

SRI International

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SRI Project 4746

EVALUATION OF THE ORGANIZATIONAL STRUCTURE AND MANAGEMENT PRACTICES OF THE CALIFORNIA DEPARTMENT OF TRANSPORTATION

VOLUME I: SUMMARY AND RECOMMENDATIONS

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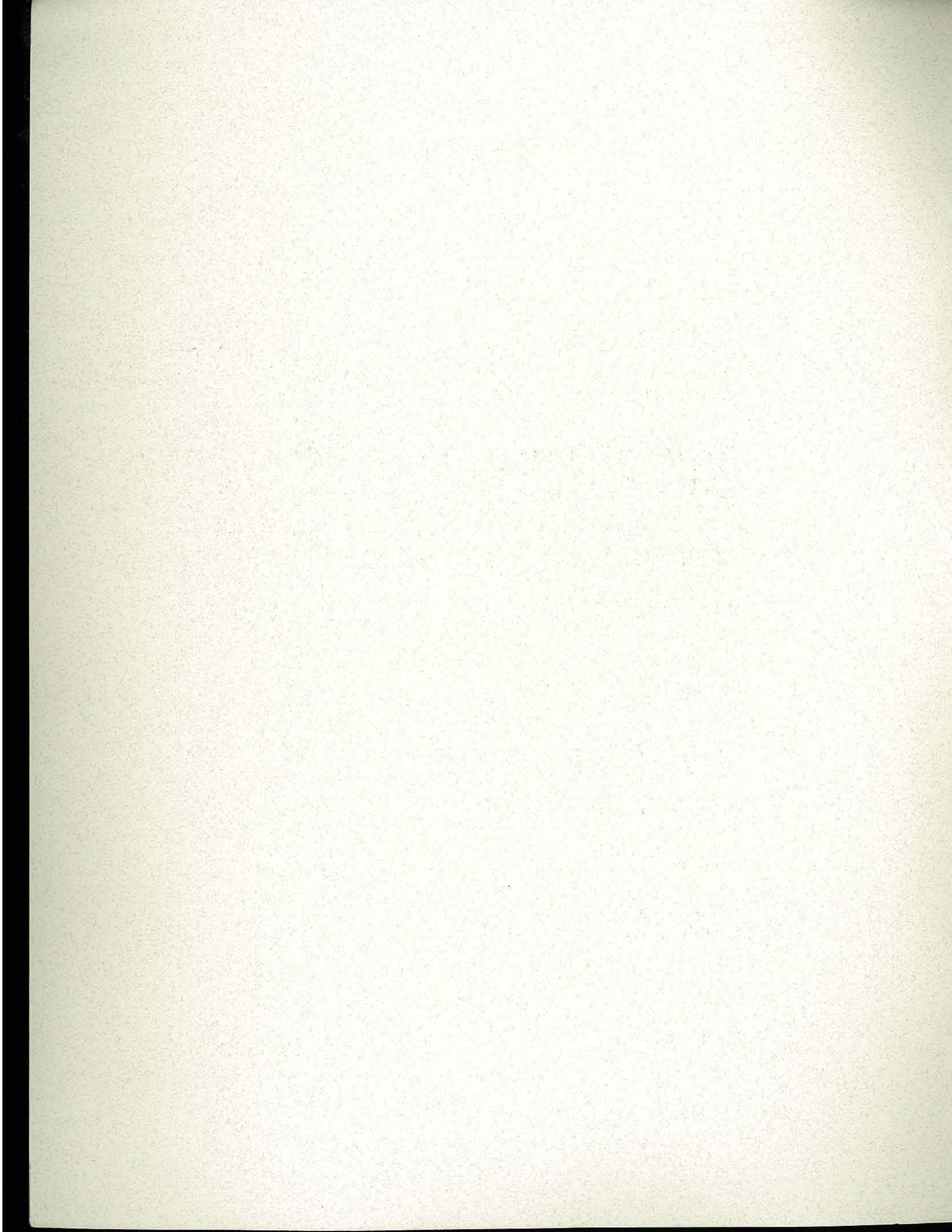
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GLOSSARY

AASHTO	American Association of State Highway and Transportation Officials	EIS	Environmental Impact Statement
A&E	architect and engineering	EPA	Environmental Protection Agency
ADTs	average daily trips	FCR	Flexible Congestion Relief
BT&H	Business, Transportation and Housing	FHwA	Federal Highway Administration
CADD	computer-aided design and drafting	GIS	geographic information systems
CASE	computer-aided systems engineering	GPS	global positioning systems
CAFE	corporate average fuel efficiency	HOV	high occupancy vehicles
CEQA	California Environmental Quality Act	ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
CHP	California Highway Patrol	IVHS	Intelligent Vehicle Highway Systems
CPI	consumer price index	LAO	Legislative Analyst's Office
CTC	California Transportation Commission	LFP	labor force participation
C/O	capital outlay	MBE	Minority Business Enterprise
CTP	California Transportation Plan	MIS	management information systems
DBE	Disadvantaged Business Enterprise	MPO	metropolitan planning organization
DGS	Department of General Services	MSA	merit salary adjustment
DPA	Department of Personnel Administration	MVA	Motor Vehicle Account
DIS	Division of Information Services	NEPA	National Environmental Policy Act
DMV	Department of Motor Vehicles	OTS	Office of Traffic Safety
DOT	Department of Transportation	PCE	preliminary and construction engineering
DVBE	Disabled Veteran Business Enterprise	PE	professional engineer
EEO	Equal Employment Office	PECG	Professional Engineers in California Government
EIR	Environmental Impact Report	PM	project manager
		PMCS	Project Management Control System

PSR	Project Study Report	SHOPP	State Highway Operation and Protection Plan
PTMS	Public Transportation Facilities and Equipment Management System	SSRA	Seismic Safety Retrofit Fund
PYEs	person-year equivalents	STA	State Transportation Assistance
PYs	person-years	STIP	State Transportation Improvement Program
QC/QA	quality control and quality assurance	TEIS	Transportation Executive Information System
RFP	Request for Proposal	TMA	transportation management areas
ROW	right of way	TP&D	Transportation Planning and Development Account
RTPA	regional transportation planning agencies	TRAMS	Transportation Accounting Management System
SANDAG	San Diego Association of Governments	TSM	Traffic Systems Management
SCAG	Southern California Association of Governments	VLF	Vehicle License Fee
SHA	State Highway Account	VMT	vehicle miles of travel
		WBE	Women Business Enterprise

HIGHLIGHTS

SRI International (SRI) and supporting consultancies were selected to evaluate the organization and management structure of the California Department of Transportation (Caltrans) as directed in Senate Concurrent Resolution Number 72 (SCR72). The evaluation was undertaken between May and December 1993. This report presents the results of our management audit of Caltrans' organizational structure and practices and recommends specific actions to improve the department's efficiency and effectiveness.

During our assessment, we undertook extensive interviews and analysis, including a review of audits conducted in the past 20 years proposing solutions to specific operational issues more-or-less similar to those raised in the present effort (in addition to reviews undertaken by legislative committees and the California Transportation Commission [CTC]). Clearly, Caltrans remains "rule-driven" rather than "product-driven" not for lack of good ideas but because of its (not unique) bureaucratic culture. The key to achieving any meaningful change in the department's performance will be to change its culture, including its operating rules and work habits.

This study provides 72 specific recommendations for improving Caltrans' performance, addressing primarily the broad functional areas of policy, organization and management, human resource management, management information systems (MIS), and project delivery. Of these 72, we identify 14 high-priority needs and structure our implementation plan around them. The first central need is for Caltrans (with gubernatorial and legislative support) to develop and implement an integrated series of performance measures that apply to the department, its divisions, its functional units, projects, and rank-and-file employees. These measures will establish performance targets at all levels, to which groups and individuals will be held accountable. Coupled with these measures is the need to develop effective monetary and nonmonetary rewards and the disciplinary procedures to reinforce accountability for meeting the targets. Efforts to measure performance and to obtain accountability will have no impact without implementation of the recommendation to reward high performing managers and staff and to discipline those who fail to achieve their objectives. Toward this end, we recommend that legislation regarding current personnel procedures be revised. The second central need is to obtain increased flexibility to match needs and resources while establishing competition, through a constitutional amendment to permit contracting out.

perf. measure
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\$ reward

Outside the department, our key recommendations call for strengthening executive leadership by restructuring the Business, Transportation and Housing (BT&H) Agency to focus on transportation-related departments (which comprise over 95% of its budget) by moving other departments to consumer and trade and commerce agencies and modifying the California Transportation Plan (CTP) process to address a number of recurring issues (e.g., long-term instability of the present transportation funding mechanisms).

Internal

Internal to the department, our recommendations include a reduction to the State Highway Account cash balance, improved staff-planning procedures, development of dual professional and managerial career tracks to reduce the supervisor to rank-and-file ratio, simplification of affirmative action procedures, a major reorientation of MIS priorities, and a reengineering of the project delivery process.

The Department of Transportation (DOT) has established a program to evaluate the organization and management of the California Department of Transportation (Caltrans) in order to ensure that the agency is able to meet the needs of the state and the nation. This program is being implemented in a number of phases. The first phase is to conduct a comprehensive review of the organization and management of the agency. This review will be completed by the end of the year.

The second phase is to conduct a series of studies to identify areas for improvement. These studies will be completed by the end of the year. The third phase is to develop a plan of action to address the areas identified in the studies. This plan will be completed by the end of the year. The fourth phase is to implement the plan of action. This implementation will be completed by the end of the year.

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INTRODUCTION AND OVERVIEW

In May 1993, the California Legislative Analyst's Office (LAO) selected SRI International (SRI) and supporting consultancies to evaluate the organization and management structure of the California Department of Transportation (Caltrans) as directed in Senate Concurrent Resolution Number 72 (SCR72). This report presents the results of our management audit of Caltrans' organizational structure and practices and recommends specific actions to improve the department's efficiency and effectiveness. Some of our recommendations will require changes to government entities other than Caltrans because of the effect their actions have on Caltrans' performance.

This evaluation has been conducted at a time when private sector businesses worldwide are "rightsizing" to meet the realities of a changing economic environment and are increasingly focusing on customer needs in response to the competitive environment. In California, as in the nation, the limited availability of public funds is causing all levels of government to change; departments are being asked to maintain or expand their services with less funding. Responses have varied widely, but those government agencies that have been most successful at responding to the new environment are those that have learned to seriously reexamine their goals, the structure under which they have organized themselves, and the means by which they provide services to their constituents; that is, they have found ways to "reinvent" themselves.¹ Caltrans is a prime candidate for reinventing itself.

The project team's evaluation consisted of four steps: an assessment of Caltrans' current performance (the findings), an identification of options to improve performance where appropriate, development of a plan for improving Caltrans' performance, and development of an implementation plan that identifies the specific steps necessary to carry out the preferred plan. These efforts are directed toward improving Caltrans' positioning in state government, its organizational and management structure, and its project delivery performance—in short, creating a more flexible, responsive Caltrans.

We have organized our findings so as to facilitate discussion of the major problems and of the recommendations that arise to address them. The project team has focused on the issues raised in SCR72, the LAO Request for Proposal (RFP), our assessment of issues raised by interviewees, and other guidance such as comments from the Steering Committee. We have divided the areas of focus established in SCR72 into seven specific categories for analysis, similar to those we have used to evaluate other government agencies and private sector businesses. These seven are policy, organization, overall management and leadership, financial management, human resources management, management information systems, and project delivery. Although they are addressed separately, the problems and solutions are closely linked; for example, implementation in the project delivery area cannot be achieved without also addressing leadership, human resources, and management information system problems.

¹ David Osborne and Ted Gaebler, *Reinventing Government*, Addison-Wesley (1992).

The findings of this audit are presented in two volumes. This first volume provides key recommendations, our implementation plan, and a summary of findings and recommendations. Volume II provides the details of our findings, options, and recommendations.

This audit identifies 72 recommendations that address a variety of specific issues; the overall thrust of the recommendations is to improve Caltrans' operating efficiency and effectiveness, accomplishing this through enhancements in performance measurement, management, and accountability at all levels. The audit aims to establish procedures by which accountability will be effectively enforced and to improve policy direction by strengthening Executive Branch attention to transportation issues. It seeks improvement in management by establishing a set of integrated performance measures (to be developed with gubernatorial and legislative concurrence) that will apply to senior managers, division managers, functional managers, project managers, and rank-and-file employees and by fostering a managed competition with private-sector firms for design, maintenance, and other work. Improved accountability is accomplished by providing rewards and disciplinary procedures that will make managers responsible for meeting their performance measures while giving them the flexibility to take the actions necessary to meet these measures, including use of contract resources whenever appropriate. Taken as a whole, our recommendations offer a dramatic departure from the traditional management and operational practices of Caltrans.

Our recommendations are needed to instill a sense of timeliness and cost-consciousness in Caltrans' activities. We are advocating more than the normal good management principles; our recommendations aim to bring Caltrans closer to fulfilling the public trust that requires prudent and responsible use of state resources and responsible action toward stakeholders—external as well as internal. Delays are costly to the state's taxpayers. Historically, the construction cost index has risen at a faster rate than the consumer price index (CPI), and right-of-way costs that are closely tied to real estate values have risen more rapidly than the CPI. In the extreme, these rose at double-digit levels in the early 1980s. Unfortunately, the benefits gained in a period of slow real estate appreciation or construction markets (as at the present) do not offset the increases experienced at other times. In addition, inefficiencies in administrative, operational, and maintenance activities reduce funding available for capital expenditures, because these are programmed "off-the-top" before capital outlays are programmed.

SCR72 specifies that this audit shall address, at a minimum, six specific issues. A summary of our response to each of these follows.

1. *Should a new transportation agency be formed?* A transportation-oriented agency should be formed by moving the nontransportation departments out of BT&H. Transportation-related departments comprise more than 95% of the budgets of all departments within BT&H, but attention to transportation issues at the agency level is significantly lower because of the larger number of these other departments. Many of these other departments could be equally or better accommodated within other agencies, such as the State and Consumer Services and Trade and Commerce.

2. *Is the department too large and diverse to manage effectively?* The primary problem facing Caltrans management is not its organizational structure but rather its "culture." The department cannot be managed effectively with the present lack of policy direction, lack of flexibility, lack of performance measures, and ineffective system of rewards and disciplinary procedures. This lack of normal (private sector) management tools is a greater problem than the

department's size or mix of activities. We therefore focus on the need for appropriate management tools and responsibility. In terms of dollar expenditures, Caltrans is equivalent to a Fortune 100-sized organization, such as Levi Strauss or the Northrop Corporation; such an organization is not, intrinsically, too large to manage if appropriate techniques are employed.

3. *What is the appropriate number of units within each department?* Caltrans has experienced 17 organizational changes in the last 12 years. As previously noted, organizational structure is not the major impediment to efficiency and effectiveness. The number of units should be reduced over time to the optimum to meet budget and delivery schedules. Once the necessary management tools and incentives are in place, we expect Caltrans management to identify this number, taking into account the amount of work assigned to private sector firms. Department management's own performance evaluation and rewards will be based on increasing the cost-effectiveness of all Caltrans performance, including its organizational structure.

4. *What is the effectiveness of the project development process within current legal constraints?* Caltrans' project delivery process is not effective within current legal constraints, which limit Caltrans' options and often make simple project delivery assignments complex and difficult. We found that Caltrans:

- Currently does not have the overall integrated plan or the appropriate organizational structure to execute its multiple project delivery roles effectively
- Is still in the early stages of implementing project management principles and has not yet developed the tailored approach for its own circumstances to ensure strong project-level and functional control
- Holds neither project managers nor functional managers accountable for project delivery support cost performance and does not have the systems, procedures, and measures to provide effective project management control of projects
- Uses guidelines and procedures (compounded by external rules and regulations) that create a bureaucratic hierarchy of requirements and add to the costs and delay of project delivery.

hence incorp. cap. into support project.

5. *What is the optimum mix of consultants and in-house engineering staff?* We recommend a Constitutional Amendment to allow contracting-out flexibility, and a series of performance measures that will encourage management to use the most cost-effective mix of in-house and contract resources to meet delivery schedules and other deliverables. We look to managed competition to determine this mix.

6. *What is the appropriate number of regional offices or districts?* The current district structure is an inefficient use of state resources. We identify regionalization of selected functions (while leaving others at a local level) as a means of reducing the inefficiencies.

We would add at least two additional key issues to those established in SCR72.

7. *What management tools would most benefit Caltrans?* Caltrans needs an integrated set of meaningful business objectives and measures, a set of rewards and disciplinary procedures to enforce compliance, and an effective management information system and strategy to support all of its management efforts.

- No standard is in place for determining whether Caltrans' overall performance as an organization has improved or deteriorated over time. Specific measures, such as project delivery completion rates and project development cost percentages, have been developed in response to legislature-initiated attempts to enforce efficiency, but these do not measure the productivity or output of the entire organization. Most of the frequently cited measures, such as person-years (PYs) or dollars committed, are inputs, not outputs. This deficiency not only occurs at the department level but cascades down to division, functional, and project levels. The saying, "You cannot manage what you cannot measure" applies.
- Closely tied to the lack of measures is the lack of group and individual incentives to excel. Individual initiative is not sought except in narrow categories. Exemplary performance is not strongly rewarded and poor performance is not strongly disciplined (except in the most egregious cases). Such a flat incentive structure leads to relatively uniform performance—performance that tends to focus on following the rules rather than creatively addressing the problems at hand.
- The lack of an effective information system to provide managers the data they need on organizational performance in a sufficiently timely manner to allow corrective action to be taken makes timely budget adjustments impossible. Such a deficiency cannot remain if the department is to be managed to meet budgeted (dollar and other) objectives.

Need measurable outputs to evaluate performance over time

8. *How can implementation of recommendations be ensured?* Mid-year or annual goals need to be established for the changes sought by the adopted recommendations. A follow-up procedure that will monitor and report on a continuing basis to the governor and legislature on Caltrans' actions to implement the adopted recommendations is required. This monitoring process should be conducted by an entity outside of Caltrans; we recommend the California Transportation Commission (CTC).

The scope of such an evaluation as this requires the participation of numerous individuals. The SRI team wishes to acknowledge the cooperation received from many Caltrans, CTC, LAO, and other state department staff and managers throughout this study. We owe a special debt to the SCR72 Steering Committee members (identified in Table I-1), whose efforts in reviewing and critiquing our interim products—though not always in agreement—forced us to continually push for a clearer understanding of issues and description of our findings.

The assessment of Caltrans' performance entailed many steps: analyses of data; a literature search, including a review of prior reports, audits, and selected studies; and extensive interviews. During the study, the project team interviewed approximately 200 persons within Caltrans and outside the department to develop our perspective on the problems and issues that the department faces, as well as perspectives on how these might be addressed. We obtained data to support points that permitted quantification. Table I-2 identifies the organizations interviewed and summarizes the breadth and depth of our interview program.

Table I-1
SCR72 PROJECT STEERING COMMITTEE

Hon. Marian Bergeson
Senator, 35th District
Sacramento

Hon. Richard Katz, Chair
Assembly Transportation Committee
Sacramento

Mr. Mehdi Morshed
Senate Transportation Committee
Sacramento

Mr. Richard T. Baker
Blanning and Baker Associates, Inc.
Sacramento

Ms. Mary F. Berglund
The J. Berglund Company, Inc.
La Jolla

Mr. Daniel W. Derbes
Signal Ventures
San Diego

Mr. Jerry Epstein
Marina Del Rey

Mr. Rod Garcia
ICF Kaiser
Los Angeles

Mr. Bruce K. Nestande
Costa Mesa

Mr. Timothy G. Psomas
Psomas and Associates
Costa Mesa

Mr. Peter J. Tennyson
Jones, Day, Reavis, and Pogue
Irvine

Ms. Sara C. Walker
Lehman Brothers
Newport Beach

The project team heard and analyzed many viewpoints and compiled data from a wide variety of sources. Nevertheless, the responsibility for the findings, options, and recommendations presented in this report remains squarely and fairly with the SRI International team.

**Table I-2
INTERVIEW PROGRAM SUMMARY**

California State Government				
Caltrans	Legislature/ Governor's Office	Other	Other Government	Private
Director	Legislators/Staff	Steering Committee	Alameda Co.	Lobbyists
Deputies and Division Chiefs	Agency Secretary Governor's Office (Deputies)	Members CTC Commis- sioners and Staff	Contra Costa Co. Transportation Authority	Irvine Company Various construc- tion firms
Other HQ Management/ Staff	Legislative Analyst's Office	Little Hoover Com- mission Staff Former Department/ Agency Staff	Shasta Co. Santa Clara Co. Transportation Authority	Various environ- mental con- sulting firms
District 2		DMV	Orange Co. CMA	Sierra Club
District 3		CHP	Fresno County of Local Governments	Associated General Contractors
District 4		Department of Fish and Game	Fresno County Transportation Authority	Californians for Better Trans- portation
District 6			MTC	PECG
District 7			Regional Caltrans Coordination Group	
District 11			SCAG	
District 12			Orange County Transportation Authority	
Anonymous individuals			Transportation Corridor Agencies	
			San Diego Council of Governments (SANDAG)	
			Sacramento County	
			Florida	
			Georgia	
			Illinois	
			New York	
			Texas	
			Oregon	
			Washington	
			FHWA	

KEY RECOMMENDATIONS AND IMPLEMENTATION PLAN

ACTION PLAN

Key Recommendations. This audit has generated 43 findings, leading to 112 options, from which 72 recommendations have been drawn. These are fully described in Volume II of this report, though Table I-3 identifies SRI's 14 key (priority) recommendations. The two objectives guiding the selection of these priorities were that implementation of the recommendation address Caltrans' most fundamental problems while yielding the greatest benefits in time and funds and that implementation (or clear progress toward it) be possible within 2 to 3 years of adoption date.

We seek a change from current Caltrans' practice in a number of key areas; we recommend a series of mutually reinforcing changes designed to enhance the department's efficiency and effectiveness through strengthened accountability and competition. We recommend strengthening executive branch leadership in transportation by refocusing BT&H on its transportation-oriented departments. We recommend that a consistent set of departmental, functional unit, project, and individual staff performance goals (expressing quantitative and nonquantitative targets) be established and that annual performance appraisals (leading to rewards and disciplinary actions) be based on accomplishments relative to these goals. We recommend a contracting-out amendment to permit management flexibility and to enhance competition for internal units. We recommend Management Information System (MIS) improvements to support overall department management and specific functional needs, as well as the performance appraisal process. We recommend modifying the California Transportation Plan (CTP) process to address a number of key issues (including long-term funding needs, the appropriate balance of capacity expansion/rehabilitation/maintenance expenditures, and the role of Caltrans in urban and intercity transit) on a continuing basis in advance of specific legislative initiatives. Finally, we recommend a series of changes related to project delivery, the most immediate of which include changes in the project approval and permitting processes, development of a hybrid project management system, and creation of a project delivery performance management control system.

Our 14 key recommendations fall into three categories—constitutional change, legislative/executive change, and administrative change—depending on the institutional source of the change, not on the order of priority. Collectively, if implemented, these priority recommendations provide an integrated set of actions to improve Caltrans' management practices.

The first key recommendation is for contracting-out permission to increase the department's flexibility. A final settlement of the contracting-out issue will, we believe, require an amendment to the state constitution and is unlikely to be achieved by further litigation or legislation. SB1209 was enacted in September 1993 with provisions specifically applicable to contracts for certain projects to support state transportation infrastructure funded by local resources, to retrofit highway structures in accordance with statutes enacted following the 1989 Loma Prieta earthquake, and to ensure timely, cost-effective project delivery. Because of present litigation, pending court decisions, and appeals, however, a stay on contracting out could run for at least another year, and contracting-out prohibitions could remain due to constitutional provisions.

**Table I-3
HIGH-PRIORITY IMPLEMENTATION STEPS**

Action to Be Taken	Key Responsible Organization	Support Organizations	Internal Resources	Duration
Constitutional Amendment				
• Remove impediments to contracting out	Legislature	Governor's Office	minor	12 months
Legislative/Executive Level				
• Restructure BT&H to focus on Transportation	Governor's office	Legislature	minor	6 months
• Modify the California Transportation Plan process	Legislature	Caltrans/CTC	2-3 person months	6 months
• Evaluate long-term transportation funding requirements	Governor's office/ Legislature	Caltrans/CTC	4 person years	2 years
• Include capital outlay support cost estimates in the STIP ✓ SB45	Legislature	CTC/Caltrans	minor	continuing
Caltrans				
Management, Leadership and Human Resources				
• Enhance efficiency and effectiveness through the following:				
– Develop and implement performance measures	Caltrans	Legislature/CTC	40 person years	2 years
– Develop monetary and nonmonetary rewards and disciplinary actions	Caltrans	Legislature	10 person years	2 years
• Develop a viable implementation plan for mission/values/goals statement	Caltrans	N/A	2 person years	6 months
Management Information Systems				
• Support reengineering of the project delivery/project management processes	Caltrans	N/A	12 person years	18 months
• Continue with interim enhancements, such as the Data Warehouse, as appropriate	Caltrans	N/A	present level	2 years
• Create a new systems development environment and upgrade skills	Caltrans	Governor's Office/ Legislature	20 person years	2 years
Project Delivery				
• Simplify project approval and permit processes	Caltrans	Governor's Office/ Legislature	} 24-32 person years	2 years
• Implement hybrid project management approach (trying?)	Caltrans	N/A		
• Develop a project delivery performance management control system	Caltrans	N/A		

To address this issue in a timely manner, we recommend legislative action to generate the ballot proposition required to enact a constitutional change. Specific provisions of Article VII related to the integrity (and work load) of the civil service need to be recast in a manner that allows competition to enhance efficiency. We recommend that the senate and assembly constitutional amendment committees consider the merits of such a change and develop wording for an amendment to be proposed to the full legislature. Gubernatorial backing should also be sought.

Our second key recommendation is to restructure BT&H to acknowledge the overwhelming importance of transportation-related activities under its mandate and the need for better transportation policy direction. Planning for this step, which may benefit from legislative concurrence, is likely to begin in the governor's office. We recommend that the governor's office initiate a review of the purposes and activities of the departments within BT&H and their potential fit into other agencies. Our review indicates that the number and diversity of departments within the agency can be reduced to better focus it on transportation-related issues and policy. We recommend that the findings of this review be incorporated into the follow-up reporting on action taken to implement findings of this audit.

Our third and fourth key recommendations are that the legislature modify the provisions of SB1435 to fulfill requirements of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) to establish a transportation planning process to develop a statewide consensus on key issues in advance of legislative action on an ongoing (annual or biennial) basis. We suggest that the process include elements for significant local participation through hearings and meetings, and that provisions for statewide working groups to support legislative and Caltrans efforts to address selected themes on a multiyear basis also be included. (Examples of issues that currently require attention include evaluation of long-term funding requirements, evaluation of the appropriate balance of capacity expansion/rehabilitation/maintenance funding, and identification of roles for Caltrans in local mass transit and intercity rail. Our findings emphasize the need to address the first issue in particular.)

We recommend that the legislature seek advice from the CTC regarding the requirements for this planning process and that the CTC be tasked with reviewing and commenting on the resultant findings upon their (annual) completion. Caltrans staff would be primarily responsible for leading and staffing the process. We further recommend that the legislative transportation committees hold hearings on the planning process as a means of refining the authorizing legislation.

Our fifth key recommendation stipulates that the legislature require capital outlay support costs to be included in the STIP. These costs would supplement the capital outlay estimates and provide a more comprehensive forecast of individual project costs while enhancing professional staff planning and requirement forecasting efforts. The provision of this information will help establish a data base for tracking improvements in Caltrans' project delivery efforts over time.

The first two management, leadership, and human resource actions we recommend are (taken together) among the most important changes we seek. The establishment of group and individual goals and the rewarding or disciplining of individuals and groups based on their ability to meet these goals is the only effective means available to instill a sense of accountability and timeliness throughout the department. Previous efforts to establish specific goals (such as the establishment of project delivery cost targets) have only frustrated legislators and others with

the minimal compliance of the response. Implementation of this key recommendation will require action on several fronts, including:

- Development of a new set of Caltrans performance measures to be used by the legislature and governor's office in evaluating the performance of the department and its management
- Development of an integrated set of division, functional, project, and individual performance measures and goals that improve accountability through reflecting and reinforcing the department's overall performance measures
- Development of personnel procedures that give management the ability to award or discipline employees in a timely manner based on their performance relative to their goals.

We recommend that a set of integrated measures be developed by the governor's office and legislature to establish performance goals for Caltrans' management team; all other sub-measures, such as project-delivery targets and overhead ratios, should be eliminated as separate legislation and incorporated into the integrated departmental measures, as appropriate—as should accounting of capital outlay support. Care is needed to avoid low-level, single-purpose measures, however, as these become “micro-management” of Caltrans, thereby undermining management authority and responsibility for meeting any of the performance goals established.

We also believe that once measurement standards are in place, accountability is critical to break the reaction of “just another plan” that too frequently frustrates implementation of new initiatives. Efforts to measure performance and to obtain accountability will have no impact without implementation of our recommendation to genuinely reward high performing managers and staff, and to discipline those who fail to accomplish their objectives. Toward this end, we recommend that legislation regarding current personnel procedures be revised. Specifically, Department of Personnel Administration (DPA) laws related to merit-salary-adjustments (MSA), MSA denial, and employee disciplinary proceedings should be reviewed with the goal of maintaining due process, yet permitting more timely and effective management actions to be taken than is presently allowable. Further, we recommend that procedures that apply to employment and promotion be reviewed to determine if the principles of merit and open competition can be maintained while reducing the barriers that they have created to selecting and promoting employees in a timely manner commensurate with program goals and needs. Examples of procedures to review include position and examination prerequisites, examination content, examination scoring and ranking, veterans preference, and priority consideration to affirmative action groups.

Our eighth recommendation arises from the need to implement the director's mission, values, and goals statements. We have found that planning—which focuses on multiyear policies and strategies as well as on implementation of the director's mission, values, and goals—is sorely needed. An implementation plan for the director's statements is needed to translate expressions of the organization's vision into concrete, measurable steps. By its second year, this implementation plan should incorporate performance measures developed jointly by the governor's office, the legislature, and Caltrans, as discussed above.

New management information systems will be necessary to implement our recommendations. Other recommendations should lead Caltrans management to rethink the department's

basic business processes (particularly in the area of project delivery); they can then begin an effort to restructure (reengineer) the business process and, as part of these actions, to redesign the related data systems to fit and support the reengineered business processes. This systems redesign element of the project delivery reengineering effort is our ninth key recommendation.

Our tenth key recommendation endorses Caltrans' efforts to enhance the links between individual system islands by developing data bases at a new level. The Data Warehouse is the first example of this new data base level. The initial Data Warehouse contains general information about projects and project-related PY and capital costs and is automatically updated as other data bases are changed. Although we support Department of Information Systems (DIS) efforts, we view these as interim efforts that should be abandoned when data systems in a functional area (such as project delivery) are redesigned as part of a broader business processes restructuring or reengineering effort.

From the standpoint of continuity, in our MIS-related series of recommendations, we recommend carrying forward improvements to the existing development environment and the systems that DIS supports. From the standpoint of a new beginning, in the long term we believe that the existing systems and the development environment must be redesigned to take full advantage of emerging information systems technologies, such as powerful and inexpensive microprocessors, CD ROM, and image processing. An integral part of this process will be enhancing staff skills in those areas where new system developments are occurring.

Finally, we recommend that the project delivery process be structurally overhauled (reengineered) to reduce the long time frames and extensive amount of rework associated with current projects. Significant cost savings are possible by reducing the time required to deliver projects and eliminating unnecessary steps and rework associated with the current design, approval, and permitting processes. To accomplish this, we recommend the following objectives:

- Integrate project delivery considerations explicitly into the overall strategy planning of Caltrans
- Streamline and simplify the involvement of regulatory agencies and other stakeholders in project planning, early project development, and permitting processes
- For complex projects, give the project manager more authority and make that individual more in charge of and accountable for project delivery results; with more numerous, less-complex projects, emphasize the role of the functional manager and make that function more responsible and accountable for project delivery results
- Develop and implement a comprehensive performance management system for planning, measuring, and controlling projects, including specific targets, measures, and accountability mechanisms for project delivery support costs; provide support cost estimates in the project study reports (PSRs); and include support cost estimates in the STIP (as previously recommended)
- Attack bureaucratic barriers in the administration of external contracts, oversight of external consultants, and right-of-way activities.

In addition to the 14 high-priority items discussed above, we expect that other recommended actions will become targets of opportunity during the 2- to 3-year implementation period. If so, their implementation should be encouraged as long as it does not distract Caltrans management, the governor's office, and the legislature from completing these high-priority items. We note, however, that downgrading the 14 high-priority items that we have identified in favor of others will diffuse focus, confuse stakeholders, and permit delays and deletions. The message to those from whom these recommendations require changes will be that business as usual is acceptable.

Implementation Plan. To implement the action plan, several decisions will be necessary. These include the determination of which actions are critical, a timeline for undertaking these actions, and the appointment of an agent or agents responsible for and capable of determining that the agreed-on action is indeed being undertaken in a timely manner. The critical actions have already been described; this section addresses implementation responsibilities.

This study responds to a legislative directive, and the responsibility for initial implementation rests with the legislature (columns two and three of Table I-3) as the statute-enacting branch of government. Further, many of the proposed changes will require the concurrence of the legislature and/or the governor. Caltrans is likely to implement some of the recommendations without outside influence—as improved management practices. Other changes, however, such as those related to contracting-out and the establishment of performance incentives, cannot be implemented by Caltrans without outside support, as they require enabling statutory changes.

As a first step in implementing the action plan recommendations, a consensus needs to be developed regarding the necessity and appropriateness of the changes. Major responsibility for this consensus will fall on the senate and assembly transportation committees, with support from the governor's office. We anticipate that the governor's office would take the lead on the question of agency structure. We expect that hearings on this plan will be required to develop a consensus for the recommended changes and to allow dissenters to argue their cases before the cognizant legislative committees. Once hearings are completed, the committees will then decide which recommendations are to be implemented and the time frame for implementation.

Changes that are administrative in nature can be reviewed with Caltrans management and a schedule adopted for their implementation. Follow-up reporting on progress can be achieved in one of two ways—direct reporting by Caltrans management (and any other responsible parties) to the legislative committees on an annual basis, or reporting by Caltrans management (and other responsible parties) to an intermediary who, in turn, would provide an annual comprehensive report to the legislature on the progress of the various elements of this plan. We believe that the CTC could serve as the intermediary for this progress review.

If, after a 2-year (or at most 3-year) period, progress toward implementing the recommendations endorsed by the legislature has stalled, the question of whether these recommended improvements are realistic in the Caltrans culture needs to be addressed. We recommend adopting an alternative implementation plan if such a delay occurs.

ALTERNATIVE ACTION PLAN

Our review of Caltrans studies identified eight audits in the past 20 years proposing solutions to issues more or less similar to those raised in the present audit. These audits are in

addition to ongoing reviews and comments of Caltrans performance undertaken by legislative committees, the CTC, and others. Several of the audits and reviews have had selected impacts, such as improved programming procedures and the introduction of project management. On the whole, however, detecting the impact of these studies is difficult. Consequently, we recognize that some of our recommendations will be controversial enough that implementation may be stalled.

In light of this observation and the history of Caltrans' resistance to change, we recommend that—parallel to the series of recommendations described herein—a process be established to undertake a full “Reengineering the Corporation” at Caltrans. That is, a process should be established that would seek to reengineer the entire organization from a “clean sheet of paper” perspective recognizing that many of the services delivered by Caltrans can be separated from the department's policy functions. Although the state needs to establish policy, its provision of a large portion of delivery functions (such as project engineering and maintenance) occurs because of tradition and choice.

Such a department-wide reengineering process would be kept as an active option for a period of 2 (no more than 3) years, while implementation proceeds on the other efforts recommended herein. If the implementation of key elements of our recommendations were to become unlikely, resulting in little or no change in Caltrans' efficiency or effectiveness, then efforts could begin to implement the reengineering alternative.

We anticipate that the first step of such an effort would be to clarify those business practices and functions that Caltrans needs to be involved in to accomplish its mission. Once determined, the strategies for pursuing these business practices would need to be expanded across functional lines. For example, does Caltrans need to “own” the bulk of its engineering work force, routine data-processing functions, highway maintenance, or legal resources? The present audit raises some of these questions, but a reengineering process would take the search for solutions much further. Such an undertaking would require outside assistance to facilitate and guide a co-operative process reaching from top to bottom in the department. State policymakers and Caltrans managers would need to be confident that they have an input—but outsiders with no stake in past patterns and “turf” would need to assist the process.

A reengineering process is not inexpensive—except, perhaps, in comparison with the cost of doing business as usual if this study's key recommendations cannot be implemented. Corporate reengineering efforts typically pay back in a benefit-to-expense ratio of as high as 3 to 1. We do not include this as a key recommendation, however, because we believe that, if implemented, the changes arising from our recommended actions can achieve many of the same benefits and would need to be implemented in any event to enhance the efficiency and effectiveness of whichever functions Caltrans continued to provide.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

FINDINGS

This assessment of Caltrans' performance entailed many steps: analysis of data; a literature search, including a review of prior audits, reports, and selected studies; and extensive interviews. During the course of the study, the project team interviewed nearly 200 persons inside and outside of Caltrans to develop our perspectives on the problems and issues that face the department and how these might be addressed. We obtained data to support points that permit quantification, and in generating findings, options, and recommendations we have incorporated the team's experience with similar management consulting assignments and analyses for government and corporate clients.

Many images of Caltrans exist—and many of these are contradictory. Positive examples of quality professional behavior abound, and staff members rightfully take pride in their professional attainments and in the department's rich tradition. The performance of the present director, James van Loben Sels, received frequent favorable comments. And many critics recognize that problems attributed to Caltrans (for example, lengthy environmental reviews) are, in fact, often due to circumstances not under the department's direct control.

But in many other ways Caltrans manifests the most negative qualities of large government organizations. Despite its potential, it suffers from a complex mix of inefficiencies in organizational structure, statutory responsibilities that specify procedures to meet policy objectives, and lack of consistent political direction. Management and staff typically seek adherence to external rules and standards rather than results-oriented excellence of performance. The overall effect is that of diminished flexibility, which in these times of heightened stakeholder concerns exacerbates Caltrans' slow response to change.

In developing our findings, we sought to identify areas of inefficiency and inflexibility in Caltrans. During this work, we encountered cases in which root causes could be traced to other government entities—the legislature or executive branch departments (including the governor's office). We thus considered possible changes by these other entities as we developed options to address the findings.

As much as lack of flexibility emerged as a problem, so did lack of accountability. Part of the culture involves an attitude that has been described as "it [a project] will cost as much as it costs and take as long as it takes." Although fortunately a waning opinion, the underlying lack of cost and time sensitivities was typically encountered as a lower concern than adherence to rules and standards.

Our evaluation resulted in 43 findings of problem areas that reflect the lack of flexibility and accountability, as well as other issues. After identifying the findings, we developed 112 options to address the problems contained in these findings. In some cases, interviewees initially suggested the options; in other cases, the team drew on its experience with management practices and applied this expertise to the Caltrans situation.

RECOMMENDATIONS

To move from findings and options to recommendations, we were guided by three general approaches to change and a series of five criteria. The general approaches reflect our management consulting experience and theory, combined with our perception of what has (and has not) worked at Caltrans in the past. The five criteria reflect desired organization and management qualities and characteristics; these include a desire for enhanced efficiency and effectiveness, strengthened leadership, improved accountability, and greater responsiveness to stakeholders.

Alternative Approaches to Change

The audit team considered three distinctly different degrees of changes to address the problems identified with Caltrans and related state transportation issues. These are distinguished from one another by the extent to which they vary from current practice. They include approaches that seek to ameliorate identified problems by 1) using incremental enhancements and procedural changes within established rules and practices, 2) restructuring selected practices and relaxing current rules and procedures to allow for new nonbureaucratic procedures to be adopted, and 3) seeking increased use of private sector resources and capabilities, while reducing state resources. Although we combine elements of all three, taken as a whole, our recommendations tend to be a blend of the latter two approaches.

1. The first type of approach to change would entail seeking resolution to the myriad of problems by selective changes and strengthening to existing practices. It is probably the easiest to implement and is the most familiar form of change to Caltrans and the legislature. Improving time-charge collection mechanisms, enhancing management systems and project software, and increasing staffing to overcome apparent bottlenecks (such as arise in project delivery, the seasonal shortage of specialists, and processing disadvantaged business enterprise—DBE—applications) are examples of this type of change. The argument for choosing this approach is that by fully staffing Caltrans and introducing changes to improve selective procedures, Caltrans would improve all aspects of its performance.

Unfortunately, although this approach could resolve selected problems, we see little evidence that changes of this sort would address the fundamental, underlying problems identified in the culture and work style at Caltrans. They would do nothing to address the process (versus product) orientation of the department, nor would they enhance the ability of management to manage effectively. This approach reflects the changes that have occurred in past years and have led to the present level of frustration with Caltrans' ability to manage the transportation resources with which it is entrusted.

2. The second type of approach to change would entail redesign of existing systems and relaxation or change to numerous rules and procedures. In brief, the goal of these changes would be to instill a product (in contrast to a process) orientation. It would be achieved by giving managers increased flexibility for action and increased responsibility for the outcome of these actions. If coupled with a set of performance measures quantifying the

financial and delivery improvement objectives of the policy-setting bodies, such as the legislature and governor's office, then this approach could establish a more business-like Caltrans within the domain of state government.

The main drawback of this approach is that it requires extensive review of existing work rules and enabling legislation, followed by changes to this legislation. Such an approach will require (and attempt to instill) a major new orientation by Caltrans management and rank-and-file.

3. The third approach to change would entail a greater reliance on public/private competition to achieve economic and time-related efficiencies believed to be available in the private sector. Outside (private sector) resources would be utilized on a competitive basis with internal staff resources to provide managers options in obtaining the lowest cost, most timely support services available. The element of competition forces monopoly organizations (including government agencies) to increase their efficiency if they wish to continue as a service provider.

The main drawback of this option is that it has the potential to dramatically change the character of employment at Caltrans, which might create resistance from some elements of the work force. The cost disadvantage associated with contracting-out has not been proven one way or the other; we conclude that little or no adverse cost impacts would be realized if this approach were used competitively, and improvements in responsiveness might be realized.

Criteria

We used the following criteria to select among the options:

1. **Enhanced Efficiency**—improvements to current operations that lead to increased output or productivity at equal or reduced cost. Costs can be measured as time, money, and/or hours of staff effort. Enhanced efficiency is demonstrated by more work being done with the same or reduced resources. Caltrans' programs and budget responsibilities in the present era of fiscal constraints demand these improvements if public trust is to be maintained.
2. **Enhanced Effectiveness**—improvements in producing or obtaining desired results from an activity or effort. Enhanced effectiveness is demonstrated by a greater ability to "get the job done."
3. **Strengthened Leadership**—from Caltrans and from the two state entities with policy-setting responsibilities. Stronger leadership can be provided by Caltrans management acting alone only up to a point; greater advances require the simultaneous and congruent efforts of the legislature and the governor's office.
4. **Accountability**—in the performance of individuals, organizational units, and programs, with an emphasis on managerial accountability. We believe that desired behavior is more enduringly implemented if rewards and disciplinary procedures can be used to motivate performance, rather than the application of external standards.

5. **Responsiveness to Stakeholders** (external as well as internal)—by honoring commitments and by enhancing the time consciousness of organizational responses. Responsiveness is not synonymous with agreement; it does imply that needed changes are implemented over a time frame that honors commitments. Reduced delays for internal (process-related) reasons and enhanced service delivery would be characteristics of improved responsiveness.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

In general, our recommendations seek to “reinvent” Caltrans by achieving improvements through a small number of changes in the external organizational environment and some significant internal changes strengthened by the selected relaxation of traditional bureaucratic rules. The key recommendations have been previously described; our goal is to improve Caltrans’ efficiency and effectiveness through a combination of procedural and process changes. We seek a staff motivated by internalized rewards (rather than external requirements) and competition with private sector businesses. The following paragraphs provide a synopsis of all findings and recommendations; details of these and the options considered are provided in Volume II. The findings that lead to the recommendations are divided into our seven analysis categories: Policy and Positioning (P), Organization (O), Overall Management and Leadership (L), Financial Management (F), Human Resources Management (H), Management Information System (M), and Project Delivery (D).

Finding P1: Low BT&H Agency Attention to Transportation Issues

Recommendation R1: Create a Focused Transportation Agency

Even though more than 95% of BT&H departments’ budgets are related to transportation, executive branch policymakers appear to pay low attention to transportation issues on a continuing basis. As a result, Caltrans tends to function in a manner determined primarily by the need to develop and deliver program commitments; although this approach is adequate for day-to-day activities, it inhibits the department’s ability to respond to new political and economic constraints and opportunities. Moving nontransportation functions from BT&H to other agencies would improve attention to transportation issues.

Finding P2: Lack of an Acceptable Statewide Transportation Plan

R2: Modify the California Transportation Plan Process

ISTEA legislation mandates the development of a state long-range transportation plan (the California Transportation Plan—CTP); requirements are further articulated in SB1435 enacted in 1992. The plan was due to Governor Wilson on December 1, 1993, and is due to the federal government on January 1, 1995. This planning process provides the basis for an ongoing forum to address questions that require wide public debate toward developing a statewide consensus. We recommend that the process be modified following legislative review (to be conducted by Caltrans with advisement by CTC), to address, at a minimum, specific issues that are identified in subsequent recommendations.

Finding P3: Declining Funding Based on Vehicle Fuel Taxes

R3: Modify the Statewide Transportation Planning Process: Evaluate Long-Term Transportation Funding Requirements

Transportation funding based on motor vehicle fuel taxes is forecast to cause State Highway Account (SHA) purchasing power to decline annually in future years. As a result, tax receipts based on a fixed rate per gallon will decline in real purchasing power year by year. A means needs to be found to evaluate long-term transportation funding requirements and sources; the previously cited planning process provides a forum for addressing this issue in advance of specific legislative initiatives.

Finding P4: Lack of Leadership Role for Caltrans in Mass Transportation Activities

R4: Modify the Statewide Transportation Planning Process: Identify Caltrans' Mass Transit Role Consistent with Local Leadership

R5: Modify the Statewide Transportation Planning Process: Identify Caltrans' Intercity Rail Role

Caltrans promotes the development and coordination of rural, small urban, and metropolitan transit services and works in partnership with national, state, regional, and local agencies (public and private) to perform transit planning. Yet, unlike its role in the state highway system, Caltrans (with few exceptions) does not execute mass transportation-related projects. Project execution is the responsibility of the local agency or district, or of Amtrak. At present, statutory justification for further Caltrans involvement in mass transportation is lacking, as is local support for an increased role. The exact nature of this role can be addressed through the forum created as part of this planning process.

Finding O1: Duplicate Expertise and District Boundaries

R6: Increase Caltrans Efficiency by Regionalizing Functions

Under current policies, each district performs essentially all work functions. The duplication of line functions, such as planning, supervision, and maintenance, appears to be more suitable than the duplication of such staff functions as laboratory work, personnel, payroll, and general accounting. Consolidation of some of these functions into multidistrict regional groupings is recommended.

Finding L1: Establishment of Mission, Policies, and Strategies

Each director has chosen to address the mission, policies, and strategies of Caltrans differently. Generating such statements is appropriate to the role of the director. The present statements are comprehensive, internally consistent, and can generate more specific implementation measures. As such, we have no basis for recommending changes in this area.

Finding L2: Lack of Implementation Plan

R7: Develop an Integrated, Viable Implementation Plan for the Mission, Values, and Goals

Caltrans currently lacks an implementation plan describing how Director van Loben Sels proposes to accomplish the mission, values, policies, and strategy statements he has developed. We recommend that the director complete the strategies for implementing his mission, values, policies, and strategy statements in a manner consistent with other recommendations contained herein.

Finding L3: Inadequate Performance Measures

R8: Develop Appropriate Performance Measures

No set of overall department measures exist that disaggregate into division, functional unit, project, and individual staff targets to use as the basis for regularly tracking achieved performance versus target and for annual performance reviews. Such measures are essential if Caltrans is to improve its efficiency and productivity. We recommend that Caltrans management undertake development of a department-wide set of integrated performance measures and obtain agreement on the department-level portions from the agency and legislature.

Finding L4: Barriers to Change

Caltrans has had high turnover among directors who, on average, serve short terms of office. At the same time, the investigations of consultants dating back nearly 20 years conclude that work at Caltrans is slow paced, that extra steps are frequently taken, that work often exceeds budgets. Well-considered and frequently repeated recommendations, however, have not altered these conditions. A thoroughly bureaucratic ethos characterizes Caltrans. Change of any type within the organization is likely to be slow in implementation—a characteristic that we describe in part as “director surfing.” This problem will require consistent direction over a significant period. Recommendations R8 coupled with R16 address this problem.

Finding L5: Professional Staff Planning at Headquarters Linked with District Workload Forecast

R9: Improve the Professional Staff Planning Process by Increasing Top-down and Bottom-up Integration

The process of professional staff planning relies heavily on PYPSCAN; indeed, until recent years, it was reportedly almost the sole basis for such planning. This process could be improved if a more balanced top-down and bottom-up approach were taken to staff planning, reflecting the types of skills, local measure work, and other information that is known at the district level and is not captured by PYPSCAN.

Finding L6: Need for Better Capital Outlay Support Accountability

R10: Modify PYPSCAN to Provide Greater Accountability

R11: Include Capital Outlay Support Cost Estimates in the STIP

Representatives of the legislature and their staffs, executive branch staff, and CTC commissioners and staff have expressed major concerns about the lack of a clear and accepted analytical basis for establishing the size of the capital outlay support budget. Similar concerns are expressed with Caltrans' lack of measurement tools to monitor and manage capital outlay expenditures. Many of these issues are now being addressed by a Capital Outlay Support Task Force in Caltrans. In the policy realm, however, modifications to PYPSCAN to better reflect the variability of project types and inclusion of capital outlay support cost estimates in the STIP would assist monitoring of these expenditures over time (see also Recommendation R65).

Finding F1: Reductions in Capital Outlay as a Result of Expanding Maintenance, Rehabilitation, and Administrative Expenses

R12: Modify the Statewide Transportation Planning Process; Evaluate the Appropriate Balance of Capacity Expansion/Rehabilitation/Maintenance Expenditures

Before funds are programmed in the STIP for capital outlay, other expenses are first deducted. As a result, funds available for capital outlay become the amount remaining after these other "off-the-top" commitments are made. The relationship of capital outlay to other highway-related needs such as rehabilitation and maintenance should be viewed in a manner that reflects overall system needs as well as the priorities assigned to individual accounts. The public forum for this discussion would be appropriately part of the previously recommended modified planning process.

Finding F2: State Highway Account Cash Management

R13: Reduce State Highway Account Balance

In the past 5 years, the cash balance in the SHA has ranged from a high of \$768 million to a low of \$174 million. Based on our analysis of constant-dollar fluctuations in receipts and disbursements to the account, we recommend that a balance of \$100 million (1993\$) be established as an average daily target level if no major changes to receipts or commitments occur.

Finding F3 : Grant Administration Management Weaknesses

R14: Undertake a Focused Review of Grant Administration

A recurrent complaint of local governments and others dependent on Caltrans administration of programs and pass-through of funds is the disproportionate effort required to obtain grants. We recommend an assessment to help determine if changes in grant procedures (such as minimum-size standards or simplified application procedures) are required to prevent the costs of application and administration from becoming disproportionately large relative to the size of the grants awarded.

Finding F4 : Review Caltrans Billing Rates for Competitively Bid Work

R15: Establish Billing Rates for Caltrans Reflecting Full Cost Recovery

Caltrans has a series of rates used when work is undertaken for others, such as measure counties. If increased competition is to be sought with the private sector for internal design (or other) work, then billing rates will be crucial to fair competition. Without full recovery billing rates for Caltrans, the incentives to achieve increased efficiencies is reduced. The contents of the rates used for outside (and, in competition with contracted-out suppliers, inside) work should be reviewed to determine if they fully recover Caltrans' costs. New rates need to be established for areas such as maintenance that are not yet bid competitively.

Finding H1: Need for Individual and Group Performance Awards

R16: Seek Opportunities to Provide Monetary and Nonmonetary Rewards and Disciplinary Actions

Caltrans offers little formal incentive for employees to excel. This problem is not unique to the department but is common to government civil service systems in which both rewards for exemplary behavior and below-average pay raises or other disciplinary actions for substandard performance are generally avoided. A review of compensation regulations leading to the development of effective performance incentives and disciplinary procedures is recommended.

Finding H2: Obtaining Efficiencies and Cost Reductions Through Contracting Out

R17: Seek a Constitutional Amendment to Increase Flexibility, Efficiency, and Accountability by Removing Impediments to Contracting Out

The question of whether Caltrans should (or legally can) contract out engineering design and other technically specialized work and what benefits would accrue to the state from such a practice has been argued in several studies and in the courts. SB1209, enacted in September 1993, provides the department new latitude and flexibility to meet its project delivery commitments in a timely manner with the use of contract assistance. Beyond this bill, however, remains the provisions of Article VII of the state constitution protecting state employee rights to undertake work for which they are capable.

Our findings indicate that studies produced to date on the cost-effectiveness of contracting out have been sufficiently flawed that no definitive answer is yet available; no study has shown that contracting out will or will not be more cost-effective for the state.

We do not foresee a timely judicial or legislative resolution to the contracting-out question. We therefore recommend that a constitutional amendment be sought to permit competitive procurement of services between internal and external (private-sector) sources.

Finding H3: Growth of Managerial and Supervisory Work Classifications

R18: Expand Opportunities for Professional Advancement

Caltrans' data show that managers and supervisors appear to be increasing in numbers more quickly than rank-and-file employees, and that the ratio of managers and supervisors is high by private-sector standards. We recommend the extension of the professional career track so that individuals seeking salary increases are not required to enter supervisory positions.

Finding H4: Appropriateness of Licensure Requirements for Tasks and Positions

R19: Review Appropriateness of Licensure Requirements for Tasks and Organizational Positions

Engineers have been the dominant figures in Caltrans since its early years. The importance of civil engineering expertise to road building has led to licensure as a professional engineer being a prerequisite for advancement in the department. Despite evidence that backgrounds in right-of-way, finance, or general management are equally appropriate in leading functions and districts, Caltrans continues to require licenses or professional degrees for positions that do not seem to require that expertise. We recommend that a review be undertaken of professional engineering licensure requirements, including benchmarking against other private firms and public agencies.

Finding H5: Difficulties Obtaining Specialists

R20: Identify Needs and Simplify Procedures for Obtaining Specialists

Environmental planning requirements seem to be increasing, with more specific skills required to respond to concerns of other agencies and special interest groups; Caltrans must have access to the skills needed to evaluate and design projects without delaying project completion. Both the consultant hiring process and employee hiring processes are extremely time consuming, and Caltrans districts or headquarters have difficulty acquiring persons with specific skills without delay of projects. We recommend a series of simplifying procedures to obtain these skills, including pre-qualification of a pool of potential specialists.

Finding H6: Filling Mid- and Senior-Level Vacancies

R21: Provide Training and Development Programs and Increase the Flexibility to Hire Externally to Fill Mid- and Senior-Level Vacancies

Most Caltrans executive managers have reached their late 50s or early 60s. Many have already reached the maximum value of their retirement plans. Their retirement (particularly if accelerated by an early retirement offer) will raise questions about the adequacy of the preparation of those poised to succeed. We recommend focused training for managers now in their 40s who are about to move to executive positions. Further, increased flexibility in hiring externally is recommended as another way to overcome the possible shortage of experienced senior managers.

Finding H7: Competitiveness of Caltrans Salaries

R22: Review Salary Classifications

R23: Assess Potential to Vary Remuneration by Location

Our review of salary data indicates that Caltrans' salaries are competitive at the entry level but decline in competitiveness as seniority increases. We also identify that staff mobility has declined, with a loss of department-wide experience by middle managers. We recommend that Caltrans management review the salary issue with the DPA to assess its flexibility in modifying salary schedules, and that an experimental approach be undertaken to evaluate the beneficial impacts on mobility of location-related salary differentials.

Finding H8: Inadequate Response to Affirmative Action Complaints

R24: Improve Procedures for Processing Affirmative Action Complaints

Caltrans has made some notable strides in affirmative action compliance in some areas but lags in others. Internal task forces are currently addressing those areas that have lagged. The department's apparent inability to handle discrimination complaints in a timely fashion continues as a major cause for criticism. We recommend that Caltrans review how other agencies, including the Commission on Fair Housing and Employment, process affirmative action complaints with the goal of developing improved procedures.

Finding H9: DBE Certification Process Problems

R25: Reduce Documentation for DBE Certification

R26: Recertify DBEs Every 2 Years

Although the Disadvantaged Business Enterprise (DBE) certification process has improved, legislators still receive complaints from their constituents regarding the certification process. In addition, some DBE firms feel that they lose job opportunities while their applications for certification are pending. Reducing documentation requirements and requiring recertification every 2 years (with spot checks and other strictures) are recommended to improve the process.

Finding H10: Meeting DBE Goals

R27: Undertake Research to Identify the Causes of Low African-American Owned Firm Participation in Caltrans Work

Although the selection of consultants for Caltrans contracts has resulted in successfully meeting DBE goals, not all groups have equally benefited. African-American firms receive a very low percentage of DBE contract dollars for both design and construction projects. We recommend that the reasons for this discrepancy be studied. The findings should provide a basis for determining what intervention by Caltrans is appropriate.

Finding M1: Disconnected System Islands

R28: Support Reengineering of Major Business Processes

The Caltrans application systems are primarily a series of independent system islands designed for and used within a single function; the system islands form barriers to cross-functional exchange of information, limit cooperation across organization boundaries, and reduce Caltrans' productivity. Data in one system are often duplicated in another system, and the duplicated data are often inconsistent between systems.

Elsewhere we recommend major changes in the project delivery and project management process. Taken together, these changes entail a restructuring or reengineering of the project delivery process. We recommend that the Division of Information Services (DIS) participate in the reengineering effort of this area and follow with system redesigns to support the reengineered process.

Finding M2: Slow Progress on Systems Integration

R29: Abandon the Comprehensive Systems Integration Approach

DIS began addressing the need to integrate Caltrans' systems processes in 1986 but has made little headway and continues to find progress difficult; however, DIS management states that it has "recently made excellent progress with a revised approach that focuses on shorter term redevelopment deliverables and a closer examination of existing systems and functions." The recently completed Data Warehouse Release 1.0 is cited as the first of the new generation of integrated data bases, but the Data Warehouse does not directly address the data redundancy issue and in fact creates a new data base with an additional level of redundancy. We recommend that system redesign undertaken as part of a broader functional process reengineering is a better integration alternative, although the comprehensive systems integration approach could be continued to support functional areas (e.g., maintenance) not yet scheduled for reengineering.

Finding M3: Dated Systems Development Practices

R30: Assess the Future Need for Mainframe System Development

R31: Upgrade DIS Systems Development Practices

DIS needs to modernize its applications systems development practices. DIS recognizes the need to invest in CASE hardware and software tools together with staff training to use the new tools. The 1991 Strategic Directions plan included a program to introduce more modern systems development approaches in DIS. The recently introduced Data Warehouse system was developed with CASE tools and employs a new-to-DIS relational data base manager (DB2). SRI recommends, however, that before DIS invest further in mainframe systems infrastructure (such as new development tools), it examine the future role of mainframes in Caltrans. We further recommend that once the extent of the mainframe future is understood, DIS implement a new systems development environment for mainframe systems and microsystems software development personnel consistent with that future.

Finding M4: Out-of-date Staff Skills

R32: Upgrade DIS Staff Skills and Capabilities

DIS will need to invest in staff retraining to enable Caltrans to take full advantage of new technologies. DIS development staff's knowledge and skills are attuned to COBOL programs in a mainframe environment, yet the current technological trend is unmistakably away from the current skill sets of DIS staff. The major new systems that have been developed in the past 5 or 6 years have invariably used a quite different technology set, including specialized mini-computers or microcomputers (rather than mainframes), single-purpose data networks, and specialized data bases. We recommend that DIS undertake comprehensive staff training and that the training program recognize these new methods and technologies.

Finding M5: Ineffective Planning and Budgeting

R33: Appoint a Systems Steering Committee to Align Systems' Budgets

The Caltrans information services planning and budgeting process is ineffective. DIS budgets do not fully reflect the underlying demand for DIS services. Rather, DIS assembles the total demand in its work plan and then submits a budget that covers the portion of the total demand that can be met while remaining within the Caltrans staffing and budget guidelines. The relative priorities within each functional area that will be included in the budget are set in consultation with the respective functional managers and stay within the DIS staff allocations to that function. SRI recommends that a steering committee of senior managers be formed to help direct DIS staff assignment and system priorities.

Finding M6: Ineffective Management of Technology

R34: Adopt and Promulgate Technology Standards

Caltrans uses a variety of information systems technologies. That variety sometimes impedes the adoption of more cost-effective methods and makes simplification and streamlining of processes more difficult. Further, Caltrans has no effective method for exploiting new information services technology. The current planning and budgeting approach perpetuates the division of Caltrans systems into narrowly focused islands and tends to disregard opportunities to make major breakthroughs. SRI recommends that DIS give a relatively high priority to the adoption and promulgation of standards that will govern the selection and purchase of new hardware and software.

Finding M7: Significant Networking Requirements

R35: Enhance the Network

Caltrans needs effective networking to allow its computers and other information-handling devices to work together. The executive summary of the Strategic Directions plan notes that the directorate has "emphasized the desire for all Caltrans knowledge workers to have electronic

access to corporate data and the ability to use it competently." Nonetheless, major data exchange barriers persist. SRI recommends that DIS establish data interchange standards that will allow users to import data into, and export data from, their standard PC and workstation programs, presumably via electronic mail, and to exchange data between PCs and mainframe programs.

Finding D1: Multiple Project Delivery Roles

R36: Develop Strategy for Delivering Alternate Services

R37: Modify the Statewide Transportation Planning Process; Define Caltrans' Responsibilities in Project Delivery

R38: Develop a Long-Term Project Delivery Plan

R39: Increase Caltrans' District Authority to Adjust Resources to Meet Changing Workload Demand

R40: Dedicate Individuals or Organizational Units within Districts to Alternative Roles

R41: Coordinate with Local Agencies

R42: Experiment with New Project Delivery Strategies

The Caltrans project delivery role has evolved from simply being a highway designer to more diverse participation in local measure and transit projects. Caltrans today does not have the plan, organization, and resource flexibility to execute its multiple project delivery roles effectively. Caltrans project delivery approaches must become more flexible and responsive to the needs of individual, diverse projects.

The basic focus of this series of recommendations is to integrate project delivery considerations explicitly into the overall strategy planning of Caltrans, better define Caltrans' many different roles, and orient the organization and skills of the organization to these diverse (and quite distinct) roles. For example, SRI recommends that Caltrans evaluate the use of several different planning, design, and construction models on an experimental basis. These models include the use of design-and-build contracts for complex, urgent projects; lump-sum contracts for engineering; or new partnership arrangements with private sector firms.

Finding D2: The Factory Process

R43: Develop the Hybrid Project Delivery Approach

R44: Mandate a Statewide Project Delivery Approach

R45: Focus Resources and Shorten Durations to Increase Overall Productivity

Caltrans' pipeline of projects resembles a job-shop factory with fixed functional stations. Each function is working on many projects at the same time. The challenge is to balance

resources and deliver a large number—approximately 650—unique projects each year while maintaining progress on hundreds of others. Implementing Caltrans' new project management objectives on top of this factory-like process may not work unless specific allowances are made for the number of projects involved and the need for strong functional areas. Caltrans needs to reengineer the current process to develop a unique project delivery approach that ensures strong project level and functional control.

SRI finds that one project delivery model cannot be efficient for the spectrum of design projects that Caltrans undertakes. For less complex projects, we recommend a strong role for the functional managers and a planning function with project coordinators. For complex projects, we recommend an enhanced project manager model with authority on project issues passed to the manager. We further recommend that this hybrid management approach be implemented statewide (eliminating individual district discretion) to facilitate development of common tools, measures, and guidelines to enhance transferability of skills and learning experiences. Finally, to improve productivity on projects, reduce delivery costs, and improve schedule performance, we recommend that Caltrans focus its resources and reduce the number of active projects underway at any one time to reduce stops, starts, and long periods of low-productive coordination.

Finding D3: Multiple Stakeholder Involvement

R46: Simplify the Project Approval and Permit Processes to Obtain Earlier Stakeholder Involvement and Commitment

R47: Devote More Caltrans Resources to Planning, PSR, and Early Project Development Stages

R48: Adopt a Split-Level STIP Funding Approval Process

R49: Experiment with Risk-Taking Project Delivery Approaches

R50: Develop Early Project Screening Technique

Public infrastructure projects are characterized by their extensive external stakeholder involvement and long time frames for defining project scope. Caltrans requires a flexible approach that can respond to the multiplicity of stakeholders, develop early consensus and commitment among those stakeholders, integrate their concerns and needs, and yet still be subject to management control.

We recommend that Caltrans take significant action on changes to current legislation to rationalize the process by which regulatory agencies and other stakeholders are involved in project planning and early project development. The current approach results in extended project delivery durations and elevated project support costs. Specifically, we first recommend establishing a multi-stakeholder task force to improve/reengineer the process for obtaining external stakeholder' approvals and permits; the task force would be charged with developing mutually acceptable project solutions that would obtain buy-in at the planning stage rather than challenging a project in the design phase. Second, we recommend that Caltrans devote more capital outlay support resources to the planning, PSR, and early project development stages to

result in anticipated savings in subsequent time and staff effort (analogous to concurrent engineering changes introduced by manufacturing firms). Next, we recommend a split-level STIP funding approval process to avoid time and budget commitments when large uncertainties in both have not yet been resolved. We recommend that projects be screened according to the extent their delivery is at risk and that different approaches and resource allocations be used for lower- and higher-risk projects.

Finding D4: Contracting Out to Facilitate Project Delivery

R51: Reduce Contracting-Out Administration Requirements Substantially

R52: Change Contractual Terms

R53: Enhance Efforts to Develop Partnership-Like Relationships with Outside Consultants

R54: Implement an Early Warning System for Contracting-Out Projects

Caltrans' resource allocation procedures require planning for the use of outside consultants approximately 18 months in advance. In addition, Caltrans' procedures to process consultant contracts take at least 8 months to complete. The cumbersome planning and contract administration processes for contracting out limit Caltrans' ability to meet its overall project delivery goals in a timely manner and contribute to problems in relationships with external consultants. Opportunities to respond quickly to local needs, take risks, and deliver projects cost-effectively, which are provided by the flexibility to contract out, are missed.

Despite recent changes in the administration of the contracting-out process, we found that substantial improvements are still required, and we recommend significant streamlining of the contracting-out process to enhance Caltrans' ability to manage external professional service efforts effectively. We recommend that Caltrans seek an identified series of process and legislative changes to reduce to 2 months the time required to award A&E (architect and engineering) contracts. We recommend, through statute and policy changes, that allowances be made in the contractual and commercial conditions for quick agreement and issuance of change orders during the course of a project, as well as the use of contingencies, fixed billing rates, performance warranties, guarantees, and, if needed, fixed-price contracts. We recommend that Caltrans enhance its efforts to develop partnership-like relationships, rather than adversarial relationships, with consultants in the contracting-out program. And, finally, we recommend that an early warning system be developed to assist both Caltrans and its consultants in spotting problems in a project and responding to them quickly.

Finding D5: Lack of a Cost-Control Culture

R55: Develop a Set of Meaningful Measures of Service Efficiency and Effectiveness to Support Costs at the Project Level

R56: Provide Support Cost Estimates in the PSR

R57: Review the Design and Procedures for Project Cost Accounting to Ensure Proper Charging of Time to EAs, Realistic Allocation of Overhead Back to Projects, and Timely Data Input and Retrieval of Information

Caltrans management does not hold the project manager and functional managers accountable for project delivery support cost performance nor does it have the systems and procedures to provide effective support cost control of projects. As a result, Caltrans does not yet have support cost control at the individual project levels to achieve its project management and project delivery objectives.

We recommend a series of reviews and measures that will strengthen support cost identification and increase individual accountability for support cost spending; some of these overlap with Recommendation R8. Coupled with these procedural changes is our recommendation to provide group incentives for improving resource productivity, which overlaps with Recommendation R16. Our recommendation to review the design and procedures for project cost accounting overlaps with Recommendation R38.

Finding D6: Matrix Project Management Alternatives

Caltrans has a patchwork of project management approaches implemented in its districts. Caltrans districts were delegated the authority to develop their own individual project management strategies based on headquarters' guidelines. Each has its own approach, resulting in a number of suboptimal results. In addition, with responsibility for 5 to 25 projects in various stages of delivery, project managers at Caltrans have little time for the close coordination, expediting, and networking on each project that helps minimize and resolve conflicts. This finding has been addressed by recommendation R43.

Finding D7: Need for Enhanced Project Managers' Skills and Experience

R58: Develop a Pool of Project Managers

With Caltrans' commitment to project management less than 5 years old, few staff members have extensive experience as project managers. As delegation of project responsibilities increases, project managers will become more involved in planning at one end and construction at the other, will work more with external agencies and the community, and will make more decisions on nonhighway design issues. Caltrans will need to develop future project managers with the diverse skills, experience, and leadership to effectively carry out their project delivery duties.

To meet these needs, we recommend strengthening the project management function through such actions as creating project management classifications, opening project manager assignments to nonlicensed (PE) professionals who demonstrate superior management skills, and

assigning high-potential candidates to key project manager positions. These recommendations are closely linked to those recommending changes in the project management process (R40 through R45).

Finding D8: Need for a Project Delivery Performance Control System

R59: Develop a Comprehensive Performance Control System

R60: Develop Support Cost and Quality Project Delivery Measures to Apply Across All Districts

R61: Develop Functional Unit Measures

R62: Institute an Annual Independent Review of Caltrans' Performance Measurement and Accountability System

R63: Amend CTC Responsibilities and Obtain Legislative Concurrence; Monitor Schedule Delivery Performance for All STIP-Programmed Projects Involving State Funds

Caltrans currently lacks a system to effectively manage individual projects and functions with groups of projects. Practices vary within the districts, but generally for purposes of managing the project delivery process, targets are not set and monitored for capital outlay support costs and quality. As a result, Caltrans does not have the basis for measuring and improving the productivity of its capital outlay support.

An essential recommendation is to implement a performance-control system for project delivery. Implementation of this recommendation involves setting performance targets that are negotiated and agreed on by the functional, project, and division managers; collecting pertinent performance information about progress against these targets; using that information to monitor and communicate about performance in a timely manner to Caltrans management and project personnel, with an annual review to be submitted to the agency, legislature, and CTC; and taking appropriate management actions. (Recommendation R8 also applies to this finding.) On a related issue, we recommend that CTC monitor schedule delivery performance for all STIP projects involving state funds, to track the timeliness of use of all state monies for these development purposes together.

Finding D9: Insufficient Project Management Tools

R64: Develop Other Managerial Tools for Functional Capacity Planning, Resource Management, Budgeting, Scheduling, and Performance Measurement

R65: Modify PYPSCAN to Permit Greater Flexibility and Accountability

R66: Expand Use of CADD as an Engineering Tool

Caltrans' project and functional managers currently lack the necessary information technology tools to enable them to plan, budget, schedule, and obtain timely status information for their projects. Key needs include:

- One set of tools statewide
- Flexibility to fit individual project needs (not all projects require the same detail or structure)
- Timely integration with actual progress and capital outlay support cost data
- Fit with overall program planning (i.e., PYPSCAN).

Our prior recommendations addressing MIS needs (particularly recommendations R28 and R29) apply to this same need for reengineering this portion of the project delivery process. For the hybrid project management approach to work, we recommend that Caltrans design and implement tools (of the sort identified in the recommendation title) for function management to complement the tools and measures that we have recommended for individual project management. Modifications to PYPSCAN to obtain a clear and accepted analytical basis for establishing the size of the capital outlay support budget are recommended. (This overlaps the same concerns giving rise to Recommendations R9 and R10.) As an extension of our recommendations for enhancing Caltrans' MIS technological capabilities (R32 and R34), we recommend that the department reassess its current use of CADD and evaluate the future potential for using it to improve project delivery efficiency and effectiveness.

Finding D10: Excessive Bureaucratic Guidelines, Procedures, and Standards

R67: Train Caltrans' Staff and Outsiders on Project Delivery Procedures and Standards

R68: Simplify Guidelines and Procedures for Administrating Work Contracted Out

R69: Investigate Mechanisms for Reducing Schedule Impact of Right of Way

R70: Increase Consultant Participation and Streamline Oversight

Caltrans guidelines and procedures create a bureaucratic hierarchy of requirements that can add to the costs and delay in project delivery, particularly when nontraditional projects (and outside parties) are involved. This series of recommendations address aspects of the reengineering of the project delivery process dealing with the way control and procedures are involved in project delivery. Specifically, we recommend training of staff and outsiders to allow project personnel to expedite delivery of the work and to avoid costly mistakes. We recommend a review process to assess the effectiveness and value-added by Caltrans review of consultant work. Similarly, we recommend a focused evaluation of the right-of-way process to reduce average time necessary by a target of up to 50%. And finally, we recommend a task force to focus on the question of how Caltrans' oversight functions can be appropriately reduced while transferring much of the quality assurance/quality control responsibilities to private consultants.

Finding D11: Weak Link between Project Start-Up and Completion Responsibilities

R71: Link Project Start-Up and Completion Responsibilities by Clarifying Roles in Planning, Project Development, and Construction

R72: Develop a Shared Responsibility within Functions for Project Delivery

Strong links between project delivery and planning (upstream) and project delivery and construction (downstream) are encouraged in theory but are weak in practice. Project managers tend to be assigned projects as they “come over the fence” and tend to pass on projects “over the fence” to construction.

SRI recommends enhancing linkages between the steps involved in project planning, delivery, and construction by defining the responsibilities of each of the parties involved from the PSR stage through construction; the objective is to achieve a smoother transition between stages. In complex projects, however, the project manager should have oversight responsibility for all elements. Secondly, we recommend that Caltrans create a program of awareness and communication that brings representatives from planning, project development, construction, and maintenance together to develop a shared responsibility for project delivery and construction.