Total miles with low or high spending:</b>				<b>646.60</b>	<b>Total miles with low or high spending:</b>				<b>217.06</b>
<b>Percentage of miles in district with low or high spending:</b>				<b>32%</b>	<b>Percentage of miles in district with low or high spending:</b>				<b>19%</b>

**Figure A**  
 Median Income and Field Maintenance Per-Mile Spending, District 4 (Oakland)



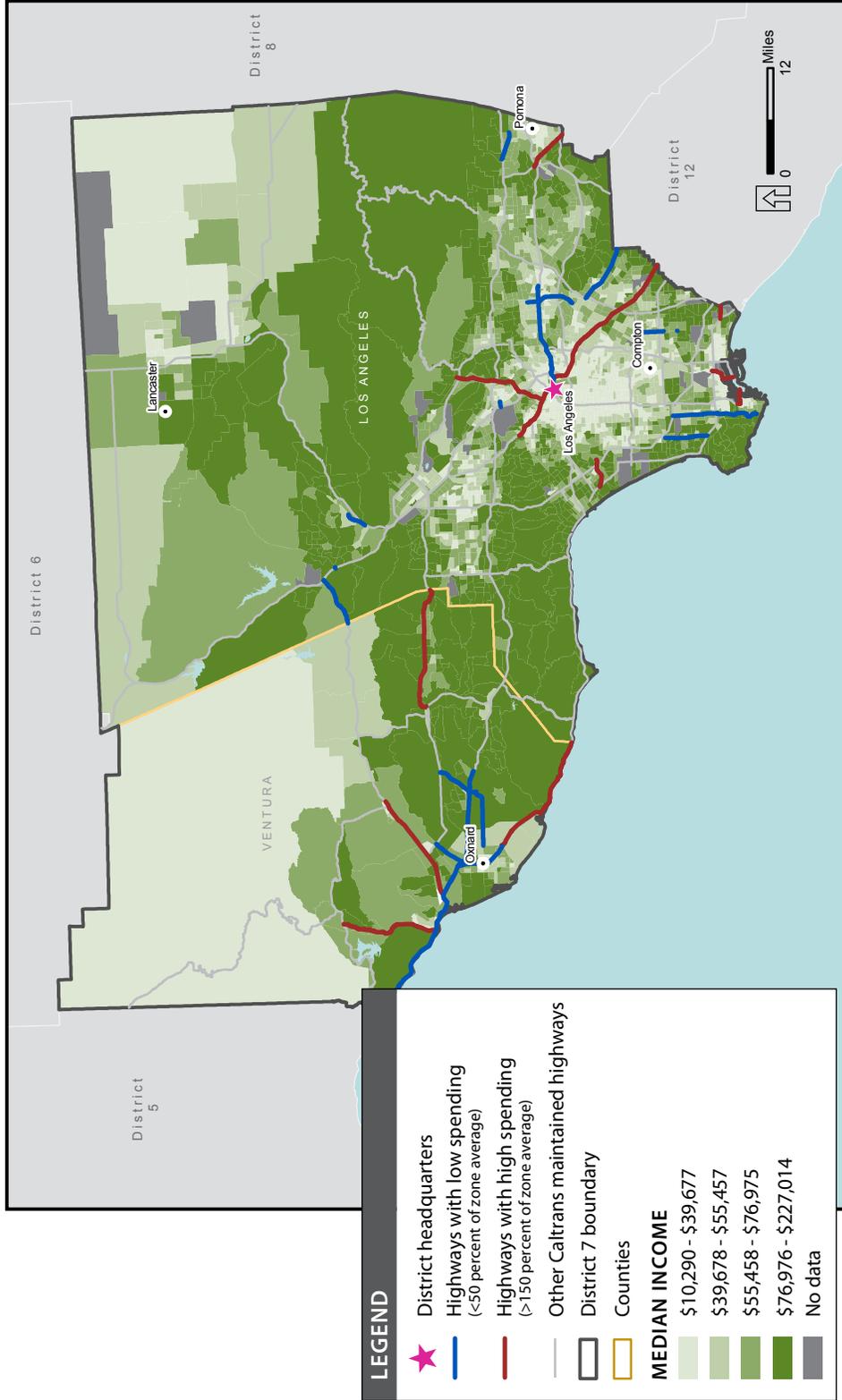
Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data. Median income categories classify the district's census tracts into four groups of an equal number of tracts based on their distribution of median income using data from the U.S. Census Bureau's 2009–2013 American Community Survey Five-Year Estimate.

**Figure B**  
 Median Income and Field Maintenance Per-Mile Spending, District 6 (Fresno)



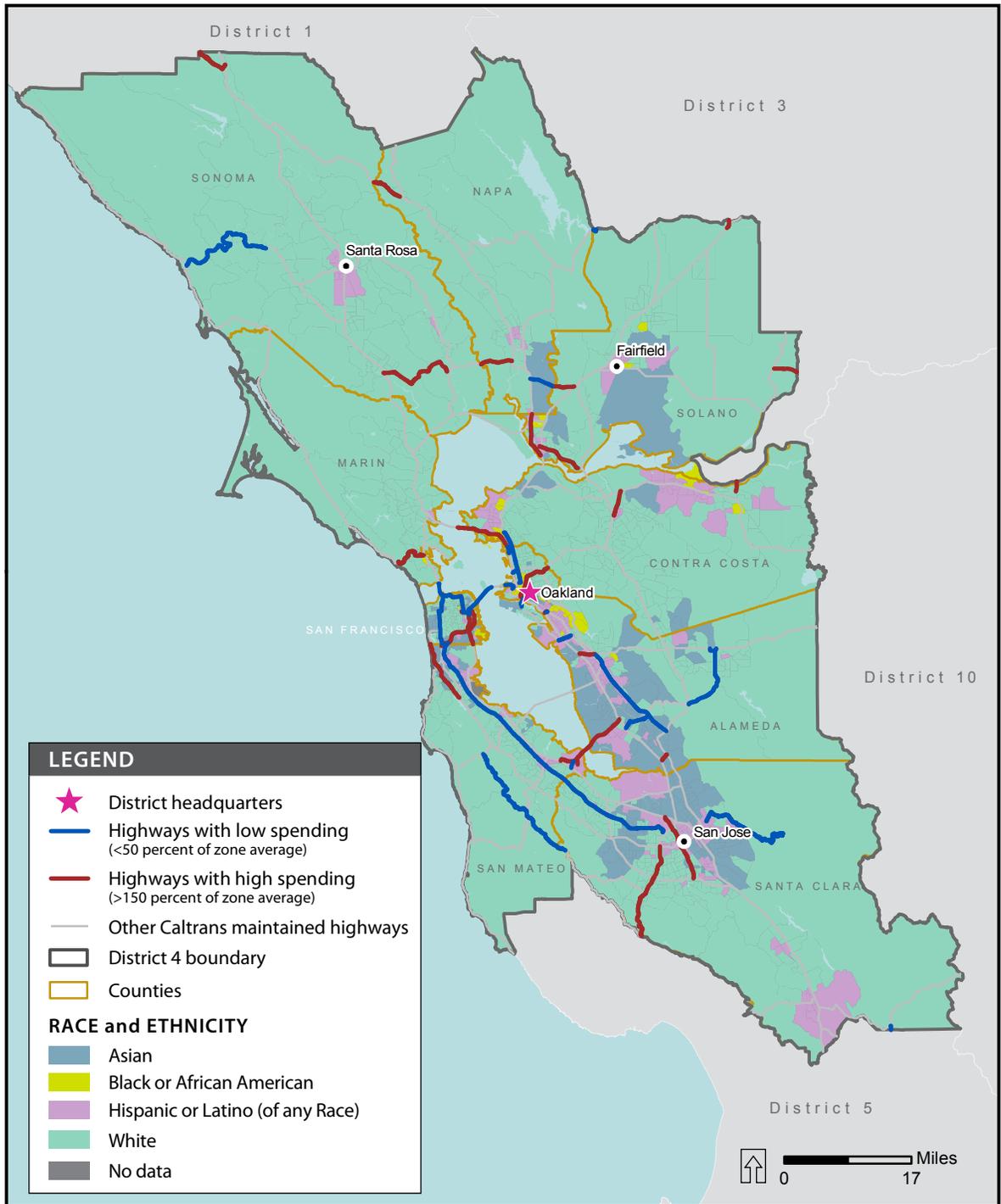
Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data. Median income categories classify the district's census tracts into four groups of an equal number of tracts based on their distribution of median income using data from the U.S. Census Bureau's 2009–2013 American Community Survey Five-Year Estimate.

**Figure C**  
 Median Income and Field Maintenance Per-Mile Spending, District 7 (Los Angeles)



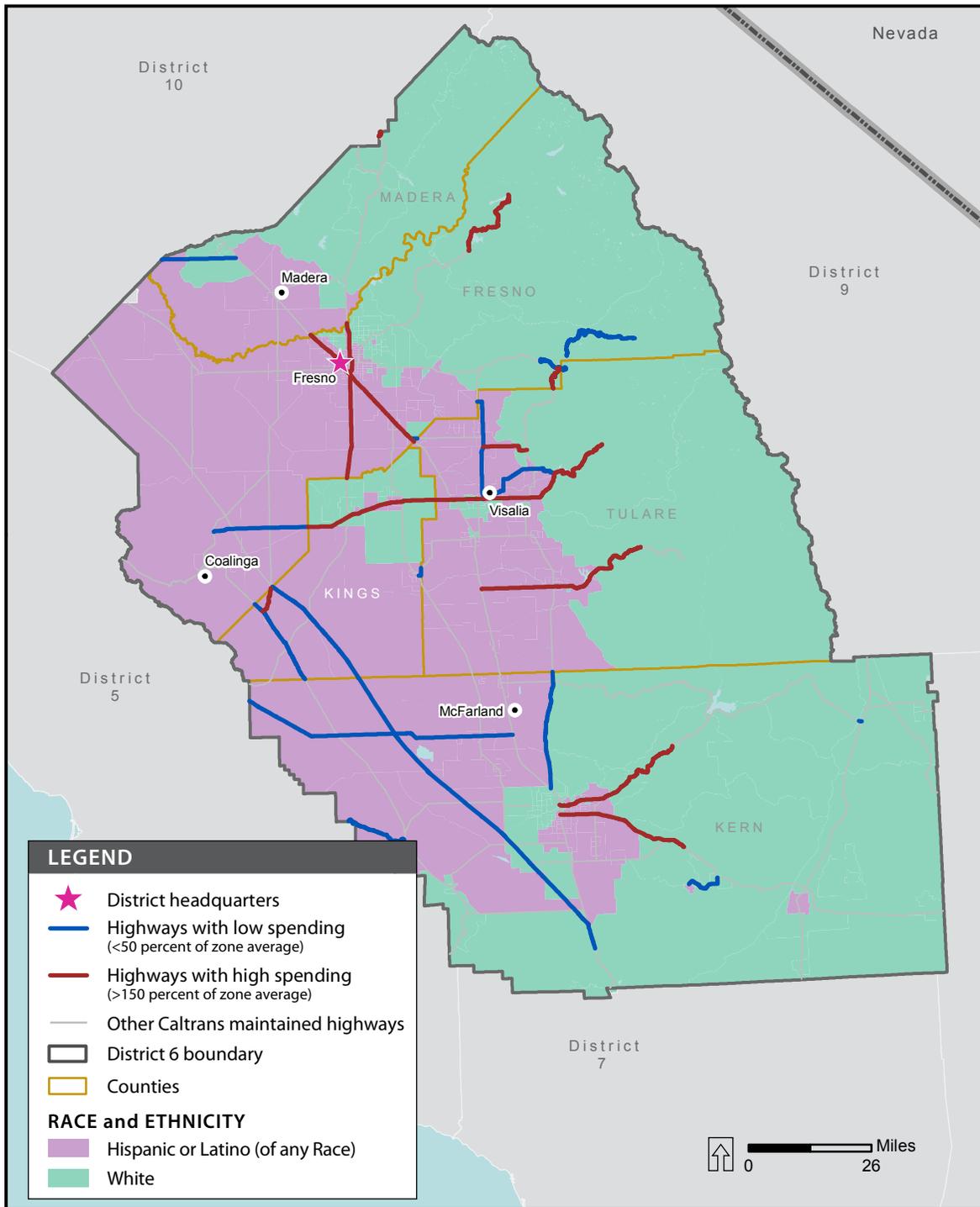
Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data. District median income categories classify the district's census tracts into four groups of an equal number of tracts based on their distribution of median income using data from the U.S. Census Bureau's 2009–2013 American Community Survey Five-Year Estimate.

**Figure D**  
 Race and Ethnicity and Field Maintenance Per-Mile Spending, District 4 (Oakland)



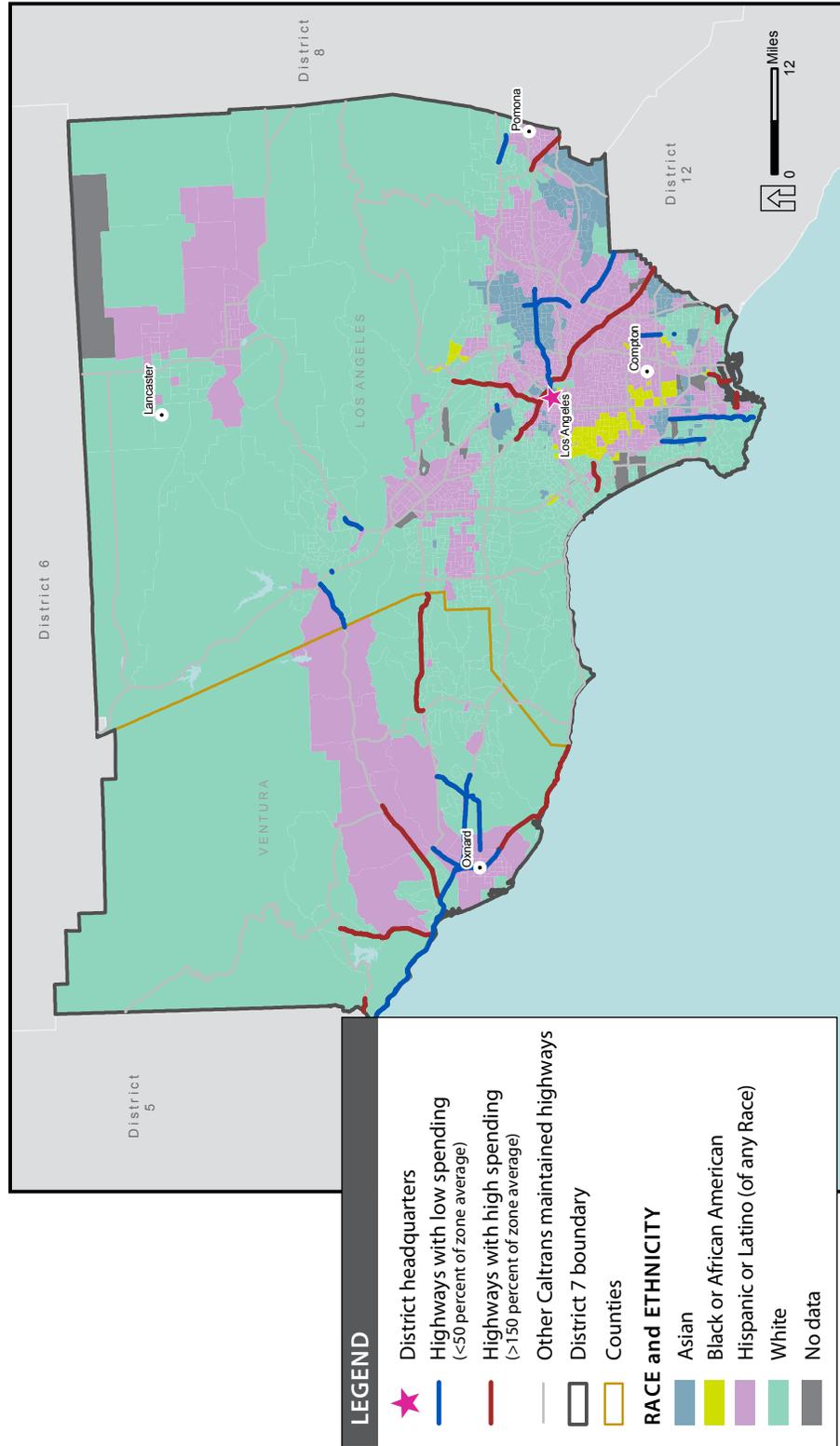
Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data. The consultant also calculated the race and ethnic group that made up the highest percentage of each census tract's population using data and terms from the U.S. Census Bureau's 2009–2013 American Community Survey Five-Year Estimate.

**Figure E**  
 Race and Ethnicity and Field Maintenance Per-Mile Spending, District 6 (Fresno)



Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010–11 through 2014–15 and Caltrans' climate region and traffic volume data. The consultant also calculated the race and ethnic group that made up the highest percentage of each census tract's population using data and terms from the U.S. Census Bureau's 2009–2013 American Community Survey Five-Year Estimate.

**Figure F**  
 Race and Ethnicity and Field Maintenance Per-Mile Spending, District 7 (Los Angeles)



Sources: California State Auditor geographic information system consultant's analysis of cost data from California Department of Transportation's (Caltrans) integrated maintenance management system for fiscal years 2010-11 through 2014-15 and Caltrans' climate region and traffic volume data. The consultant also calculated the race and ethnic group that made up the highest percentage of each census tract's population using data and terms from the U.S. Census Bureau's 2009-2013 American Community Survey Five-Year Estimate.

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March 2016

**CALIFORNIA STATE TRANSPORTATION AGENCY****Edmund G. Brown Jr.**  
Governor915 Capitol Mall, Suite 350B  
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916-323-5400  
[www.calsta.ca.gov](http://www.calsta.ca.gov)**Brian P. Kelly**  
Secretary

March 1, 2016

**Elaine M. Howle, California State Auditor\***  
California State Auditor's Office  
621 Capitol Mall, Suite 1200  
Sacramento, CA 95814

Dear Ms. Howle:

Attached please find a response from the California Department of Transportation (Department) to your draft audit report entitled "California Department of Transportation: Its Maintenance Division's Allocations and Spending for Field Maintenance Do Not Match Key Indicators of Maintenance Needs" (#2015-120). Thank you for allowing the Department and the California State Transportation Agency (Agency) the opportunity to respond to the report.

Your findings and recommendations are timely because the Administration currently has a proposal before the Legislature to augment transportation funding to address the backlog of highway maintenance and rehabilitation. I agree with your findings that expenditures should be better linked to performance outcomes, and that is why the Administration's proposal includes ongoing performance targets, reporting, and transparency. The Agency also appreciates that your report includes mention of the significant backlog of pavement and culvert maintenance and rehabilitation, which is a major component of the new spending in the Administration's plan.

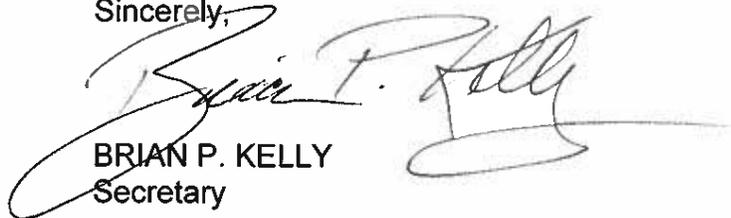
As noted in its response, the Department concurs with the recommendations in the report and already has established timelines to implement corrective action. Additionally, we appreciate your confirmation that there is no clear correlation between field maintenance spending and income levels or race and ethnicity. Further, we are pleased that you determined Caltrans appropriately manages highway maintenance projects and that your testing indicated positive results for some of the largest highway and field maintenance expenditures, as well as for payments and corresponding invoices.

\* California State Auditor's comments appear on page 67.

March 1, 2016  
Page 2

If you need additional information regarding the Department's response, please do not hesitate to contact Michael Tritz, Agency Deputy Secretary for Audits and Performance Improvement, at (916) 324-7517.

Sincerely,



BRIAN P. KELLY  
Secretary

Attachment

cc: Malcolm Dougherty, Director, California Department of Transportation

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY

EDMUND G. BROWN Jr., Governor

**DEPARTMENT OF TRANSPORTATION**

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Help save water!*

February 25, 2016

Brian P. Kelly  
Secretary  
California State Transportation Agency  
915 Capitol Mall, Suite 350B  
Sacramento, CA 95814

Dear Mr. Kelly:

Thank you for the opportunity to review and comment on the California State Auditor's (CSA) report entitled "California Department of Transportation: Its Maintenance Division's Allocations and Spending for Field Maintenance Do Not Match Key Indicators of Maintenance Needs."

At the request of the Joint Legislative Audit Committee, the CSA conducted an audit of the methods used by the California Department of Transportation (Caltrans) to make spending decisions related to the Maintenance Program and to assess the timeliness and effectiveness of the program's funding for fiscal years 2010-11 through 2014-15. The CSA concluded improvements are needed in allocating and spending field maintenance funds, reporting to the Legislature the allocation methodology, strategically planning field maintenance activities, demonstrating the timeliness of performing maintenance work, and exercising controls over maintenance work orders. Further, the CSA determined the Maintenance Division appropriately manages highway maintenance projects, but that some backlogged maintenance work is increasing.

It should be noted, however, that another of the CSA's objectives was to identify the current socioeconomic demographics of each district receiving funding and determine the amounts received by those districts in each of the years reviewed. The CSA found that all 12 district offices received funding in each of the five years reviewed and that there was no clear correlation between the levels of spending and income levels or race and ethnicity. The CSA also found that there were areas of both high and low spending in each of the three districts on highway sections that pass through areas where the income level and race and ethnicity of the majority of the population varies.

①

Mr. Brian Kelly  
February 25, 2016  
Page 2

Additionally, the CSA reviewed some of the largest expenditures for highway maintenance projects and some of the largest expenditures for field maintenance activities. We are pleased that the CSA found that the expenditures were generally reasonable and allowable, and that payments were supported with invoices that were properly reviewed and approved.

One point of clarification we think is important regards the CSA's determination that Caltrans developed a budget model in 2009 but never implemented it. Caltrans could not fully implement the budget model because it was not compatible with the upgraded financial system implemented in July 2010. Specifically, supporting spreadsheets integral to the functionality of the budget model were linked to the former financial system and were not compatible with the new financial system. Additionally, the budget model recommended significant fluctuations in field allocations (both personal services and operating expenses) from year to year. These fluctuations cannot be implemented with current civil service procedures on a year-to-year basis. However, Caltrans did use the budget model to establish 30 zones based on climate and traffic, and these zones are used to establish dashboard activities.

②

CSA's recommendations and Caltrans' responses are listed below:

**Recommendation No. 1:**

To better align the maintenance division's allocations with districts' maintenance needs, the Legislature should consider including language in the Budget Act that requires the maintenance division to develop and implement a budget model for field maintenance by June 30, 2017, that takes into account key indicators of maintenance need, such as traffic volume, climate, service scores, and any other factors the maintenance division deems necessary to ensure that the model adequately considers field maintenance need. Once developed, Caltrans should use the model to inform appropriate allocations to the districts.

**Caltrans Response:**

The first part of this recommendation is addressed to the Legislature; therefore, Caltrans will respond only to the second part of the recommendation.

Caltrans is committed to developing a budgeting and allocation tool that incorporates traffic volume, climate, and level of service. The allocation tool will be performance-based and will consider maintenance needs and allocate to the district region level. Caltrans will evaluate the feasibility of incorporating the ten highest priority field maintenance activities across all district regions in a new budget and allocation tool. The ten highest priority field maintenance activities are:

- Pavement (potholes/cracks/spalls)
- Bridge field maintenance activities
- Guardrail

Mr. Brian Kelly  
February 25, 2016  
Page 3

- Striping/pavement markers
- Signs
- Traffic signals
- Roadway lighting
- Tree/brush encroachment
- Litter/debris
- Graffiti

These ten activities represent 75 percent of the field maintenance budget allocation and are also aligned with the Governor's "fix it first" approach to preserving transportation infrastructure. Caltrans will coordinate with the California State Transportation Agency to update and implement this budget and allocation tool by June 2017.

②

**Recommendation No. 2:**

Caltrans should revise the language in its future five-year maintenance plans to accurately describe the method it uses to allocate field maintenance funding to its districts.

**Caltrans Response:**

Caltrans will revise the language used in future five-year maintenance plans to more accurately describe the method used to budget and allocate maintenance funding. The revisions will be reflected beginning with the 2017 update.

**Recommendation No. 3:**

To ensure that it performs field maintenance work consistently on highways with similar needs, the maintenance division should do the following:

- Assess whether districts are using funds in a manner commensurate with indicators of need included in its new budget model.
- Implement the zone-level evaluation of service scores contemplated in the earlier budget model that it abandoned.
- Establish zone-specific service score goals for all of the field maintenance activities it deems critical to ensuring a safe and usable state highway system and require districts to meet those goals for all the zones within their borders.
- Implement the requirements for strategically planning field maintenance work that it previously included in its maintenance manual or develop similar requirements that it believes are feasible and ensure that supervisors plan and schedule field maintenance work based on service scores. Caltrans should require superintendents and regional managers to approve those plans. Caltrans should also require supervisors and superintendents to monitor progress toward improving service scores.

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**Caltrans Response:**

Once Caltrans develops and implements the new budgeting and allocation tool (discussed in the response to Recommendation No.1), it will ensure districts are using funds in a manner commensurate with the indicators included in the tool.

Caltrans has already categorized the state highway system into zones based on traffic and climate data. Caltrans will determine an LOS score for each of the ten maintenance field activities (noted in the response to Recommendation No. 1) by zone in each district region and establish LOS goals for each district region. Caltrans will implement the items discussed above concurrently with the new budgeting and allocation tool discussed in the response to Recommendation No. 1.

In addition, Caltrans will require Maintenance Field Supervisors to develop an annual work plan to achieve the LOS goals established through the zone-level evaluation for each district region. Region managers will be required to review/monitor Integrated Maintenance Management System (IMMS) work orders to ensure work plan consistency and timely work completion. Caltrans will implement this by December 2016.

**Recommendation No. 4:**

Caltrans should require its staff to verify and update the status of all outstanding service requests. Additionally, Caltrans should require supervisors to monitor completion of service requests by reviewing the data from the service request system monthly to identify service requests not completed after a period of time that Caltrans deems appropriate, such as 30 days. For all service requests outstanding after this period, Caltrans should require its supervisors to determine the status of the service request by reviewing the related work order that records what work Caltrans completed and ensure the work is appropriately prioritized. Also, Caltrans should require its staff to record all service requests it receives via methods other than Caltrans' website, such as by phone, mail, or its service request system to ensure it captures all service requests in one central repository.

**Caltrans Response:**

- ③ Caltrans has a web-based system which receives thousands of Maintenance Service Requests (MSR) annually from the public. The system currently generates a ten-day alert; however, Caltrans will require supervisors to verify and update the status of all outstanding MSRs within thirty days. Caltrans will require regional managers to prioritize and develop a plan to complete all MSRs outstanding after 30 days.

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In addition, Caltrans will establish guidance that requires its staff to record all MSRs received via methods other than its website and maintain them in a central repository. This recommendation will be implemented by December 2016.

**Recommendation No. 5:**

To detect and prevent fraud, waste, and abuse, and to ensure costs are appropriate, the maintenance division should strengthen its controls over reviewing and approving work order costs by requiring its supervisors and superintendents to document their review and approval of work orders in the maintenance management system. For example, supervisors or superintendents could include a note in the comment field of the work order indicating their review and approval. The maintenance division could also establish a reasonable dollar threshold for those work orders that would require documented review and approval.

**Caltrans Response:**

The maintenance division will review its current controls over reviewing and approving work orders and find ways to strengthen those controls. The maintenance division will look into establishing a dollar threshold for work orders and require that supervisors and superintendents document their review and approval in the maintenance management system. In addition, the maintenance division will remind all its employees of the requirement to follow proper procurement practices in the acquisition of materials, service contracts, and purchase orders/requests, which include varying levels of supervisor/ management review and approval. This recommendation will be implemented by December 2016.

**Recommendation No. 6:**

To ensure that field maintenance work orders are completed in a timely manner, the maintenance division should require supervisors to initiate work orders in the maintenance management system at the time that they identify field maintenance work that needs to be performed and record the date that work was started and the date work was completed. Superintendents should periodically review work orders to ensure that identified work is completed in a timely manner.

**Caltrans Response:**

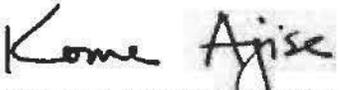
Caltrans will revise current guidance to require each supervisor to initiate an IMMS work order when field maintenance work begins. The IMMS work order will be closed out and will reflect the date when work is completed. Superintendents will be required to periodically review IMMS work orders to validate work is being completed in a timely manner. This recommendation will be implemented by July 2016.

④

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Caltrans appreciates the opportunity to provide a response to the draft audit report. If you have any questions or require further information, please contact Steve Takigawa, Deputy Director, Maintenance and Operations, at (916) 654-6823, or William E. Lewis, Assistant Director, Audits and Investigations, at (916) 323-7122.

Sincerely,

  
for MALCOLM DOUGHERTY  
Director

c: Steve Takigawa  
William E. Lewis

## Comments

### CALIFORNIA STATE AUDITOR'S COMMENTS ON THE RESPONSE FROM THE CALIFORNIA DEPARTMENT OF TRANSPORTATION

To provide clarity and perspective, we are commenting on the California Department of Transportation's (Caltrans) response to our audit. The numbers below correspond to the numbers we have placed in the margin of Caltrans' response.

To clarify, as we state in the Appendix on page 49, we analyzed more precisely where the districts spent their field maintenance funding by focusing on three selected districts: district 4 (Oakland), district 6 (Fresno), district 7 (Los Angeles). Because we had this detailed spending information for the three districts, we attempted to focus our review of socioeconomic demographics in the three districts as well.

①

As we describe on page 24, the purpose of the budget model was to establish baseline field maintenance funding needs and allocations needed to maintain similar highways within the state at a specified maintenance performance level. Notwithstanding the challenges with implementing the budget model that Caltrans described in its response, we are pleased that it agrees with our recommendation to develop and implement a budget model that takes into account key indicators of maintenance need and use the model to inform appropriate allocations to the 12 districts.

②

As we state on page 40, the maintenance division has not established a time frame for completing service requests. The *10 day alert* that Caltrans mentions in its response refers to the requirement to respond to the individual who submitted the service request within 10 days, stating whether the district commits to perform the work or stating the reasons why it is not going to perform the work. In contrast, on page 46 we recommend that Caltrans require supervisors to monitor actual completion of service requests to identify those not completed within a certain period of time that Caltrans deems appropriate, such as 30 day and determine their status.

③

We are concerned that in its response Caltrans' proposed revision to its current guidance will not adequately address our concern. In particular, on page 47 we recommend that supervisors initiate work orders in the integrated maintenance management system once they identify needed field maintenance work rather than when the work begins as Caltrans mentions in its response. As we state on pages 41 and 42, unless the maintenance division initiates work orders when work is identified, the true length of time it takes from the date the work is identified to the date it is completed is not captured, and the maintenance division cannot accurately monitor whether it is addressing field maintenance needs in a timely manner.

④