

California State Auditor

B U R E A U O F S T A T E A U D I T S

California Department of Transportation:

*Although Encouraging Contractors to
Use Recycled Materials in Its Highway
Projects, Caltrans Collects Scant Data
on Its Recycling and Solid Waste
Diversion Efforts*



July 2006
2005-135

The first five copies of each California State Auditor report are free.
Additional copies are \$3 each, payable by check or money order.
You can obtain reports by contacting the Bureau of State Audits
at the following address:

**California State Auditor
Bureau of State Audits
555 Capitol Mall, Suite 300
Sacramento, California 95814
(916) 445-0255 or TTY (916) 445-0033**

OR

**This report is also available
on the World Wide Web
<http://www.bsa.ca.gov>**

The California State Auditor is pleased to announce
the availability of an on-line subscription service.
For information on how to subscribe, please contact
the Information Technology Unit at (916) 445-0255, ext. 456,
or visit our Web site at www.bsa.ca.gov

Alternate format reports available upon request.

Permission is granted to reproduce reports.



CALIFORNIA STATE AUDITOR

ELAINE M. HOWLE
STATE AUDITOR

STEVEN M. HENDRICKSON
CHIEF DEPUTY STATE AUDITOR

July 18, 2006

2005-135

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 Bureau of State Audits presents its audit report concerning the California Department of Transportation's (Caltrans) use of recycled aggregate materials in its highway construction projects.

This report concludes that although it encourages its contractors to use recycled materials, Caltrans does not require contractors to report how much recycled materials they use in its construction projects and statutes do not require it do so. However, the law requiring Caltrans to write contracts so construction contractors can use recycled materials is part of the Integrated Waste Management Act of 1989 (act), which intends to reduce the amount of solid waste disposed of in landfills. Another part of this act requires all state agencies, including Caltrans, to divert at least 25 percent and 50 percent of its solid waste away from landfills by January 1, 2002, and January 1, 2004, respectively. It further requires Caltrans to annually submit a report summarizing its diversion efforts to the California Integrated Waste Management Board (board). However, Caltrans generally reported to the board the waste generated on only a single project from each of its 12 districts between 2002 and 2004. Further, although Caltrans reported the waste generated by more projects in 2005 than in prior years, it still only accounted for about 14 percent of its projects. Moreover, the data it did report for 2005 appear to be erroneous. As a result, Caltrans cannot assure itself and others that it is meeting the State's goal of diverting at least 50 percent of its solid waste away from landfills.

Respectfully submitted,

ELAINE M. HOWLE
State Auditor

CONTENTS

<i>Summary</i>	1
<i>Introduction</i>	5
<i>Audit Results</i>	
Neither Caltrans Nor the Public Resources Code Requires Contractors to Report How Much Recycled Aggregate They Use in Highway Construction Projects	13
Caltrans Cannot Demonstrate That It Is Meeting the State’s Goals for Diverting Solid Waste	15
Recommendations	22
<i>Appendix</i>	
Caltrans’ Contract Language and Solid Waste Disposal and Recycling Report	25
<i>Reponse to the Audit</i>	
Business, Transportation and Housing Agency, Department of Transportation	29

Blank page inserted for reproduction purposes only.

SUMMARY

Audit Highlights . . .

Our review of the California Department of Transportation's (Caltrans) use of recycled aggregate in its highway construction projects found that:

- Although Caltrans does not generally see any impediments to using recycled aggregate in its construction projects and allows its contractors to use up to 100 percent recycled materials, it allows contractors to decide when and to what extent recycled aggregate is more cost-effective than virgin aggregate.***
 - With no statutory requirement to report how much recycled aggregate is used, Caltrans does not collect this data and thus does not know how much recycled materials its contractors use in highway construction projects.***
 - To demonstrate compliance with 1999 legislation, Caltrans captures and reports some data on how much waste construction material its contractors generate for highway construction projects and divert away from landfills.***
 - Caltrans did not report the solid waste generated on all its construction projects and often could not support the data it did report.***
-

RESULTS IN BRIEF

The California Department of Transportation (Caltrans) designs, constructs, maintains, and operates the California State Highway System, including that part of the Interstate Highway System lying within state boundaries. Many Caltrans projects require aggregate materials—natural minerals such as sand, gravel, and crushed stones—commonly used as foundation material for constructing streets and highways. These materials are available in several forms, including “virgin” aggregate mined from gravel quarries, and recycled or reclaimed aggregate from building or road demolition. The California Department of Conservation expects that in 50 years the demand for aggregate will exceed the supply at sites with permits for mining aggregate in most regions of California, including highly urbanized regions. Fortunately, asphalt pavement and concrete waste materials can be recycled into aggregate, increasing the life span of existing aggregate resources. A study conducted for the California Integrated Waste Management Board (board), however, found that in 2003 almost 1 million tons of such waste material were disposed of in California’s landfills.

Legislation passed in 1989 to encourage the maximum use of recycled materials, including aggregate, required Caltrans to review and modify all bid specifications for purchasing paving materials and base, subbase, and pervious backfill materials. This requirement was later incorporated into the Integrated Waste Management Act of 1989 (act), which intended to reduce the amount of waste materials disposed of in landfills. Although Caltrans does not generally see any impediments to using recycled aggregate in its construction projects and allows its contractors to use up to 100 percent recycled materials, it permits the contractors to decide when and to what extent recycled aggregate is more cost-effective than virgin aggregate. With no statutory requirement to report how much recycled aggregate is used, Caltrans does not collect these data and thus does not know how much recycled material its contractors use in highway construction projects.

However, to demonstrate compliance with a 1999 amendment to the act, Caltrans captures some data on how much waste construction material its contractors generate on its construction

projects and divert away from landfills. This amendment requires all state agencies and large state facilities, which include Caltrans' 12 districts, to divert at least 25 percent and 50 percent of their solid waste from landfills or transformation facilities¹ by January 1, 2002, and January 1, 2004, respectively. This amendment further requires each state agency and large state facility to report annually to the board on its progress in diverting solid waste during each calendar year.

To comply with the 1999 amendment, each Caltrans' district submits an annual waste management report to the board, specifying amounts of solid waste generated for highway construction projects and amounts diverted from landfills. However, in reviewing the data the Caltrans' districts collected and reported to the board, we found that Caltrans did not report the solid waste generated on all of its construction projects and often could not support the data it did report. For its 2002 through 2004 annual reports, Caltrans generally reported the solid waste generated on only one project in each of its 12 districts. For its 2005 report, Caltrans intended to report the amount of solid waste generated and diverted away from landfills for all contracts advertised and awarded after November 2004. To capture these data, Caltrans required all project contractors to submit "diversion forms" that specify the amounts of diverted solid waste. However, we found that Caltrans did not ensure that all of its contractors submitted these forms. Further, some of its resident engineers responsible for collecting diversion forms either did not do so or did not forward the completed forms to the designated district coordinators, who summarize this information and report it to the board. As a result, the 2005 reports Caltrans' 12 districts submitted to the board accounted for only about 14 percent of the projects that should have been included in those reports.

Not only did Caltrans underreport projects to the board, but the data it did report also contained inaccuracies. From a sample of 30 projects, our review of the 28 projects for which Caltrans had diversion forms available found that Caltrans' resident engineers did not always review the forms and many forms contained errors. For example, resident engineers for 11 projects did not sign the diversion forms to indicate that they had

¹ A facility whose principal function is to convert, combust, or otherwise process solid waste by incineration, pyrolysis, destructive distillation, or gasification, or to chemically or biologically process solid wastes, for the purpose of volume reduction, synthetic fuel production, or energy recovery.

reviewed them. In addition, the amounts of waste reported on diversion forms for nine projects were clearly inaccurate, with some diversion forms not accounting for the materials reused on the project. Although the diversion forms for the remaining projects did not have obvious quantity errors, the nature and complexity of construction activities often made it difficult to assess the completeness and accuracy of the reported quantities on most projects. Besides quantity errors, contractors included inconsistent information, such as reporting that they disposed of the materials in a landfill but giving the name of a recycling center as the location where they took the material. Finally, we also found that more than half of the diversion forms failed to specify the reporting period, reflected periods crossing calendar years, or included waste generated outside the applicable calendar year.

RECOMMENDATIONS

To ensure that its annual waste management reports on its diversion efforts to the board are complete and supported, Caltrans should:

- Ensure that its contractors for all projects annually submit diversion forms to the projects' resident engineers in a timely fashion.
- Ensure that its resident engineers submit a copy of all reviewed diversion forms to the appropriate recycling coordinator in a timely fashion.
- Ensure that its resident engineers consistently review and sign all diversion forms and consistently follow up with contractors to resolve any discrepancies in material type or volume.

AGENCY COMMENTS

Caltrans agreed with our recommendations and will take steps to implement them. ■

Blank page inserted for reproduction purposes only.

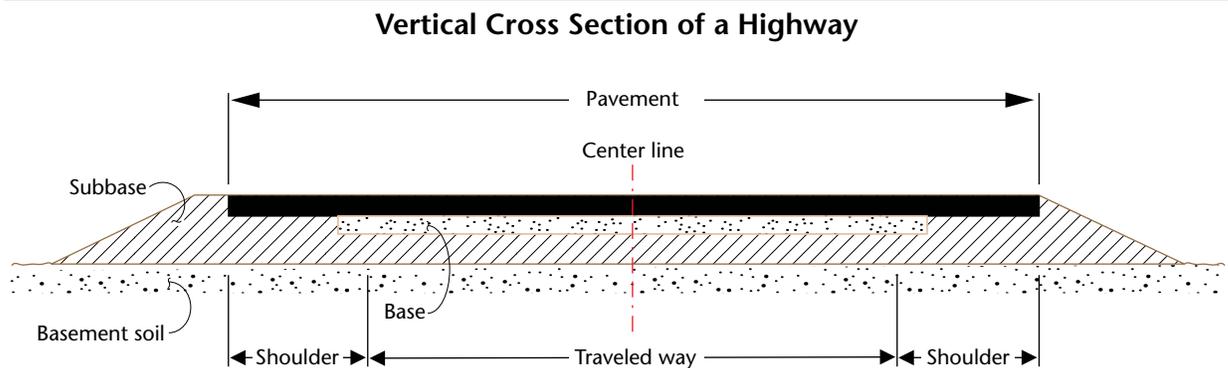
INTRODUCTION

BACKGROUND

The California Department of Transportation (Caltrans) is responsible for the design, construction, maintenance, and operation of California's State Highway System, including that part of the Interstate Highway System within the State's boundaries. A recent Caltrans study showed that transportation construction ranged from 4 percent to 8 percent of the funds spent on total statewide construction between 1995 and 2004. According to data provided by Caltrans' contracts office, during 2005 Caltrans executed more than 525 construction contracts, and this figure is expected to rise over the next 10 years if the Legislature adopts the governor's proposed infrastructure plan, which will funnel more money into various highway infrastructure projects. Accordingly, Caltrans anticipates an increased demand for aggregate materials needed to support these new projects.

Aggregate consists of natural minerals such as sand, gravel, and crushed stones used to make concrete and asphalt. Aggregate is also used as road base and subbase, which support the pavement, as shown in Figure 1. Base is a layer of selected, processed, and/or treated aggregate material of planned thickness and quality placed immediately below the pavement and above the subbase or basement soil. Subbase is a layer of aggregate material of designed thickness and specified quality, placed on the basement soil as a foundation for the base. Compared to road base, subbase has less strength and more sand, silt, and clay, but is more economical when bringing the road up to grade.

FIGURE 1

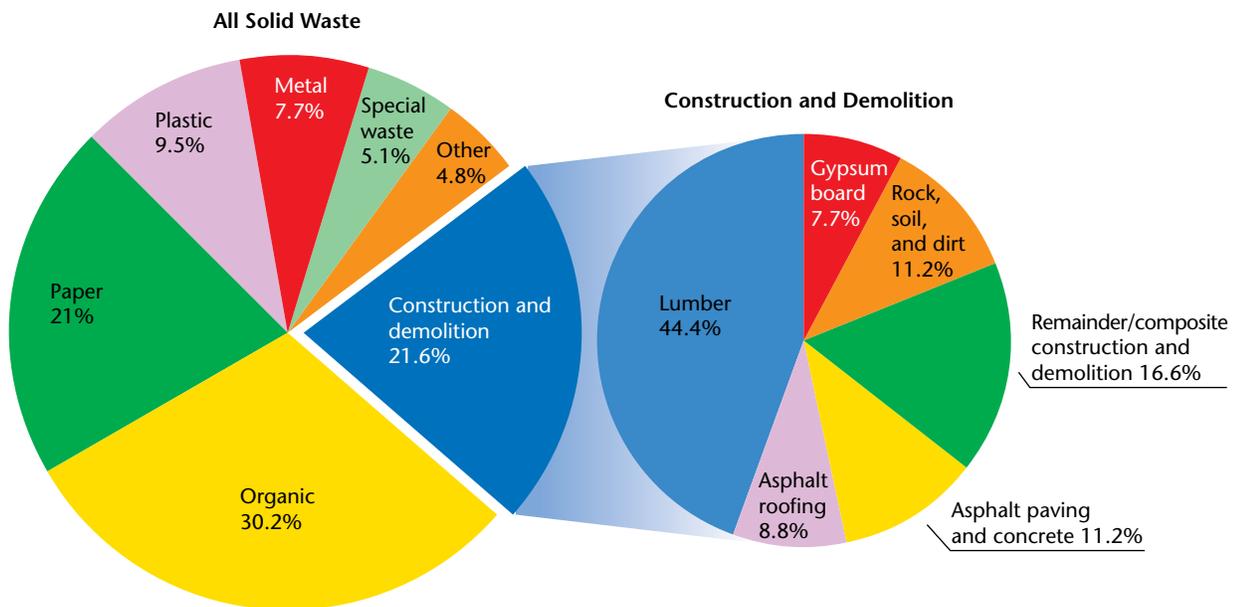


New aggregate materials, often called virgin aggregate, are mined in various locations throughout California. The principal authority to approve mining permits for such materials in California lies with the counties and cities, as indicated in the California Public Resources Code. According to a 2002 study by the California Department of Conservation, the availability of virgin aggregate at sites with mining permits as of January 2001 is not expected to meet the demand for such material beyond the next 50 years in various regions of California, including highly urbanized regions.

The limited supply of virgin aggregate emphasizes the need to recycle waste aggregate generated by construction and demolition of various infrastructures, including highways. This waste aggregate might otherwise be disposed of in landfills. According to a study conducted for the California Integrated Waste Management Board (board), construction and demolition waste material accounted for nearly 22 percent of the total waste streams disposed of in California’s landfills during 2003, as Figure 2 shows. This amounts to an estimated 8.7 million tons of construction and demolition materials—including almost 1 million tons of asphalt pavement and concrete that could have been recycled into reusable aggregate.

FIGURE 2

Overview of Waste Streams Disposed of in California’s Landfills During 2003



Source: California Integrated Waste Management Board, Statewide Waste Characterization Study, December 2004 (unaudited).
 Note: Percentages for material types may not total 100% because of rounding.

Although not all used asphalt and concrete can be recycled, more than 175 recyclers in California recycle used asphalt and concrete, according to the board's Web site. The waste asphalt and concrete generally arrive in chunks at the recycling plants, where heavy crushing equipment breaks up the chunks into reusable aggregate. Some construction contractors set up portable equipment at the construction site to recycle asphalt and concrete. Where practical, using this mobile equipment can reduce the overall cost of construction by minimizing the cost of transporting heavy materials to and from the construction site and can provide contractors with an incentive to make greater use of recycled aggregate.

VARIOUS STATUTES ENCOURAGE RECYCLING TO LIMIT THE AMOUNT OF WASTE GOVERNMENT AGENCIES DISPOSE OF IN LANDFILLS

In 1989, new legislation required Caltrans to review and modify all bid specifications relating to the purchase of paving materials and base, subbase, and pervious backfill materials to encourage the use of recycled materials, unless its director determines it is not cost-effective to do so. The recycled materials include, but are not limited to, recycled asphalt pavement and crushed concrete subbase. The 1989 law directed Caltrans to develop new standards and specifications for using these recycled materials, without reducing the existing quality standards for highway and road construction. This law was later incorporated into the California Integrated Waste Management Act of 1989 (act) as the California Public Resources Code, sections 42700 and 42701. The act intends to reduce the amount of solid waste, including construction waste material, disposed of in landfills and to encourage the recycling of such materials.

In response to the California Public Resources Code, Caltrans adjusted its bid specifications and contracts to allow contractors to use recycled aggregate as long as the materials meet its established standards. Caltrans' procedures for accepting aggregate material call for multiple types of tests throughout the project to determine whether various aggregates meet the standards for base and subbase. In general, Caltrans' policies require various tests when the contractor brings the aggregate to the project site before the materials for both base and subbase can be accepted. Caltrans' policy calls for one or more acceptance tests a day, based on the quality of the materials.

Moreover, Assembly Bill 75, (Chapter 764, Statutes of 1999), amended the act to require all state agencies and large state facilities, including Caltrans' 12 districts, to divert at least 25 percent and 50 percent of their solid waste from landfills or transformation facilities by January 1, 2002, and January 1, 2004, respectively. This amendment further requires each state agency and large state facility to prepare an annual waste management report summarizing its progress in reducing solid waste during each calendar year and submit it to the board on or before April 1 of the following year, beginning with 2002. These requirements were codified as the California Public Resources Code, sections 42920 to 42926. To comply with the new requirements, in 2001 Caltrans developed and required its contractors to complete a Solid Waste Disposal and Recycling Report (diversion form) to specify the amount of waste materials generated during construction and the disposition of those materials as either taken to or diverted from landfills. The types of waste materials captured by this diversion form include asphalt, concrete, mixed debris, wood or cleared vegetation, and metal removed during construction. This audit report's Appendix provides an example of the form.

Although not required to provide detailed support along with the diversion forms, the contractors are required to certify under penalty of perjury that the information on the form is complete and accurate. Caltrans' construction manual requires the project's resident engineer to review and sign each form, comparing the total volume of materials taken to and diverted from landfills as shown on the form with the approximate volume of materials removed during construction. Before approving each form, resident engineers are expected to resolve any discrepancies in material type or volume with the contractor. Finally, resident engineers submit all approved diversion forms directly to the district recycling coordinator and provide copies to the statewide recycling coordinator in Caltrans' Division of Design. Based partly on the data reported on these diversion forms, each of Caltrans' 12 districts submits an annual waste management report to the board.

SCOPE AND METHODOLOGY

The Joint Legislative Audit Committee (audit committee) asked the Bureau of State Audits (bureau) to evaluate Caltrans' compliance with the California Public Resources Code, Section 42701, which requires it to write contracts so construction contractors can use recycled materials, unless its director determines that using such materials is not cost-effective. The audit committee also

asked us to assess the process Caltrans uses to determine the cost-effectiveness of using recycled materials. Further, we were asked to identify any impediments to Caltrans' use of recycled aggregate material. In addition, the audit committee asked the bureau to determine the extent to which Caltrans communicates the State's recycling requirements to its contractors and encourages them to use recycled materials in its construction projects. Lastly, the audit committee asked us to determine whether Caltrans maintains data on how much recycled aggregate base material its contractors use. If Caltrans does not track this information, the committee asked the bureau to identify, to the extent feasible and using available data, the amount of recycled material used by a sample of Caltrans' geographically diverse road construction and repair projects, both small and large, over the last five years.

To determine how Caltrans complies with the law requiring it to write contracts so construction contractors can use recycled materials, how it evaluates the cost-effectiveness of using recycled materials, how it encourages its contractors to use recycled materials, and what impediments it perceives to using recycled aggregate materials, we conducted interviews with Caltrans' staff and obtained written responses from Caltrans' director. We also obtained written responses from each of Caltrans' 12 district office directors regarding impediments, if any, to Caltrans' use of recycled aggregate materials. Caltrans' director indicated that the California Public Resources Code, Section 42701, requires a cost-effective determination only when Caltrans decides that the use of recycled materials is not cost-effective. The director noted that because Caltrans has made no such decision as part of its contracting process, it has no documentation to support a cost-effective determination. He stated that Caltrans awards its construction contracts through competitive bidding and that contractors, in developing their bids, decide when it is cost-effective to use recycled rather than virgin materials.

To obtain data on its use of recycled materials, we interviewed various Caltrans' officials, including the chief of its Construction Division, to learn what data Caltrans collects for its construction projects. We learned that Caltrans does not track how much recycled aggregate materials its contractors use in its construction projects. However, we found that Caltrans does gather some data on how much solid waste it diverts from landfills as part of its efforts to demonstrate compliance with another part of the act, California Public

Resources Code, Section 42921. We reviewed these data on waste materials diverted away from landfills because Caltrans does not track how much recycled aggregate material goes into its construction projects and because the California Public Resources Code, sections 42700 and 42701, are part of the same act, which aims to reduce the amount of construction waste material disposed of in landfills.

To determine how much waste asphalt and concrete Caltrans' contractors are diverting away from landfills, we selected six contracts from each of five geographically diverse districts that had large numbers of projects. Specifically, we selected one contract each district reported to the board for each of calendar years 2002 through 2004. In addition, we obtained from Caltrans' contract office a list of all contracts Caltrans awarded in 2005 that were advertised since November 2004, when it changed its contracting policies to require all contractors to report solid waste diversion data, and selected three projects from the five districts. The U.S. Government Accountability Office, whose standards we follow, requires us to assess the reliability of computer-processed data. We verified the completeness and accuracy of the data the Caltrans contracts office provided by comparing the list of contracts to its accounting records and by sampling contract documents. We found the data sufficiently reliable for the purposes of analyzing the number of contracts awarded during 2005 that were advertised since November 2004. We limited our review of contracts to the last four years because Caltrans' record retention policy allows the discarding of records for all projects finalized more than three years ago.

For the 30 contracts selected, we visited the district offices where the project files are located and reviewed the files to ensure that contractors submitted the required diversion forms and that Caltrans' resident engineers responsible for supervising the contractors' work reviewed the forms. To determine the accuracy of information on the forms, we reviewed any supporting documents the contractors may have submitted to verify the amount of materials and the locations to which the contractors took the materials as reported on the diversion forms. Further, we reviewed various documents in the project files and, with the help of the resident engineers, attempted to estimate the amount of waste material the projects generated. Our review was limited to the documents that were in Caltrans' project files, so we did not review any documents that contractors may have retained. This audit focuses on recycled aggregate,

produced primarily from waste asphalt and concrete, so we did not attempt to verify other waste materials generated on a project and appearing on the diversion form, including vegetation and metal. Finally, for any of the 30 contracts that included aggregate, we determined whether the contract contained the provision to allow contractors to use 100 percent recycled material.

Also, to determine the completeness of Caltrans' data on its waste diversion efforts, we reviewed the reports that Caltrans' 12 districts submitted to the board to demonstrate its compliance with the California Public Resources Code, Section 42921, for calendar year 2005. We identified the number of projects each district used to prepare these reports. We also identified the number of contracts Caltrans advertised for each district after November 2004 that should have been reported on the districts' reports to the board for calendar year 2005. Based on this information, we determined whether the 12 districts' reports to the board for calendar year 2005 accounted for all projects. ■

Blank page inserted for reproduction purposes only.

AUDIT RESULTS

NEITHER CALTRANS NOR THE PUBLIC RESOURCES CODE REQUIRES CONTRACTORS TO REPORT HOW MUCH RECYCLED AGGREGATE THEY USE IN HIGHWAY CONSTRUCTION PROJECTS

Although it encourages contractors to use recycled aggregate in its construction projects, the California Department of Transportation (Caltrans) does not track how much recycled material contractors actually use for highway construction. Caltrans gives contractors the option to use up to 100 percent recycled aggregate and does not generally perceive any impediments to using such material as long as it meets Caltrans' established standards. However, contractors do not report data on how much recycled aggregate they actually use in highway projects, because statutes do not require and Caltrans does not ask contractors to submit such information. As a result, Caltrans lacks complete data on how much recycled aggregate contractors use. Nevertheless, to comply with statutes requiring it to limit the solid waste disposed of in landfills, Caltrans does collect some data on the amount of highway construction waste, primarily asphalt and concrete, its contractors recycle.

In our review of 30 construction contracts, we found that Caltrans provided its contractors with the option of using up to 100 percent recycled aggregate for all 19 projects requiring aggregate. As we described in the Introduction, legislation passed in 1989 required Caltrans to modify its bid specifications to encourage the use of recycled materials. Caltrans responded to this statutory requirement by modifying its contracts to allow contractors to use 100 percent recycled material. According to the chief of the contracts office, currently Caltrans' standard specifications, part of every construction contract, allow contractors to use up to 50 percent recycled aggregate. However, Caltrans uses special provisions, unique to each contract, to remove this limitation and allow its contractors to use up to 100 percent recycled aggregate. The chief of the contracts office also indicated that because local governments use Caltrans' standard specifications and choose to limit the use of recycled aggregate to 50 percent, the current process accommodates the desires of both local governments and Caltrans.

Caltrans allows contractors to use up to 100 percent recycled aggregate on its construction projects and advises them of relevant provisions of the California Public Resources Code. However, according to Caltrans' director, it does not impose the use of recycled aggregate by any set percentages or otherwise direct contractors to use recycled aggregate. Instead, he said that Caltrans awards construction contracts through competitive bidding, allowing contractors to decide when it is cost-effective to use recycled rather than virgin material based on market conditions.

Almost all districts and the headquarters indicated that generally there are no significant impediments to using recycled materials.

Caltrans' headquarters and eight of its 12 district offices informed us that they do not see any impediments to using recycled aggregate in construction projects. The remaining four districts noted a few difficulties in using recycled aggregate. For example, three districts observed that some environmental regulations prevent the use of recycled aggregate near waterways or culverts and other regulations require special equipment or permits for using recycled material. Two of these three districts noted that contractors' cost savings from using recycled material might not be significant in some projects. One district also said that recycled aggregate does not always meet Caltrans' standards. However, almost all districts and the headquarters indicated that generally there are no significant impediments to using recycled materials on most projects.

The California Public Resources Code does not require Caltrans to report the amount of recycled aggregate used in its construction projects, and Caltrans does not require its contractors to report this information. Caltrans said that it would be difficult to determine the amount of recycled aggregate that contractors use in its construction projects because contractors do not keep records of how much of the total quantity is recycled aggregate. However, as we mentioned in the Introduction, the California Public Resources Code that requires Caltrans to permit contractors to use recycled materials is part of the California Integrated Waste Management Act of 1989 (act), which aims to reduce the amount of waste construction materials disposed of in landfills. In fact, another part of the act requires Caltrans to divert at least 25 percent and 50 percent of its solid waste away from landfills by 2002 and 2004, respectively, and also requires Caltrans and its 12 districts to annually collect and summarize their waste disposal activities in a report to the California Integrated Waste Management Board (board). As we discuss below, we found that data Caltrans collects to demonstrate compliance with the State's waste diversion goals can provide some information regarding the use of recycled materials.

CALTRANS CANNOT DEMONSTRATE THAT IT IS MEETING THE STATE'S GOALS FOR DIVERTING SOLID WASTE

Caltrans cannot be sure that it is meeting state goals for diverting solid waste from landfills, because the data it collects and reports to the board are incomplete and unsupported. Our review of Caltrans' annual reports on its efforts to divert construction waste materials found that between January 2002 and December 2004 the reports accounted for only a few of the several hundred projects that were active during those years. Although based on more projects than in prior years, Caltrans' 2005 reports to the board contained data for only 14 percent of the projects that should have been included in those reports. Also, the annual reports' project data—collected from the Solid Waste Disposal and Recycling Reports (diversion forms)—are not reliable. In particular, 24 of the 28 diversion forms that were available to us, out of our sample of 30 contracts, contained obvious errors or were not signed by resident engineers. Taking into account these omissions and errors, it is unclear whether Caltrans is meeting state goals for diverting at least 50 percent of its solid waste from landfills.

Until Recently, Caltrans' Annual Reporting on Its Diversion Efforts Has Been Generally Limited to a Single Project per District

The annual waste management reports that Caltrans' 12 districts submitted for 2002 through 2004—which generally included only a single construction project from each district—did not account for most of the waste generated on its construction projects during those years. Caltrans noted that because its contracts at that time did not require contractors to submit diversion forms, it needed to amend the contracts to require contractors to complete the forms, often at additional cost. For the 15 contracts we reviewed over these three years, the largest contract amendment cost Caltrans incurred was \$7,500 to obtain the data. As a result, it generally chose to amend only a single project for each district to require the contractors to complete the diversion forms. Although in 2004 Caltrans planned to amend the contracts for two selected projects per district to collect diversion data, recycling coordinators for four of the five districts we visited could only provide us the diversion form for one project. Caltrans' coordinator who oversees the annual waste management reports submitted by

Although in 2004 Caltrans planned to amend the contracts for two selected projects per district to collect diversion data, recycling coordinators for four of the five districts we visited could only provide us the diversion form for one project.

the district recycling coordinators said Caltrans' inability to amend contracts as planned probably accounted for the lack of diversion forms for two projects from each district.

Caltrans informed the board in 2002 that each of its districts was reporting on only one project. The board allowed Caltrans to provide diversion and disposal data for a single project for each district to give Caltrans a reasonable amount of time to implement a process to capture the data from its contractors. The board was under the impression that Caltrans would include the requirement to collect these data in all new contracts it awarded beginning in early 2003. However, as our review found, Caltrans did not begin including this requirement in its construction contracts until November 2004.

Although Caltrans' 2005 Waste Management Reports Include More Data Than in Past Years, They Still Lack a Significant Number of Projects

Caltrans reported on significantly fewer projects than it should have during 2005. Caltrans requires its contractors to complete the diversion form for all contracts advertised and awarded since November 2004. In their 2005 waste management reports to the board, Caltrans' districts reported diverting a total of about 377,000 tons (97 percent) of their combined solid waste away from landfills. This figure includes various types of solid waste, but because of weight, construction materials make up most of the tonnage. This reported diversion would more than meet the state goal for Caltrans to divert 50 percent of its solid waste. However, we estimate that Caltrans' districts reported on only about 14 percent of their construction projects during 2005.

We estimate that Caltrans' districts reported on only about 14 percent of their construction projects during 2005.

According to a database acquired from Caltrans' contracts office, 525 contracts advertised since November 2004 were awarded during 2005. Therefore, we anticipated that the 12 districts would have reported solid waste data for at least that number of projects in their 2005 waste management reports to the board. However, as Table 1 shows, the districts initially reported solid waste disposal data for only 75 projects. After we began inquiring about how many projects' data were included in their initial reports, many districts indicated that they were acquiring more diversion forms and planned to amend their reports. Caltrans' coordinator who oversees the annual waste management reports submitted by the district recycling

coordinators said that Caltrans did not receive all diversion forms from the construction staff because of ineffective outreach and communication to construction staff and contractors.

TABLE 1

Caltrans Reported Diversion Data for Far Fewer Contracts Than Required in 2005

District	Estimated Numbers of Contracts That Should Have Been Included in 2005 Waste Management Reports*	Numbers of Contracts With Diversion Forms Available for Initial 2005 Waste Management Reports†	Estimated Percentage of Contracts With Diversion Forms Available
Eureka	33	3	9%
Redding	46	19	41
Marysville	43	9	21
Oakland	59	9	15
San Luis Obispo	42	0	0
Fresno	64	5	8
Los Angeles	86	18	21
San Bernardino	35	0‡	0
Bishop	13	6	46
Stockton	35	2	6
San Diego	36	4	11
Santa Ana	33	0	0
Totals	525	75	14%

Source: Data extracted from contract listing provided by Caltrans' contracts office.

* Figures represent the number of contracts Caltrans advertised after November 2004 and awarded in 2005 and do not include contracts awarded in prior years which may have had diversion activity in 2005. Also, there may have been no diversion activity to report for some contracts awarded in 2005. However, the figures represent a conservative estimate of how many diversion forms Caltrans should have expected to include in its 2005 waste management reports.

† In some cases, Caltrans' district staff told us that they received more diversion forms after they prepared their initial 2005 waste management reports and they plan to submit amended reports in the future. In addition, some of the diversion forms they received indicate that there were no materials to report for 2005.

‡ According to the San Bernardino district recycling coordinator, as of early June 2006, the district had not yet completed its 2005 waste management report.

In our review of 15 contracts advertised since November 2004 and awarded during 2005, we found that lack of communication regarding the new contract requirement accounted for the omission of many projects. For various reasons, Caltrans did not include seven of these 15 projects in the waste management reports. For five of these projects, the resident engineers obtained the diversion forms from contractors but did not submit them to the district recycling coordinator, who then did not include the solid waste generated for these five projects in

the 2005 waste management reports. Generally, these resident engineers said they were not aware that they needed to forward a copy of these forms to the recycling coordinator.

For the remaining two projects, the contractors did not submit diversion forms. A resident engineer for one project told us that he did not ensure that the contractor submitted the diversion form because he overlooked the new requirement. For the other project, Caltrans did not include the requirement for completion and submission of the diversion form in the contract.

Caltrans acknowledged that some contracts did not include the requirement for the diversion form because of its manual process of inserting the language into each contract advertised after November 2004. According to Caltrans' contracts office, this requirement, now part of the boilerplate language, is automatically included in all contracts.

Many Diversion Forms Contained Errors and Lacked Review

Not only have many projects gone unreported, but also we found errors and scant review by resident engineers on the diversion forms Caltrans has received. As we described in the Introduction, Caltrans does not require contractors to submit detailed support along with their diversion forms, but it does require contractors to certify that the forms are complete and accurate. Caltrans also expects its resident engineers to review the forms, comparing the total volumes of materials taken to and diverted from landfills with the approximate volume of materials generated during construction, and resolving any discrepancies in material type or volume with contractors before signing the forms. However, as Table 2 shows, we found that resident engineers did not even sign 11 of the forms, and other errors indicate that they did not adequately resolve obvious discrepancies on a total of 21 forms, whether they signed them or not. Table 2 excludes two forms not available at all and four forms that contained no obvious errors.

Caltrans expects its resident engineers to review the forms and resolve any discrepancies in material type or volume with contractors before signing them.

TABLE 2

Twenty-Four Diversion Forms Contained Obvious Errors or Were Not Reviewed

District	Reporting Year	Quantity Errors	Disposition Errors	Reporting Period Errors	Resident Engineer Did Not Sign
Fresno					
	2002			X	X*
	2003	X	X	X	
	2004	X	X	X	
	2005	X	X	X	
Los Angeles					
	2002	X [†]			X*
	2004			X	
	2005		X	X	
	2005			X	X
	2005		X		X
Oakland					
	2002		X	X	X*
	2003	X		X	
	2004			X	
	2005	X			X
	2005		X	X	
	2005		X	X	
Marysville					
	2002				X*
	2003		X		
	2004	X [‡]	X		
	2005		X		X
San Diego					
	2003			X	
	2004	X		X	X
	2005				X
	2005	X		X	
	2005				X
Totals		9	11	15	11

Source: Auditor's review of construction project files.

* The diversion forms used in 2002 did not have a signature block for resident engineers.

† Although the contractor completed the diversion form, he did not sign it.

‡ The resident engineer prepared the diversion form.

We found that Caltrans did not have diversion forms for two of the 30 projects we reviewed. In addition, although the diversion forms for the remaining 28 projects were on file, our review of the documents available in Caltrans' project files revealed obvious errors on a total of 21 forms related to one or more of the following: material quantities, disposition data, or reporting period. Specifically, quantities for some materials were overstated on two forms and understated on seven. For example, on a freeway-widening project that began in March 2002, the contractor reported on a single diversion form that he reused or recycled 80,000 cubic meters of asphalt and concrete on the project. However, according to the resident engineer, the contractor estimated this figure by projecting the total amount of asphalt and concrete that he expected to reuse on the project over the entire six-year period of the contract. In addition, the resident engineer noted that much of the reported amount included waste asphalt and concrete generated from other projects and locations beyond this particular project. The resident engineer also told us he was not aware that the information on the diversion form should be for only one calendar year and limited to the actual waste generated on a specific Caltrans project. Moreover, the district recycling coordinator included this inflated amount on the 2005 waste management report submitted to the board.

The resident engineer for one project indicated that some waste asphalt and concrete generated during the project were reused, but the diversion form did not include any of these reused materials.

In contrast, another form did not include all waste materials generated during construction. The resident engineer for a 2003 project in the Oakland district indicated that some waste asphalt and concrete generated during this project were reused, but the diversion form did not include any of these reused materials. He noted that he did not question this because he was not aware that materials reused on the project should be included on the diversion form. However, both the board's guidelines to state agencies and Caltrans' directions for completing the diversion form specify that contractors report reused materials as materials diverted away from landfills. By not capturing this information, Caltrans understated its diversion efforts for this project.

For the diversion forms for the remaining 19 of the 28 projects not containing obvious errors related to the quantities of asphalt and concrete on the diversion forms, we still found it difficult to assess the completeness and accuracy of the reported quantities on most forms, for two reasons. First, the nature and complexity of certain types of construction activities make it difficult to estimate the amount of waste asphalt and concrete generated. For example, most projects we reviewed included some form of structure removal, such as removing a bridge, or a roadway excavation that involves removing all materials

The nature and complexity of certain types of construction activities make it difficult to estimate the amount of waste asphalt and concrete generated.

within a specified area of the roadway. Although these activities can produce asphalt and concrete, resident engineers told us that they also produce dirt and debris, and project records do not generally include any estimated breakdown of the types of waste generated. Second, while some resident engineers gave us estimates of how much asphalt and concrete was likely included in the waste generated from these types of activities, other resident engineers said they were unable to provide such estimates or could not do so without performing time-consuming and labor-intensive calculations. Thus, the accuracy and completeness of the amounts of concrete and asphalt reported on the diversion forms for these projects are unclear.

As shown previously in Table 2, we also noted errors in the disposition information included on 11 of the 28 diversion forms. For example, although the contractor for a reconstruction and rehabilitation project in the Los Angeles district reported on the diversion form that he had taken 753 cubic meters of concrete to a recycling facility, he recorded the amount under the column for materials taken to a landfill. The resident engineer for the project agreed that the amount should have been recorded under the column for materials diverted from landfills. He also acknowledged that he performed a cursory review of the form and did not catch this error.

Similarly, we found that the contractor for another project in the Fresno district reported taking 2,915 cubic meters and 2,105 cubic meters of concrete and asphalt, respectively, to a landfill in 2003, as well as reporting the same amounts as diverted from a landfill. The resident engineer indicated that the contractor should have recorded both of these materials as diverted from landfills because the contractor had indicated on the diversion form that the materials were recycled. Further, although the recycling coordinator corrected the disposition error when reporting these amounts on the waste management report to the board, he reported them as tons rather than cubic meters.

Finally, although the California Public Resources Code requires state agencies and large state facilities to report the solid waste they generate for a single calendar year, 15 of the 28 diversion forms we reviewed failed to specify the reporting period, reflected periods crossing calendar years, or included waste generated outside the applicable calendar year. For example, the contractor for a 2005 project in the Oakland district indicated that the amounts he reported on the diversion form consisted of activities performed between August 2005 and April 2006.

Thus, the district where this project was located reported the 2006 amounts to the board as solid waste generated during calendar year 2005.

The chief of Caltrans' Office of Resource Conservation acknowledged that contractors did not always complete the forms correctly and that resident engineers did not always review the forms for accuracy according to its directions. She attributed some of these problems to the fact that 2005 was the first year that most contracts required contractors to complete the diversion form. Also, she told us that Caltrans is currently modifying its diversion form to clarify that the reporting period covers a single calendar year for multiple-year construction projects or the year the project was completed for other projects. Further, she noted that Caltrans would consider providing additional training for its resident engineers to assist them with their review of the data reported on the diversion forms, to ensure that they are accurate and complete.

RECOMMENDATIONS

To ensure that its annual waste management reports on its diversion efforts to the board are complete and supported, Caltrans should:

- Ensure that its contractors for all projects annually submit diversion forms to the projects' resident engineers in a timely fashion.
- Ensure that its resident engineers submit a copy of all reviewed diversion forms to the appropriate recycling coordinator in a timely fashion.
- Ensure that its resident engineers consistently review and sign all diversion forms, following the guidance in Caltrans' construction manual.
- Ensure that its resident engineers consistently follow up with contractors to resolve any discrepancies in material type or volume on the diversion forms before signing them.
- Remind resident engineers and contractors that the diversion forms must:
 - ◆ Include quantification of all solid waste generated by the work performed, including the amount of materials reused on the project generating the waste.

- ◆ Clearly distinguish the amount of materials taken to landfills from the amount diverted from landfills.
- ◆ Include waste generated during only the particular calendar year being reported.

We conducted this review 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. We limited our review to those areas specified in the audit scope section of this report.

Respectfully submitted,



ELAINE M. HOWLE
State Auditor

Date: July 18, 2006

Staff: John F. Collins II, CPA, Audit Principal
Kris D. Patel
Sunny M. Andrews
Joseph D. Archuleta

Blank page inserted for reproduction purposes only.

APPENDIX

Caltrans' Contract Language and Solid Waste Disposal and Recycling Report

The California Public Resources Code, Section 42921, requires the California Department of Transportation (Caltrans) to divert at least 25 percent and 50 percent of its solid waste from landfills and transformation facilities by January 1, 2002, and January 1, 2004, respectively. The California Public Resources Code also requires each state agency to prepare an annual waste management report summarizing its progress in reducing solid waste during each calendar year and submit it to the California Integrated Waste Management Board (board) on or before April 1 of the following year. To comply with this requirement, Caltrans began requiring its construction contractors to complete a Solid Waste Disposal and Recycling Report (diversion form) summarizing information on how much waste material they disposed of in landfills and diverted away from landfills for all contracts advertised and awarded after November 2004. Caltrans includes this new requirement in its special provisions, as shown in Figure A.1 on the following page. As Figure A.2 on page 27 shows, the diversion form requires contractors to submit the following information:

- The name and location of the disposal or recycling facility and the type of materials involved.
- How they handled the material, shown on the form with designated activity codes.
- The quantities of materials taken to and diverted from landfills, including materials reused on the project site.
- The period during which they removed or recycled the reported waste materials.

Caltrans also requires contractors to certify that all information provided on the form is complete and accurate and requires its resident engineers to sign the form to indicate that they reviewed the information on the form, compared the quantities that contractors reported on the form with the approximate volumes of materials removed during the reporting period, and resolved any discrepancies in material type or volume with the contractor.

FIGURE A.1

Special Provision Requiring the Solid Waste Disposal and Recycling Report

5-1.065 SOLID WASTE DISPOSAL AND RECYCLING REPORT

This work shall consist of reporting disposal and recycling of construction solid waste, as specified in these special provisions. For the purposes of this section, solid waste includes construction and demolition waste debris, but not hazardous waste.

Annually by the fifteenth day of January, the Contractor shall complete and certify Form CEM-2025, “Solid Waste Disposal and Recycling Report,” which quantifies solid waste generated by the work performed and disposed of in landfills or recycled during the previous calendar year. The amount and type of solid waste disposed of or recycled shall be reported in either tons or cubic feet. The Contractor shall also complete and certify Form CEM-2025 within 5 days following contract acceptance.

Form CEM-2025, “Solid Waste Disposal and Recycling Report” can be downloaded at:

<http://www.dot.ca.gov/hq/construc/manual2001>

If the Contractor has not submitted Form CEM-2025, by the dates specified above, the Department will withhold the amount of \$10,000 for each missing or incomplete report. The moneys withheld will be released for payment on the next monthly estimate for partial payment following the date that a complete and acceptable Form CEM-2025 is submitted to the Engineer. Upon completion of all contract work and submittal of the final Form CEM-2025, remaining withheld funds associated with this section, “Solid Waste Disposal and Recycling Report,” will be released for payment. Withheld funds in conformance with this section shall be in addition to other moneys withheld provided for in the contract. No interest will be due the Contractor on withheld amounts.

Full compensation for preparing and submitting Form CEM-2025, “Solid Waste Disposal and Recycling Report,” shall be considered as included in the contract price for the various items of work involved and no additional compensation will be allowed therefor.

Source: Caltrans’ Special Provisions.

Blank page inserted for reproduction purposes only.

Agency's comments provided as text only.

Business, Transportation and Housing Agency
980 9th Street, Suite 2450
Sacramento, CA 95814-2719

June 30, 2006

Elaine M. Howle, State Auditor
Bureau of State Audits
555 Capitol Mall, Suite 300
Sacramento, CA 95814

Dear Ms. Howle:

Attached is the Department of Transportation (Caltrans) response to your draft report, *California Department of Transportation: Although Encouraging Contractors to Use Recycled Materials in Its Highway Projects, Caltrans Collects Scant Data on Its Recycling and Solid Waste Diversion Efforts* (#2005-135). Thank you for the opportunity to respond to your draft audit report.

I am pleased that Caltrans is encouraging contractors to recycle aggregate by permitting the use of up to 100 percent of recycled aggregate in highway construction projects whenever the recycled materials meet the Caltrans quality standards. In addition, I appreciate your recommendations for improving the collection of data on the diversion of waste materials by contractors. As you are aware, completion of diversion forms is a fairly new requirement. Last year was the first full year that Caltrans attempted to obtain solid waste material diversion information from the contractors on all of its highway construction projects.

To improve its solid waste data collection and reporting, Caltrans now uses boilerplate language to incorporate the requirement for diversion information into all highway construction contracts. In addition, Caltrans will update its construction manual and issue a policy bulletin to communicate and clarify the requirements for diversion forms. Further, the Division of Construction will perform an internal review next year to evaluate how well resident engineers have implemented your recommendations and complied with solid waste reporting requirements.

The attached response from Caltrans provides further detail. However, if you need additional information, please do not hesitate to contact me, or Michael Tritz, Deputy Secretary for Audits and Performance Improvement within the Business, Transportation and Housing Agency, at (916) 324-7517.

Sincerely,

(Signed by: Sunne Wright McPeak)

SUNNE WRIGHT McPEAK
Secretary

Attachment

Department of Transportation
Office of the Director
1120 N Street
Sacramento, CA 95814

June 28, 2006

Sunne Wright McPeak, Secretary
Business, Transportation and Housing Agency
980 9th Street, Suite 2450
Sacramento, CA 95814

Dear Secretary McPeak:

I am pleased to respond to the Bureau of State Audits (BSA) draft audit report entitled, "California Department of Transportation: Although Encouraging Contractors to Use Recycled Materials in Its Highway Projects, Caltrans Collects Scant Data on Its Recycling and Solid Waste Diversion Efforts."

At the request of the Joint Legislative Audit Committee, the BSA conducted an audit of Caltrans use of recycled base materials in State highway construction and repair projects.

The BSA concluded that neither the Public Resources Code nor Caltrans requires contractors to report how much recycled aggregate the contractors use in highway construction projects. Caltrans does encourage contractors to use recycled aggregate in its construction projects by allowing up to 100 percent recycled aggregate and does not generally perceive any impediments to using such material as long as it meets Caltrans established standards. However, BSA did report that Caltrans cannot demonstrate that it is meeting State goals for diverting solid waste because the data it collects and reports to the California Integrated Waste Management Board (Board) is incomplete and unsupported.

In order to ensure that the Caltrans annual waste management reports to the Board on its diversion efforts are complete and supported, BSA recommends that Caltrans should:

1. Ensure that its contractors for every project annually submit diversion forms to resident engineers in a timely fashion.
2. Ensure that its resident engineers submit a copy of all reviewed diversion forms to the appropriate recycling coordinator in a timely fashion.
3. Ensure that its resident engineers consistently review and sign all diversion forms following the guidance in the Caltrans Construction Manual.
4. Ensure that its resident engineers consistently follow up with contractors to resolve any discrepancies in material type or volume on the diversion forms before signing them.
5. Remind resident engineers and contractors that the diversion forms must:
 - Include quantification of all solid waste generated by the work performed, including the amount of materials reused on the project generating the waste.
 - Clearly distinguish the amount of materials taken to landfills from the amount diverted from landfills.
 - Include waste generated during only the particular calendar year being reported.

Caltrans Response

The results of the audit disclosed that there were no reportable issues involving the use of recycled base materials as Caltrans is not required to report and does not require its contractors to report such information. The focus of the audit shifted to emphasize the Solid Waste Disposal and Recycling Reports prepared and submitted by contractors and then used by Caltrans to prepare annual reports to the Board on waste management diversion. The BSA auditors that reviewed the contractor-filed report forms found that a very low rate of contracts had forms filed for 2005 and that some of the submitted diversion forms were inaccurate or incomplete. As the BSA report states, the contractor reporting form and requirement that the form be completed on every contract is relatively new. Caltrans appreciates the BSA recommendations on how this process can be improved.

To ensure adequate documentation for Caltrans annual reports to the Board on waste management diversion, the following actions will be taken relative to each specific recommendation.

Recommendation 1: Ensure that its contractors for every project annually submit diversion forms to resident engineers in a timely fashion.

Caltrans Response to Recommendation 1:

The Caltrans Construction Manual, Section 7-109, "Solid Waste Disposal and Recycling Reporting," and contract special provision, "Solid Waste Disposal and Recycling Report," state that the reports must be submitted annually. To ensure that Caltrans contractors are submitting Form CEM-2025, "Solid Waste Disposal and Recycling Report," the district recycle coordinators will reconcile the forms they have received with the December 1 status of ongoing contracts for the reporting calendar year to verify they have received all forms. Resident engineers will be advised to withhold payment when a contractor does not make the annual submittal.

Recommendation 2: Ensure that its resident engineers submit a copy of all reviewed diversion forms to the appropriate recycling coordinator in a timely fashion.

Caltrans Response to Recommendation 2:

The Caltrans Construction Manual, Section 7-109, "Solid Waste Disposal and Recycling Reporting," does not include a filing date by which Form CEM-2025 is to be sent to the appropriate recycling coordinator. The Caltrans Construction Manual will be updated to include a date requirement for Form CEM-2025 to be sent to the appropriate recycling coordinator.

Recommendation 3: Ensure that its resident engineers consistently review and sign all diversion forms following the guidance in the Caltrans Construction Manual.

Caltrans Response to Recommendation 3:

The Caltrans Construction Manual, Section 7-109, "Solid Waste Disposal and Recycling Reporting," requires that the resident engineer review the information on the Form CEM-2025 and sign the form. Caltrans will consider including, in other Caltrans training classes, a section on how a resident

Sunne Wright McPeak
June 28, 2006
Page 3

engineer should review a contractor-submitted Form CEM-2025. In addition, district recycling coordinators will be instructed to return all forms to resident engineers for appropriate corrective action when any forms have discrepancies or are unsigned.

Recommendation 4: Ensure that its resident engineers consistently follow up with contractors to resolve any discrepancies in material type or volume on the diversion forms before signing them.

Caltrans Response to Recommendation 4:

See Response to Recommendation 3.

Recommendation 5: Remind resident engineers and contractors that the diversion forms must:

- **Include quantification of all solid waste generated by the work performed, including the amount of materials reused on the project generating the waste.**
- **Clearly distinguish the amount of material taken to landfills from the amount diverted from landfills.**
- **Include waste generated during only the particular calendar year being reported.**

Caltrans Response to Recommendation 5:

Caltrans will issue a statewide Construction Policy Bulletin (CPB) clearly stating that all solid waste generated by a project during a calendar year needs to be accounted for on the annual Form CEM-2025. The CPB will clarify that construction waste taken to a recycling facility that is located at a landfill should not be reported as deposited into a landfill, but as recycled. Caltrans also will modify Form CEM-2025 by removing reporting period "date-to-date" and will instead include a box for calendar year to be entered.

Caltrans Division of Construction will conduct an internal review in 2007 as part of its annual Construction Administration Process Evaluation process to verify that the above responses to the recommendations contained in the BSA report have improved data collected for the Caltrans solid waste diversion report.

Caltrans appreciates the opportunity to provide a response to the draft report. If you have any questions, or require further information, please contact Gene Mallette, Assistant Chief, Division of Construction, at (916) 653-4686, or Gerald Long, External Audit Coordinator, at (916) 323 7122.

Sincerely,

(Signed by: Will Kempton)

WILL KEMPTON
Director

cc: Members of the Legislature
Office of the Lieutenant Governor
Milton Marks Commission on California State
Government Organization and Economy
Department of Finance
Attorney General
State Controller
State Treasurer
Legislative Analyst
Senate Office of Research
California Research Bureau
Capitol Press