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This report examines the tools and practices employed by Caltrans and other state transportation agencies in balancing workload and resources to complete capital projects on the state highway system. In California, these projects are completed under the Capital Outlay Support (COS) program. The first part of this report focuses on workload balancing practices employed by Caltrans. Interviews with Caltrans offices, which oversees the design and construction of structures throughout the state—provided a range of perspectives on managing workload and resources in the COS program. In the second part of this report, the results of a 13-question survey are used to describe the workload balancing practices employed by departments of transportation (DOTs) in four states—Georgia, Pennsylvania, Texas and Washington.

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Balancing Workload and Resources in Capital Programs: A Survey of Practices in Caltrans and Selected State Departments of Transportation

April 10, 2013

Executive Summary

This report examines the tools and practices employed by Caltrans and other state transportation agencies in balancing workload and resources to complete capital projects on the state highway system (SHS). In California, these projects are completed under the Capital Outlay Support (COS) program.

The first part of this report focuses on workload balancing practices employed by Caltrans. Interviews with four Caltrans offices—District 10/Central Region, District 11, North Region, and Division of Engineering Services (DES), which oversees the design and construction of structures throughout the state—provided a range of perspectives on managing workload and resources in the COS program.

In the second part of this report, the results of a 13-question survey are used to describe the workload balancing practices employed by departments of transportation (DOTs) in four states—Georgia, Pennsylvania, Texas and Washington.

Resource Mix for Capital Projects

Among the five state DOTs studied, California employs the highest percentage of state staff to complete capital projects on the SHS. The table below summarizes the percent of projects on the SHS controlled by the state DOT and the resource mix used by the five states.

Capital Projects on the State Highway System Controlled by the State DOT			
State	**% of Projects Controlled by State DOT**	**% of State Staff**	**% of Consultants**
California	Not available	90	10
Georgia	90	40	45*
Pennsylvania	100	20**	80**
Texas	92	50	50

Capital Projects on the State Highway System Controlled by the State DOT			
State	**% of Projects Controlled by State DOT**	**% of State Staff**	**% of Consultants**
Washington	100	45	55

* Local agencies complete the remaining 15 percent of work on state-DOT controlled projects.

** Percentage of dollars spent.

As the table above indicates, the other state agencies investigated for this report outsource to consultants considerably more of the work associated with capital projects. Factors contributing to this disparity include:

- In California, the legislative budget process has established the resource mix for the COS program. In recent years, this mix has been a staffing ratio of 90 percent state staff to 10 percent consultants.
- Texas DOT is subject to a legislative requirement that 35 percent of annual engineering services be awarded to consultant engineers.
- While not a formal mandate, the Washington Legislature has encouraged greater use of design-build. This emphasis, coupled with the challenge to Washington State DOT to become smaller and more flexible while retaining the department's core competencies, has led to an increase in the use of consultants.

Using Other Resources to Manage Workload

Consultants play a major role in completing capital projects in all four of the states investigated for this project, and to a lesser degree in California. There is less commonality in how another major resource category—overtime—is treated. Caltrans formalizes its use of overtime by establishing a percentage of its overall resource allocation specifically for overtime (set at 5 percent for the most recent fiscal year). None of the other four state DOTs surveyed use a specific budgeted allocation for overtime, although Washington State DOT reported a typical threshold for overtime of 9 percent of billable hours per month.

The four Caltrans offices interviewed for this report have differing views on the use of overtime. For the Central and North Regions, the bulk of overtime is used for construction inspection. District 11 encourages staff to use overtime, while DES underutilizes its overtime allocation.

Other resource classes such as limited-term appointees, volunteers, retirees and students do not play a significant role in delivering the capital programs of any of the five state DOTs investigated for this report. The table on the next page summarizes how the five states treat resource classes other than state staff, overtime and consultants.

State DOT Application of Supplemental Resources in Capital Programs					
State	**California**	**Georgia**	**Pennsylvania**	**Texas**	**Washington**
Limited-term Appointments	Challenging for professional positions that require significant training	Seldom used	Not used	Not used	Project positions used on a limited basis
Retirees	Can be hired for mission-critical work if state staff are unavailable Time cannot exceed 960 hours in fiscal year	Rarely used	Limited to 95 days per year (760 hours per year assuming an eight-hour day)	Not used	State law prohibits use
Volunteers	Can be hired for mission-critical work if state staff are unavailable	Not used	Not used	Not used	Not used
Students	Can be hired for mission-critical work if state staff are unavailable	Not used	Engineering interns, mostly during the summer	Basic production work, mostly during summers and holidays	Not used

State DOT Practices to Manage Workload

The most commonly used practice to manage workload among the state DOTs surveyed is the sharing of staff across districts and regions. While shifting projects to later program cycles or modifying delivery dates are options for the other three state DOTs, WSDOT is precluded from making such changes by its commitment to the Washington Legislature to deliver projects within a particular quarter. This is contrasted with Caltrans district practices to make adjustments at the project level to address unanticipated decreases in access to state staff by delaying projects or shifting projects to the next programming cycle.

Limitations in Managing Workload

The five state transportation agencies examined in this report are subject to a range of limitations that affect how resources are applied in managing capital programs. The state Legislatures in California and Texas set a minimum or upper limit for the use of consultants as a percentage of overall resources to manage capital programs (a limit of 10 percent in California; at least 35 percent in Texas).

Legislative influence and specific legislative action have also affected WSDOT's management of its capital program. In Washington, legislative support for greater use of practices such as design-build has led to greater use of consultants. Perhaps more significantly, the agency's self-insured status, which resulted from a 1961 statutory waiver of immunity for WSDOT employees that applies to design

engineering decision-making, has informed consultant management practices. Blended teams of state staff and consultants work together on projects under WSDOT control, with the consultant providing general engineering consultant services and state staff colocating with the consultant to produce project designs. State and agency policies and agreements also affect how workload and resources are managed. A California state policy mandating full cost recovery whenever goods and services are provided for others factors into decisions to use consultants or complete tasks with state staff. A higher rate for calculating expenses to projects applies when Caltrans completes work on a project for which it is reimbursed for its efforts under a cooperative agreement funded by a local agency. Agency policies also affect how workload and resources are managed. Two of the five states—California and Pennsylvania—are subject to collective bargaining agreements that define staffing policies.

Specialized Skills or Equipment Provided by Consultants

Each agency has its own limitations in terms of the resources it seeks to supplement or replace by engaging consultants. In Texas, high-tech survey and mapping equipment is provided by consultants. Within Caltrans, District 11 and DES also reported employing consultants to provide aerial photography and photogrammetry services. In Washington, real estate appraisals and communications associated with environmental activities are outsourced.

In California, environmental work that includes such activities as the monitoring of cultural resources, drilling through hazardous materials, paleontology activities and archaeological monitoring is typically completed by consultants. Other specialized services provided to Caltrans offices by consultants include welding inspection for structures, support for special roadway projects and public relations. Consultant-provided specialty services do not constitute a significant portion of the overall consultant allocation in the Caltrans offices interviewed.

Tasks Unacceptable for Outsourcing

Among the four DOTs surveyed, Georgia and Pennsylvania DOTs did not identify a task area unacceptable for outsourcing. However, in reviewing responses to other elements of the survey, it appears that three of the four state DOTs—Georgia, Texas and Washington—retain most if not all project management activities in-house. Similarly, the four Caltrans offices interviewed for this report retain the key decision-making positions of project manager and resident engineer positions in-house. Other Caltrans districts may elect to outsource these functions to some degree.

Both Texas and California do not outsource some aspects of right of way acquisition and management. In Texas, the agency requires state staff to be the point of contact for property purchases and the eminent domain process. Caltrans prohibits the use of consultants to perform ROW-related activities.

Resource Mix by Task Area

We found little commonality among the states and Caltrans offices studied for this report with regard to the mix of state staff and consultants by task area. Project management is the sole area of complete agreement among the five state DOTs. As noted previously, all of the agencies examined for this report retain most if not all project management activities in-house.

Among the states surveyed, Georgia and Texas DOTs reported a fairly even split between state staff and consultants when completing the following tasks:

- Environmental studies.
- Preliminary engineering.
- Planning.
- Design.
- Right of way.

In Texas, construction engineering and construction inspection are almost always completed with in-house staff. In contrast, Caltrans offices reported that construction inspection is the task area where consultants are most often used. Caltrans' greater use of consultants for construction administration activities is reflected by the table below, which summarizes Caltrans' allocation of consultant efforts by major task area. Note that DES activities are not broken out by task area.

Caltrans' Resource Mix to Manage the Capital Outlay Support Program

Function	Staff	% Personnel Years	Consultants	% Personnel Year Equivalents	Total	%
Environmental	607	6%	139	1%	746	8%
Design	1,447	15%	74	1%	1,521	15%
Right of Way	494	5%	3	0%	497	5%
Construction	2,203	22%	293	3%	2,496	25%
Surveys	619	6%	31	0%	650	7%
Division of Engineering Services	2,083	21%	438	4%	2,521	26%
Other	1,359	14%	57	1%	1,416	14%
TOTAL	**8,812**	**90%**	**1,035**	**10%**	**9,847**	**100%**

The task areas with more pronounced differences in the use of state staff across the four state DOT survey respondents include:

- Surveying and mapping:
  - Georgia—60 percent.
  - Texas—10 percent.
  - Washington—Low.
- Materials testing:
  - Georgia—60 percent.
  - Texas—10 percent.
  - Washington—High.
- Construction engineering:
  - Georgia—30 percent.
  - Texas—98 percent.
  - Washington—High.

Texas reported the most heavily outsourced task areas, including:

- Surveying and mapping (90 percent).
- Materials testing (90 percent).

In Washington, the following task areas have a high concentration of consultant efforts:

- Surveying and mapping.
- Environmental studies.
- Preliminary engineering.
- Design.

Factors Affecting Decisions to Retain Work In-House or Outsource

We asked the state DOT survey respondents to rate a range of factors that may contribute to the decision to retain work in-house or seek the assistance of consultants. The two most significant reasons to retain work in-house cited by the four state DOTs surveyed are retaining skills and expertise and legal restrictions or policy initiatives.

The factors weighing most heavily in the decisions to outsource by the four state DOTs surveyed are meeting expedited delivery schedules and gaining access to specialized equipment. Respondents consider lack of in-house staff, variations in workload, and a legal requirement or policy initiative slightly less important in making decisions to outsource. Least important to the decision to outsource for the states surveyed were seasonal fluctuations and lack of state staff in remote areas.

While the Caltrans offices did not associate relative weights to the factors affecting decisions to outsource, like the four states surveyed, all four Caltrans offices noted that consultants were used to meet expedited delivery schedules and handle variations in workload demands. Unlike the state DOTs surveyed, all four Caltrans offices indicated that consultant use in remote areas allowed the agency to more effectively manage workload, with construction inspection in remote areas often outsourced.

Two Caltrans offices—District 11 and DES—highlighted a distinction in how consultants are employed within Caltrans. For these offices, consultants are most often those retained by other agencies on projects for which Caltrans is providing oversight. In DES, these projects could be Special Funded Projects designed by other entities for which DES provides liaison and technical support to ensure that the structures included in these projects conform to Caltrans' policies, standards and practices. In District 11, the use of San Diego Association of Governments consultants is common when charging work to project associated with TransNet, a sales tax-supported program for San Diego region transportation projects.

While seasonal limitations were not cited by the state DOTs surveyed as particularly important in deciding to outsource a task, two of the four Caltrans offices reported that climatic conditions played a role in decisions to outsource. The North Region and DES both serve a large geographic area with diverse climatic conditions that vary widely, and manage work schedules that stop and start based on the weather.

While the states surveyed noted that obtaining needed equipment was among the more significant reasons to outsource a task, the four Caltrans offices are evenly split on the question of equipment providing a decision point for retaining work in-house or outsourcing. While specialty services are provided by consultants, they do not constitute a significant portion of the overall workload outsourced to consultants in the four Caltrans offices.

Conclusion

In the relatively small sample of transportation agencies examined in this report, local circumstances appear to play a significant role in the decisions made and practices followed in balancing workload in capital programs.

The most significant point of agreement among the agencies examined for this report is the retention of key decision-making roles in-house, with three of four state DOTs reviewed for this report and the four Caltrans offices indicating that most of the project manager or resident engineer positions are filled with state staff. In areas where more divergence is seen among the states studied for this report, factors such as informal and legislative mandates and simple geography play a role in the amount and type of work allocated to state staff. Costs do not appear to be a controlling factor in decisions to outsource at the state of local office level.

While it is difficult to cull a comprehensive listing of best practices from this investigation, it is clear that balancing workload and resources is a complex process informed by state-level mandates, agency-level procedures, local practices, collaborations with other agencies, and the cost-effectiveness and availability of specialty services needed for particular projects.

Part 1. Current Caltrans Workload Balancing Practices

This section of the report is divided into four sections:

1. Overview of the Capital Outlay Support program.
2. Current Caltrans workload balancing practices.
3. Reference matrices.
4. Interview questions.

Overview of the Capital Outlay Support Program

Caltrans' COS program provides funding and resources for transportation projects on the SHS and Interstate roadways. The department works on approximately 2,000 projects throughout the state each year. COS is a zero-based program that requires the department to prepare annual requests for funding based on the workload necessary to deliver transportation projects for a particular fiscal year.

Caltrans Build Process

Typical transportation projects take two to five years to prepare for construction, with construction requiring another two to five years to complete. This lengthy build process unfolds in four major task areas (also referred to as *components* or *phases*):

- **Phase 0: Completion of project approval and environmental document (PA&ED)**. After a project is programmed in the State Transportation Improvement Program or State Highway Operation and Protection Program, the project team refines information in the project initiation document to create a draft project report (DPR) and an environmental document (ED). The DPR is based on a preliminary engineering analysis that includes results of an environmental investigation. Environmental studies contribute to development of a separate ED.

- **Phase 1: Preparation of plans, specifications and estimates (PS&E)**. Using the project approval and ED, the department prepares plans for the alternative selected. The plans, which can take one to three years to develop, include or address design surveys, mapping, traffic data, hydrology, geotechnical design, pavement design and materials. The final PS&E results in a complete set of plans necessary to build the project, including estimates of construction costs and specifications on how the project is to proceed.

- **Phase 2: Acquisitions of right of way**. Acquisition of right of way (ROW) can be the controlling feature in completing a project. While ROW is acquired only after completion and approval of the ED, ROW-related activities can take place throughout the four-step build process.

- **Phase 3: Construction management and engineering (including surveys and inspection)**. Caltrans manages and oversees the construction of transportation projects on the SHS, which includes surveys, construction inspection, materials testing, resolving contract claims and administering change orders. Construction inspectors are under the control of the resident engineer or structures representative. These positions are responsible for project closeout, which includes preparation of the final construction estimate and final report.

Estimating Workload

The COS workload is estimated using the Work Breakdown Structure (WBS). The WBS contains all the work elements that a Caltrans capital project can contain, identifying the skill set of the individual required to do the work but not the type of resource (state staff or consultant) needed for the activity. The bigger the project, the more detailed the WBS. The more task-specific of the eight WBS levels are described below.

> **Level 4: Summary task level**. This level breaks out a capital project into the four summary tasks associated with the COS program: PA&ED, PS&E, ROW and construction. Some projects may not need all tasks; no project can include more than these four tasks.
>
> **Level 5: Major task level**. This level contains the minimum amount of detail required to plan, schedule and manage capital projects.
>
> **Levels 6, 7 and 8: Task and activity levels**. This level describes tasks and activities when more detail is needed than Level 5 provides to plan, schedule and manage the work.

Workload is managed and costs are assigned not in terms of dollars but in hours—personnel years (PYs) for in-house staff and personnel year equivalents (PYEs) for consultant-provided services. One PY equals 1,758 hours.

Every year, the districts prepare WBS documents that estimate the resources needed (the number of state staff and consultants) for each stage of the projects expected to be included in the new fiscal year's COS program that begins July 1. In early January, each district/region/division gathers its WBS documents that describe projects for the upcoming fiscal year and submits them to Caltrans headquarters (HQ). The WBS submissions are subjected to an initial review that includes the following:

- **Review for legitimacy**. Is the project programmed or is there an approved cooperative agreement between Caltrans and the local agency? Is the project pending and expected to be finalized by the beginning of the fiscal year?
- **Review for anomalies**. Is there an excess number of PY or PYE allocated for a single project? Is there an excess of resources allocated for a multiyear project that has not been drawn down as expected?
- **Verification of fund types**. Is the funding correct for each of the 10 fund types associated with the COS program?

The Division of Project Management (DPM) then reviews and adjusts as needed the requests for the three classes of COS resources:

- State staff.
- Cash overtime of state staff.
- Architectural and engineering consultants.

The resource mix is categorized by fund type and project to allow the department to determine PY/PYE by fund type. Resource needs are then summarized at the district and department levels. Negotiation with the districts/regions/divisions may be required if the final resource mix does not meet DPM parameters for consultant use or if DPM determines that the district has requested too many or too few resources.

Restrictions on Workload Resourcing

For the past seven to eight years, the legislative budget process has established the resource mix for the COS program. In recent years, this mix has been a staffing ratio of 90 percent state staff to 10 percent consultants. Consultant use is constrained by the division/district/region allocation and then must be matched to one of 10 COS program fund types. Some flexibility is gained by "trading" fund types within districts and Caltrans HQ.

Note: The use of consultants is also guided by California Government Code; see page 11 of this report for the relevant citation.

The third COS resource category—cash overtime of state staff—is set by Caltrans HQ. For the most recent fiscal year, Caltrans HQ set the percentage permitted for cash overtime at 5 percent of the overall COS resource allocation. Administrative policy may limit the use of cash overtime to mission-critical activities. Other resource classes such as volunteers, students and retirees are not included in the COS resource allocation process.

Furloughs can also impact the resources available to manage COS workload. The current 4.9 percent furlough equates to a decrease of 400 PY from the workload estimate. Caltrans districts make adjustments at the project level to address this decrease in PY by delaying projects or shifting projects to the next programming cycle.

Also affecting workload and resource distribution are:

- Memorandums of understanding negotiated by individual Caltrans employee bargaining units that limit possible workload resourcing options.
- A prohibition on Caltrans' use of consultants to perform ROW-related activities.
- A limitation on using volunteers, student assistants or retired annuitants (RAs) if their employment would displace state staff.
    - RAs may be hired for mission-critical work if state staff are unavailable. The RA's temporary employment will not exceed 960 hours in a fiscal year (July 1 through June 30).
    - If they are employed, volunteers, students and retirees are not considered part of the resource mix allocated to complete COS program work. See page 11 of this report for the relevant California Government Code citation affecting Caltrans' use of these types of resources.

While not a formal restriction on workload resourcing, a billing requirement may affect how Caltrans chooses to allocate resources. State policy mandates full cost recovery whenever goods or services are provided for others. The full cost of goods or services includes all costs attributable directly to the activity plus a fair share of indirect costs. The Indirect Cost Rate Proposal, or ICRP, rate applied to projects with reimbursed funding (for example, if Caltrans completes work on a project in the COS program under a cooperative agreement funded by a local agency) includes both the ICRP Program Functional Rate and the Administration Rate components (for fiscal year (FY) 2012-13, 39.34 percent and 29.16 percent, respectively).

State policy also requires the department to include indirect costs as part of project costs on all nonreimbursed COS projects. When project work is completed using nonreimbursed COS funding (for example, state, federal or bond funds), only the ICRP Program Functional Rate applies.

Related resource:

Article 4, Personal Services Contracts [19130-19135], California Government Code, 2011. http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=19001-20000&file=19130-19135

The purpose of this article is to establish standards for the use of personal services contracts. The code includes the following:

(a) Personal services contracting is permissible to achieve cost savings when all the following conditions are met:

….

(b) Personal services contracting also shall be permissible when any of the following conditions can be met:

….

(3) The services contracted are not available within civil service, cannot be performed satisfactorily by civil service employees, or are of such a highly specialized or technical nature that the necessary expert knowledge, experience, and ability are not available through the civil service system.

….

(8) The contractor will provide equipment, materials, facilities, or support services that could not feasibly be provided by the state in the location where the services are to be performed.

….

(10) The services are of such an urgent, temporary, or occasional nature that the delay incumbent in their implementation under civil service would frustrate their very purpose.

Current Caltrans Workload Balancing Practices

During interviews, representatives from the following Caltrans offices described their experience managing workload and resources in the COS program:

- District 10/Central Region.
- District 11.
- North Region.
- Division of Engineering Services.

Several factors involved in managing COS workload and resources are predetermined by Caltrans HQ or the California Legislature, including the 90/10 percentage split of state staff and consultant workload, the amount of cash overtime included in each district's or office's resource allocation, and the negligible use of nonstate staff other than consultants. Given this, the interviews focused on the characteristics of state staff and consultant efforts, the decision points that determine each office's use of consultants, and the amount of outsourcing by function or task.

Summaries of these interviews are presented below. In the section that follows, information gathered during the interviews and other informal discussions with Caltrans HQ staff are reflected in matrices designed to aid decision-makers in managing workload and resources for the COS program.

District 10/Central Region

Contacts: Sam Haack, District 10 Project Manager/Special Projects, (209) 470-2909, sam_haack@dot.ca.gov; Brian Everson, Central Region Single Focal Point, (559) 243-3420, brian_everson@dot.ca.gov; Catey Campora, Program Manager, District 10 Program/Project Management, (209) 948-6023, catey_campora@dot.ca.gov; Nabeelah Hanif, Office Chief, Central Region Program/Project Management, (559) 243-3463, nabeelah_hanif@dot.ca.gov.

Background

District 10 encompasses eight counties in the northern San Joaquin Valley: three urban counties on the valley floor and five mountain counties in the foothill and mountain region of the Central Sierra. Two of the district's counties border on Yosemite National Park. District 10 is part of the Central Region, which includes Districts 5, 6, 9 and 10. Some of the responses below reflect a regional rather than district perspective.

Characterizing State Staff and Resources

Organizational structure. State staff positions are organized into squads based on a particular function or task within the four major task areas (PA&ED, PS&E, ROW and construction). Using the major task areas as a guide in aligning tasks and identifying the staff performing them makes it relatively easy to segregate work as in-house or outsourced.

Squads are formed to address such functions as hazardous waste, design, field surveys, utilities, acquisitions, electrical design and others. Multiple squads with similar functions are grouped together into a division, such as Environmental, Right of Way or Project Management.

Overseeing consultants. State staff overseeing consultant work are not dedicated to this single task and do not require a different skill set than staff performing the same tasks in-house. State staff oversight focuses on two areas of consultant work:

- Contract compliance.
- Technical review of deliverables to ensure the work product meets Caltrans' standards, policies and specifications.

Cash overtime. While the level of cash overtime is set by Caltrans HQ, the districts have flexibility in applying it to specific functions or roles. The bulk of overtime in the Central Region is used for construction inspection, with relatively little overtime used for environmental studies and project-level design and surveys.

Characterizing Consultant Efforts

Primary uses of consultants. Construction inspection accounts for the greatest percentage of consultant use. Environmental studies account for the next highest percentage of consultant efforts.

Quality. Central Region has identified quality issues associated with both in-house and consultant efforts—both positive and negative—and notes that the quality of work is most closely associated with the individual completing the work, not the entity employing the individual.

Efficiencies. The region has not observed significant differences in efficiencies between state staff and consultants.

Costs. Projects on which consultants are employed require the extra effort of state staff to conduct oversight of the tasks completed and manage the contract and invoicing. The additional tasks associated with consultant oversight add costs to the overall project.

Benefits of utilizing consultants.

- Retain stability in state staffing by utilizing consultants to manage peak workload.
- Utilize consultants to meet delivery commitments.
- Gain access to specialized expertise.
- Gain access to updated technology.
- Remote area staffing options.
- Flexibility in personnel assignments.

Challenges of utilizing consultants.

- Communication.
- Lack of understanding of department's policy and procedures.
- Lack of understanding of funding limitations.
- Quality of reports/products.
- Ensuring that invoicing is completed in accordance with department standards.

Resource Allocation Decision Points

Specialized services are concentrated in the Environmental Division. Typically, less than 1 percent of the Central Region's workload utilizes consultants for specialized services or expertise that cannot be provided in-house. For the past two fiscal years, the region has been struggling to retain state staff qualified to conduct biological studies, and because of this some biology-related work has been outsourced to keep project delivery on schedule.

Specialized skills are needed by consultants in the following areas:

- Cultural resource monitors (lack of tribal historical knowledge among state staff).
- Hazardous waste (lack of state lab facilities to complete hazardous waste analysis; lack of state-provided equipment to bore samples).
- Special permitted biology work (Tiptone kangaroo rat, California tiger salamander).
- Geomorphology (lack of state staff with appropriate expertise).
- Paleontology (lack of state lab facility for fossil recovery).
- Archeological monitoring (lack of state-provided curation facility).

Services provided by paleontology and archeology technicians are typically labor-extensive and have proved to be cost-effective to outsource.

Spikes in workload demands are handled with consultants, allowing for stability in state staffing levels.

Remote areas. Central Region considers the following in determining whether to outsource construction inspection activities or retain that work in-house in remote areas:

- Does the short- and long-term employee per diem outweigh the costs of outsourcing the work?

- Does the workload fluctuate?
- What are the impacts of administrative and labor-relations issues associated with hiring state staff?

Seasonal limitations. Climatic conditions typically have no bearing on whether work is outsourced.

Equipment. Lack of equipment has had no bearing on whether work is outsourced.

Project/task complexity, duration and timelines. Central Region weighs risks and opportunities and makes a determination to retain work in-house or outsource based on an evaluation of the issues indicated below.

- *Complexity*. Political sensitivity; local involvement; extensive coordination (internal/external); nonstandard features; specialized knowledge base; available facilities to complete tasks; and the potential for a change in scope.
- *Duration*. Peak workload considerations; delivery commitments over the short and long term; analysis of whether the project/task is within the contract duration; and fund source availability in future fiscal years.
- *Timeline (expedited delivery)*. Staff availability in-house versus outsource; impact if project/task misses delivery commitment; availability and completeness of basic information (mapping, plans, etc.) if project/task is outsourced; and timely deliverables.

Unacceptable for outsourcing. Typically, the tasks associated with project manager and resident engineer positions are important for Caltrans to control delivery and are not preferred functions or tasks to outsource. The project manager retains authority through the life of the project and is the single point of contact for the project sponsor. The resident engineer is responsible for the contract administration and construction engineering of all assigned projects within the state ROW.

Outsourcing by Functional Area

To permit comparison of consultant use across districts, interviewees identified the percentage of consultant work associated with each of four major task areas. Central Region adds project management to the four phases typically used to categorize COS efforts.

- *Project management.* Tasks associated with project management account for 2 percent of overall consultant use.
- *Phase 0: Completion of project approval and environmental reviews.* Environmental studies account for 13 percent of consultant use; surveys are 3 percent.
- *Phase 1: Preparation of plans, specifications and estimates*. Environmental mitigation and hazardous waste activities during this phase account for 11 percent of consultant use; design accounts for 4 percent.
- *Phase 2: Acquisitions of right of way*. No consultant use.
- *Phase 3: Construction management and engineering, including surveys and inspection*. Construction inspection accounts for the greatest percentage of consultant use—61 percent—with 6 percent allocated to survey staking.

District 11

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Background

Caltrans District 11 serves a geographically diverse area that includes San Diego and Imperial counties. It spans the entire California-Mexico border from the Pacific coast to Arizona, and extends north from the international border to Orange and Riverside counties.

District 11 is a full partner with San Diego Association of Governments (SANDAG; see http://www.sandag.org/) in the development of roadway and structure projects under TransNet, a sales tax-supported program for San Diego region transportation projects. Initially approved in 1988 and extended in 2004 for another 40 years, the program will generate more than $17 billion to fund highway, transit and local road projects. SANDAG oversees the overall TransNet funding structure.

Characterizing State Staff and Resources

Organizational structure. The staff is not homogeneous, and the district may be "heavy" on engineers and "light" on specialty services. Staff working in design may shift to environmental work or development of project initiation documents, but staff working in construction do not typically shift to other functional areas. Design squads are set up for efficiency.

Overseeing consultants. State staff may serve dual roles: completing the work themselves and overseeing the work of consultants. Contract and task order managers are trained to review consultant submittals. Consultant oversight most typically involves a consultant retained by SANDAG, not by Caltrans. Caltrans' gatekeeper role in overseeing the work of consultants is critical to ensure the acceptability of consultant work products.

Cash overtime. District 11 encourages state staff to use overtime, noting that the overtime costs are less than when reimbursing under the higher ICRP rate (the Program Functional Rate plus the Administration Rate).

Characterizing Consultant Efforts

The SANDAG/District 11 partnership is unique among Caltrans districts. SANDAG consultants comprise the majority of consultants overseen by the district. While SANDAG consultants working on TransNet projects are reflected in the district's work plan, the consultants are funded through SANDAG and are not reflected in district funding or resource levels. Consultant services are used as one of many tools to balance workload, with the district gaining efficiencies by using consultants rather than relocating state staff or when the district finds recruitment difficult.

Primary uses of consultants. Consultants are used interchangeably with state staff, with state staff tending to be more concentrated in engineering than in environmental specialties. This composition of state staff becomes part of the balancing act used when employing consultants. A shift to consultants can remedy deficiencies in staffing in specialty areas, as well as address specific tasks such as

construction inspection in Imperial Valley and other remote areas of the district where state staff are unavailable.

Quality. With a wealth of consultants available, the district has a good selection of consultants to choose from. The district has identified a possible deficiency in the provision of consultant services in the area of environmental studies, an area for which the district feels no consultant can serve as an overall expert. Larger, more complex environmental issues tend to be controversial. The district retains oversight of larger projects while consultants provide assistance with environmental tasks for which the department lacks staff or needed expertise.

Efficiencies. The district finds it most efficient to conduct the bulk of its work with state staff, noting that consultants new to Caltrans undertake a steep learning curve to assimilate Caltrans' policies, standards and practices. That said, consultants offer increased efficiencies with the ability to move consultants in and out of tasks more quickly than hiring state staff to perform design or construction inspection work.

Costs. The district notes that the use of SANDAG consultants is more cost-effective than using state staff to charge to a TransNet project. State staff time would be charged to a TransNet project at the higher ICRP rate—the Program Functional Rate plus the Administration Rate—in adherence to the state policy that requires departments to recover full costs whenever goods or services are provided for others.

Benefits of utilizing consultants.

- Consultants and state staff can be interchanged to complete construction inspection.
- Consultants are easy to move to varying locations throughout the district, while it can be difficult to move state staff.
- Consultants bring specialties to bear that the district is unable to provide.
- Consultants can serve in a staff augmentation role.
- Over time the use of consultants has increased and become more efficient.

Challenges of utilizing consultants.

- The contracting-out process can be time-consuming and confusing, with periodic changes in guidance and direction providing additional challenges.
- The potential for conflict of interest with overlapping contracts has increased in recent years. For example, a firm contracted to complete design work for a project cannot be retained with an overlapping contract to complete the construction phase.
- Contract administration can be challenging when taking into consideration compliance with disadvantaged business enterprise provisions on multiyear, on-call consultant contracts.
- Salary differences for environmental positions within consultant agencies as compared to state staff can generate concerns among state staff.
- The limitation on consultant resources can mean that some funding allocated for state staff and cash overtime cannot be used if the services needed cannot be provided with in-house resources.

Resource Allocation Decision Points

Specialty services constitute a relatively small portion of the consultant activities in the district. Examples of specialty services provided by consultants include:

- *State Route-11*. This four-lane freeway/tollway will connect SR-905 and SR-125 to the Tijuana-Tecate and Tijuana-Ensenada toll roads. Specialty services are required to address unique elements of the project, including a toll road, a public/private partnership, specialized traffic and revenue studies, collaboration with the Mexican government, and border infrastructure.
- *Detailed archaeological studies*. The district works with the San Diego Natural History Museum on archaeological studies; some paleontology projects are also outsourced.
- *Environmental studies*. Consultant services were needed for alluvial analysis in the I-5 corridor widening project, as well as for analyzing lagoons.
- *Aerial photography*. Equipment costs are too high to use in-house resources to complete the aerial photography used in the department's photogrammetry program.

Spikes in workload demands can be handled with the use of consultants, one of many tools the district actively engages to balance workload.

Remote areas. Tasks associated with construction administration in remote areas in the Imperial Valley are appropriate for outsourcing.

Seasonal limitations. Climatic conditions typically have no bearing on whether work is outsourced.

Equipment. While climatic conditions do not affect the use of consultants, lack of equipment does. State vehicles are in short supply, which requires the district to engage in a leasing program with its own set of limitations. Consultants engaged to provide construction inspection services provide their own vehicles and address deficiencies in two areas: staffing and equipment.

Project/task complexity, duration and timelines.

- *Complexity*. For the most part, state staff and consultants are interchangeable for the district. Specialty services constitute a relatively small percentage of the overall use of consultants. The largest share of consultant work is associated with construction inspection.
- *Duration*. On-call consultant contracts typically span several years. The district pays careful attention to consultant use for projects that may span several years or much longer (environmental work for the I-5 corridor was completed over a 13-year period), noting that task managers may be uncomfortable contracting with a consultant if that consultant will be unavailable while the project is still in process.
- *Timeline (expedited delivery).* Proposition 1B, Transportation Bond Program, approved by California voters in November 2006, created a program of funding for the Corridor Mobility Improvement Account (CMIA). Caltrans districts dramatically accelerated project timelines to have projects ready for CMIA funding. The only way to mobilize quickly enough to meet the expedited deadlines was to use consultants. In general, the district looks at the expertise needed and the schedule to be met and makes accommodations in schedules and staffing to balance workload.

Unacceptable for outsourcing. The district does not outsource what it terms its "gatekeeper roles" that provide quality control of in-house and consultant efforts. The individuals in these positions, which include the project manager and resident engineer, are key decision-makers and serve a critical role as the primary advocate for the public's interest.

Outsourcing by Functional Area

To permit comparison of consultant use across districts, interviewees identified the percentage of consultant work associated with each of the four major task areas.

- *Phase 0: Completion of project approval and environmental reviews.* Consultant services employed during this phase account for approximately 33 percent of overall consultant use.
- *Phase 1: Preparation of plans, specifications and estimates*. Most of the consultants used during this phase are retained by SANDAG and are not reflected in the COS workload. The district reports very little use of consultants for activities on Caltrans projects during this phase.
- *Phase 2: Acquisitions of right of way*. No consultant use.
- *Phase 3: Construction management and engineering, including surveys and inspection*. Construction administration accounts for the greatest percentage of consultant use—66 percent. This reflects an increase from historical levels (33 percent) and from the 50 percent reported for FY 2008-09.

Prior to 2008, half of the consultant services engaged by the district were provided for environmental-related tasks.

North Region

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Background

North Region comprises Caltrans Districts 1, 2 and 3. Terrain varies in the district—from mountains to valleys, and lakes to coastline. District 1 includes the counties of Del Norte, Humboldt, Lake and Mendocino. District 2, headquartered in Redding, is the second largest district in the state. District 3 serves 11 counties in the Sacramento Valley and Northern Sierra.

Characterizing State Staff and Resources

Organizational structure. Most staff work exclusively in their respective specialty areas, though high demand during construction season or response to special funding programs may require moving design staff into the field.

Overseeing consultants. A different skill set is not required to oversee consultants, but staff with more expertise are typically assigned to consultant oversight. Staff are trained to evaluate consultant work products and invoices to ensure accuracy and reasonableness.

Cash overtime. The bulk of overtime in the region is used for construction inspection, with state staff sometimes working 10-hour days in locations where the construction season is shorter. Administrators are not permitted to use overtime.

Characterizing Consultant Efforts

Primary uses of consultants. Construction inspection and surveys (70 percent) and environmental work (30 percent) are the activities most often outsourced in the region. The challenging climate and seasonal fluctuations in the region drive 60 percent of consultant use, with the balance of consultants needed to provide services in remote areas.

Quality. The region has identified quality issues associated with both in-house and consultant efforts, noting that the quality of work is most closely associated with the individual completing the work, not the entity employing the individual. Unacceptable work products can be addressed by simply not hiring a consultant for future work, which is not the case when state staff are failing to meet expectations.

Efficiencies. The use of overtime is more flexible with the use of consultants than with state staff, with the region not making a distinction between overtime and nonovertime costs for consultants. Overtime is monitored more closely when deadlines are looming on consultant projects. The region does not differentiate between in-house and consultant tasks when scheduling or managing project milestones. The only time there may be a concern about timing is when a consultant contract is about to expire and work is still needed to complete a project in process.

Costs. Costs are slightly higher when employing consultants.

Benefits of utilizing consultants.

- The flexibility to use consultants is a great benefit in the region, where employing full-time staff in remote areas and in areas with significant seasonal fluctuations is not cost-effective. The ability to move consultants in and out of a task in a remote area quickly is also helpful.
- Special funding programs can create a spike in design-related work. If state staff are used to complete the projects, shifting these staff to the field to administer the construction phase when the design phase ends can decrease productivity and have a negative impact on state staff. These negative consequences are avoided when using consultants for peak workloads.
- Moving in-house staff from the office to the field requires an advance notice that is not needed when using consultants.
- Discharging an underperforming consultant is less challenging than discharging underperforming state staff.

Challenges of utilizing consultants. Cost is the biggest challenge. Support costs associated with completing a project may not have taken into account the additional cost typically associated with employing consultants.

Resource Allocation Decision Points

Specialized skills needed for public relations-related activities that are not available in-house have been contracted out. These services comprise 5 percent of overall consultant use in the region.

Spikes in workload demands that cannot be met by current in-house staff account for approximately 65 percent of consultant use; 30 percent addresses state staff shortages; and 5 percent is used to obtain specialized services provided by public relations consultants.

Remote areas. Employing consultants to conduct construction inspection in remote areas is more cost-effective than retaining full-time staff. Meeting needs in remote areas drives 40 percent of overall consultant use in the region.
Seasonal limitations. The challenging climate and seasonal limitations in the region drive 60 percent of overall consultant use. Consultants are typically employed from mid-April to mid-October when construction season begins after the winter slowdown.

Equipment. Lack of equipment has had no bearing on whether work is outsourced.

Project/task complexity, duration and timelines have little or no effect on the decision to retain consultants or complete work with state staff. Projects that are not entirely programmed and may be ready for only the environmental review are typically retained in-house, which makes it easier to pick up the project at a later date.

Unacceptable for outsourcing are project management activities and positions such as the resident engineer, which oversees the work of construction inspectors and completes project closeout. While design work can be outsourced, the oversight conducted by a project manager for an entire project remains in-house.

Outsourcing by Functional Area

To permit comparison of consultant use across districts, interviewees identified the percentage of consultant work associated with each of the four major task areas.

- *Phase 0: Completion of project approval and environmental reviews.* Environmental activities in this phase account for 20 percent of all consultant use.
- *Phase 1: Preparation of plans, specifications and estimates*. Environmental activities in this phase account for 5 percent of all consultant use.
- *Phase 2: Acquisitions of right of way*. No consultant use.
- *Phase 3: Construction management and engineering, including surveys and inspection*. Construction administration and survey work accounts for 70 percent of overall consultant use in the region. Approximately 5 percent of the 30 percent of consultant environmental services is associated with the construction phase.

Division of Engineering Services

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Background

Unlike the Caltrans districts, which provide a range services for specified areas of the state, DES serves in a consultant-like role to all Caltrans districts in designing and managing the construction of structures.

Characterizing State Staff and Resources

DES includes the following offices:

- *Structure Design* is comprised of six structure design offices providing bridge design services.
- *Structure Construction* provides engineering oversight for construction projects throughout the state, ensuring that projects are built to conform to the construction contract plans and specifications.
- *Materials Engineering and Testing Services* conducts specialized laboratory and field testing and provides inspections.

- *Geotechnical Services* provides statewide geotechnical engineering and engineering geology products and services for the department.
- *Structure Policy and Innovation* provides support in earthquake engineering, design and technical services, state bridge engineer support and structure quality management.

Organizational structure. Staff positions associated with in-house structures construction are set up to focus on project management or administration.

Overseeing consultants. Generally speaking, different skill sets are not required for state staff overseeing consultants, but the emphasis may differ. Knowledge of the work is key.

- Staff involved in consultant oversight focus less on design specifications and more on Caltrans' project development process and current practices and standards.
- Contract management requires a different set of skills than task management.
- The use of state staff associated with Special Funded Projects requires the oversight engineer to make contributions in three of the four Caltrans major task areas (PA&ED, PS&E and construction).

Note: Special Funded Projects are designed by entities outside Caltrans. DES provides liaison and technical support to ensure that the structures included in these projects conform to Caltrans' policies, standards and practices.

Cash overtime. DES typically underutilizes the cash overtime allocated by HQ.

Characterizing Consultant Efforts

Primary uses of consultants. Consultants are most often used to balance workload. DES works with two categories of consultants: the relatively few consultants hired by DES to perform design work for state-funded projects, and a second category of design consultants retained by other agencies on projects for which Caltrans is providing oversight (for example, the Special Funded Projects described above). The following comments are more reflective of the consultants retained by other agencies and overseen by Caltrans than the consultants DES retains for state-funded projects.

Quality. Standard bidding contracts help reduce risks in using consultants. Consultants performing structure construction inspection provide work of similar quality to that of state staff. The following comments relate to design consultants retained by other agencies and overseen by DES:

- Consultant products such as PS&E, design calculations and foundation reports often fail to meet current Caltrans standards and practices and require rework and resubmission.
- Work products prepared by consultants with more experience working with Caltrans may exhibit fewer errors and deficiencies, but generally, initial submittals of consultant designs are returned to the consultant for correction. Contributing to this is the fact that many consultants do not use Caltrans CADD software, requiring the conversion of files at the end of PS&E work that can lead to errors and omissions.
- State AAA (advertising, award and administer) projects on the SHS are funded by local agencies that retain consultants to complete design work and contract with Caltrans to provide construction oversight of the structures portion of the project. DES has found that such projects reflect differences between consultant and in-house unit costs.

Efficiencies. Consultant PS&E work products typically require rework to reduce omissions and errors. Consultants with previous experience delivering projects for Caltrans have delivered projects as

quickly or sometimes more quickly than in-house staff. Consultants may be more efficient when executing a single task (for example, design), but can be less efficient than state staff if unfamiliar with Caltrans procedures.

Costs. Costs against projects appear to be higher when consultant charges are included. DES estimates that consultant oversight adds approximately 10 percent to the total workload for design-related activities.

Benefits of utilizing consultants.

- Flexibility is helpful in managing a changing workload.
- Consultants come fully equipped.
- Simplified recruitment and management of personnel.
- Consultants provide specialized skills.

Challenges of utilizing consultants.

- Additional time is required to review consultant work to ensure accuracy. Caltrans and the local agencies have no control over the specific consultant staff selected to work on a project. Inexperienced consultant staff require additional Caltrans oversight and introduce delays by the consultant rework required to meet Caltrans standards.
- Solutions recommended by consultants may not be based on the state's best interest. Consultants engaged by local agencies may focus on meeting a contract budget rather than conforming to state standards.
- Training is required for consultants to comply with standard Caltrans practices and procedures.
- For locally funded projects overseen by Caltrans, local agencies and their consultants determine schedules that may limit Caltrans review time.

Resource Allocation Decision Points

Generally, DES uses a mix of state and consultant staff in most functional areas. Consultants retained or overseen by DES have a skill set that for the most part matches that of in-house staff in bridge construction, design, materials testing and geotechnical services.

Specialized skills. Consultants are used in areas where in-house staff have not developed needed skills or equipment is not maintained within the department, including:

- *Welding inspection*. Challenges in obtaining the needed certification for in-house staff and pay level issues lead to the use of consultants for this function.
- *Drilling through hazardous materials*. The expertise needed for this task has not been developed within the department.
- *Photogrammetry*. The department cannot afford to own, maintain and operate the planes needed for the flyover surveys that generate the aerial photography to produce the department's photogrammetry products.

Spikes in workload demands that cannot be met by current in-house staff are addressed with the use of consultants. Balancing the workload with consultants allows the division to fill the peaks and avoid the valleys.

Remote areas. It is difficult to retain in-house staff to oversee structures construction in rural areas of the state. Consultants are used to limit the need to move state staff to these understaffed, remote areas. This does not constitute a large percentage of the overall allocation of construction consultant efforts.

Seasonal limitations. Consultants are used to more effectively manage resources in areas where seasonal limitations preclude year-round construction oversight. Consultants are also used when needs increase in all areas of the state during the summer construction season.

Equipment. State-supplied vehicles and cell phones are in short supply. Consultants provide their own equipment and resources, which addresses this deficiency in state-supplied resources and also eliminates travel costs that can total $20,000 per year when state staff are deployed in the field.

Project/task complexity, duration and timelines have little or no effect on the decision to retain consultants or complete work with state staff. DES notes that it is important, however, to maintain support from the consultant designer when the construction phase begins, ensuring that the engineer of record is available to sign off on any changes required in the construction phase.

Unacceptable for outsourcing are higher-level project decision-makers such as resident engineers, structure representatives, and project managers or project liaison engineers. Given that the timing of emergency response is so critical, these activities are also retained in-house.

Outsourcing by Functional Area

To permit comparison of consultant use across districts, interviewees identified the percentage of consultant work associated with each of the four major task areas.

- *Phase 0: Completion of project approval and environmental reviews* and *Phase 1: Preparation of plans, specifications and estimates*. Allocations ranged from 10 to 15 percent of overall consultant use in the DES resource target plans prepared for FY 2009-10 through FY 2011-12.
- *Phase 2: Acquisitions of right of way*. No consultant use.
- *Phase 3: Construction management and engineering, including surveys and inspection*. Allocations ranged from 85 to 90 percent of overall consultant use in the DES resource target plans prepared for FY 2009-10 through FY 2011-12.

Reference Matrices

Interviews and informal discussions with Caltrans staff in HQ, districts, regions and divisions provided the content for the matrices below designed to aid decision-makers in managing COS program workload and resources. Topics covered in the matrices include:

- Utilizing state staff and resources.
- Utilizing consultants.
- Resource allocation decision points.
- Current consultant allocation by major task area.

The matrices summarize common practices, observations and issues to consider based on the successes and challenges of workload balancing practices in the districts/regions/divisions interviewed for this

project. Assumptions in preparing the matrices include the following departmentwide limitations on resources allocated for the COS program:

- Caltrans HQ has some flexibility in allocating the departmentwide split of 90 percent state staff to 10 percent consultants. Some districts/divisions/regions may receive slightly more than a 10 percent allocation for the consultant portion of its resource mix work while others may be allocated slightly less.
- Caltrans policy precludes contracting out ROW-related activities.
- Staffing-related resources for the COS program are limited to state staff, cash overtime for state staff, and consultants. Other resource classes such as volunteers, students and retired annuitants make negligible contributions to managing COS workload.
- While Caltrans HQ determines the percentage of cash overtime as a component of COS resources, the districts/divisions/regions have flexibility in how it is used.

Utilizing State Staff and Resources

	Common Practices/Observations
Organizational Structure	• Design squads increase efficiency. • The four major task areas can be used to align tasks and permit easier segregation of work as in-house or outsourced. • Greater emphasis on in-house engineering expertise can lead to greater need for consultant assistance for environmental tasks. • Staff tend to be multifunctional in design-related areas and not in construction oversight. ○ Using consultants when circumstances dictate shifting design staff to construction oversight can eliminate administrative challenges associated with shifting state staff.

Consultant Oversight	• State staff perform consultant oversight duties along with their other tasks.
	• Consider providing specialized training for state staff overseeing consultants, though a different skill set is typically not required for staff overseeing consultants and performing the same work in-house.
	  ○ Contract compliance and technical review of deliverables may require different expertise.
	• Consultant oversight may involve consultants retained by Caltrans and consultants retained by local agencies.
	  ○ More quality-related issues have been identified in connection with consultants retained by other agencies.

Cash Overtime	• Often used for construction inspection. • Can be more cost-effective than other project billing options. • Can be underutilized when needs point to greater use of consultants than state staff.

Utilizing Consultants	
	Common Practices/Observations
Primary Uses of Consultants	• Generally, consultant services are needed in the environmental area (lack of expertise in-house) and construction inspection (remote areas and seasonal limitations limit use of state staff). Construction inspection requires a greater percentage of consultant effort. • Different entities can retain consultants that are overseen by Caltrans: Caltrans (state-funded projects) or local agencies (nonstate-funded projects).

Quality	• Standard bidding contracts help reduce risks in using consultants.
	• Quality issues can be associated with both state staff and consultants (quality is associated with the individual, not the organization).
	• Consultants retained by others may present more quality concerns than those retained by Caltrans.
	  o Work submitted for consultants retained by others often require rework for correction.
	  o Consultant failure to use standard Caltrans design software can lead to errors and omissions.
	• Unacceptable work can be easier to address when supplied by a consultant than by state staff.

Efficiencies	• Consultants can be moved in and out of tasks more quickly than hiring state staff to meet a pressing need for unique or time-sensitive services. • Consultants familiar with Caltrans' practices can deliver projects as quickly or more quickly than in-house staff. o Alternatively, consultants new to Caltrans encounter a steep learning curve to acquire knowledge of Caltrans policies, standards and practices.
Costs	• The extra effort required to oversee consultant activities increases costs. o One estimate adds 10% for oversight of design-related consultant services. • When charging to a nonstate-funded project, the state's full cost recovery policy makes it more cost-effective to use consultants employed by other entities than state staff.
Benefits	*Note*: See the Resource Allocation Decision Points matrix below for additional information on these issues. • Utilizing consultants to deal with peak workload allows for stability in state staffing. • Consultants' specialized skills provide services unavailable from state staff. • Consultants come fully equipped, which can be beneficial when addressing deficiencies in state-supplied materials and equipment.

Utilizing Consultants	
	Common Practices/Observations
	• Remote areas can be staffed as needed by consultants rather than requiring state staff to travel for work in the field. • Discharging underperforming state staff is more difficult than discharging—or not retaining again—an underperforming consultant.
Challenges	• Consultants can fail to understand Caltrans standards, policies and specifications. ○ Quality issues include inexperienced consultants, rework required to ensure accuracy, and delays in design submittals that shorten Caltrans' review time. • Unlike state staff, consultants may not advocate for the state's best interest. • The contracting process can be time-consuming and confusing. • Potential for conflict of interest emerges when engaging consultants for design and construction inspection. • Limitations on consultant allocation can be problematic when more consultant assistance is needed. • Support costs are higher when employing consultants.

Resource Allocation Decision Points	
	Common Practices/Observations

Specialized Skills	Districts/regions/divisions retain consultants to provide the following services that are not available in-house or are more cost-effective to outsource:
	• Environmental work/studies.
	  ○ Hazardous waste/drilling through hazardous materials.
	  ○ Special permitted biology studies.
	  ○ Paleontology activities.
	  ○ Archaeological monitoring and studies.
	• Aerial photography/photogrammetry.
	• Welding inspection (structures).
	• Support for special roadway projects such as State Route-11.
	• Public relations (extremely limited use).

Spikes in Workload Demands	• Consultants allow districts/regions/divisions to fill the peaks and avoid the valleys when managing workload. ○ In one estimate, managing peak workload accounts for 65% of consultant use.

Resource Allocation Decision Points	
	Common Practices/Observations
	• Consultants are just one of the tools that can be actively engaged to balance workload.
Remote Areas	• Construction inspection in remote areas is often outsourced. • Consultants limit the need to shift staff from other areas and eliminate state staff travel expenses when moving staff from the office to the field. o Balance the short- and long-term costs of hiring state staff against the cost of outsourcing work in remote areas.
Seasonal Limitations	• Employing consultants as they are needed is more cost-effective than retaining full-time staff in areas where climatic conditions vary widely and work schedules stop and start based on the weather.
Equipment	• Districts/regions/divisions are split on the question of equipment serving as a decision point for retaining work in-house or outsourcing. For those indicating a concern about equipment: o Consultants provide their own equipment, such as vehicles, cell phones and computers, that can address deficiencies in state-supplied materials and equipment while also meeting a staffing need.
Project/Task Complexity, Duration, Timeline	*Note*: See page 14 of this report for a list of considerations recommended by District 10/Central Region. *Complexity.* Specialty services constitute a smaller percentage of the overall use of consultants than the types of services state staff are trained to provide. *Duration*. Maintaining the support from the consultant designer when the construction phase begins is important. *Timeline*. Meeting deadlines for special programs may require the use of consultants.
Unacceptable for Outsourcing	• ROW tasks are retained in-house as dictated by Caltrans policy. • Gatekeeper roles such as the project manager, resident engineer, structure representative and project liaison engineer are retained in-house. o Decision-making roles are retained in-house, while individual project tasks may be completed by consultants.

Interviewees estimated the percentage of overall consultant efforts expended in each of the four major task areas. As the matrix on the next page indicates, construction inspection is the task most often assigned to consultants employed by the Caltrans districts/regions/divisions interviewed. Not appearing in the matrix is the 2 percent of overall consultant use in District 10/Central Region associated with project management.

Current Consultant Allocation by Major Task Area		
Major Task Area	**Primary Consultant Service / Range**	**Description**
Phase 0, PA&ED	Environmental and design services ~10% to 33%	Consultant-provided environmental services in this phase range from a low of 10% to 15% of the overall consultant allocation in DES to a high of 33% in District 11. In between are District 10/Central Region with 13% and North Region with 20%. *Note*: The DES allocation is split between Phases 0 and 1 and includes consultant activities related to design and geotechnology. District 10/Central Region allocates 3% for consultant surveying.
Phase 1, PS&E	Environmental and design services 1% to 11%	Consultant-provided environmental services in this phase range from a low of 1% in District 11 to a high of 11% of overall consultant services in District 10/Central Region. North Region allocates 5% for environmental services. District 10/Central Region allocates 4% for consultant design services.
Phase 2, ROW	None	As dictated by Caltrans policy.
Phase 3, Construction	Construction inspection and administration 61% to ~85%	Consultant-provided construction inspection ranges from a low of 61% in District 10/Central Region to a high of 85% to 90% of the overall consultant allocation in DES. In between are District 11 with 66% and North Region with 70%. *Note*: The DES allocation includes consultant activities related to materials testing. District 10/Central Region allocates 6% for consultant survey staking. North Region allocates 5% for consultant environmental services.

The consultant allocations presented in the table above are based on estimates provided by the districts and regions consulted for this report. The table on the next page, prepared using recent Caltrans data, provides a broader perspective on the use of consultants and state staff by task area by identifying staff and consultant use by general task area across the department. Note that DES activities are not broken out by task area.

As the table on the next page indicates, where consultant allocation is broken out by task area, consultants performing construction activities constitute the largest portion of Caltrans' 10 percent allocation for consultants. This is consistent with the information provided by the four Caltrans offices interviewed.

Caltrans' Resource Mix to Manage COS Program						
Function	**Staff**	**% PY**	**Consultants**	**% A&E**	**Total**	**%**
Environmental	607	6%	139	1%	746	8%
Design	1,447	15%	74	1%	1,521	15%
Right of Way	494	5%	3	0%	497	5%
Construction	2,203	22%	293	3%	2,496	25%
Surveys	619	6%	31	0%	650	7%
Division of Engineering Services	2,083	21%	438	4%	2,521	26%
Other	1,359	14%	57	1%	1,416	14%
TOTAL	**8,812**	**90%**	**1,035**	**10%**	**9,847**	**100%**

Interview Questions

Representatives from Districts 10 and 11, North Region and DES received the questions below in advance of scheduled interviews.

General

1. Does the funding source (state (STIP, SHOPP), federal, local, cooperative agreement, others) have any bearing on the decision to retain work in-house or outsource?
2. How much of the use of consultants is based on:
    a. A need for specialized services or a particular expertise?
    b. Filling a spike in workload demands?
    c. Addressing state staff shortages?
3. How much of consultant work is driven by:
    a. Seasonal limitations?
    b. Lack of equipment?
    c. Lack of staff in remote areas?
4. How do the following affect the decision to retain work in-house or outsource?
    a. Project/task complexity.
    b. Project/task duration (complete over multiple fiscal years).
    c. Project/task timeline (expedited delivery).
5. Do time breaks in activities affect the decision to retain in-house or outsource?
6. Are there functions or tasks that are always outsourced? If so, why?

7. Are there functions or tasks that are too cost- or labor-intensive to retain in-house? Outsource?
8. Are there functions or tasks that have been deemed unacceptable for outsourcing? Tasks for which the risks are too great to have consultants complete them?
9. Are there functions or tasks that are important for Caltrans to control delivery and would therefore be unlikely candidates for outsourcing?

Staffing

1. Are you using other types of state staff (temporary workers, retirees), volunteers and student assistants in your PYE projections and allocations? If so, how are they typically allocated?
2. Do you use a standard approach to the allocation of cash overtime? For example, 6 percent of state staff? Does this percentage change as workload fluctuates?
3. Are staff positions set up such that each one focuses on one of the four focus areas (PA&ED, PS&E, ROW, Construction) so that is relatively easy to segregate tasks to keep in-house or outsource?
4. Do state staff require different skill sets to oversee consultants and complete work in-house?

Impact of Consultants' Work

1. Have you encountered quality differences between work completed by state staff and work completed by consultants?
    a. Are there specific types of functions or tasks where you have identified a pattern of quality control issues with consultants' work?
2. Have you found differences in efficiencies (completing tasks more quickly) between state staff and consultants for specific types of functions or tasks?
3. What impact does contractor oversight have on workload? Does it vary by project or type of activity?
4. Please describe the benefits of using consultants.
5. Please describe any challenges you have encountered in using consultants.

Part 2. Survey of Selected State Practice

This section of the report is divided into three sections:

1. Methodology.
2. Survey summary.
3. Survey results.

Methodology

We conducted an online survey of selected state DOTs to gather information about current practices and tools used to balance workload and resources in managing capital projects on state highway systems. States asked to participate in this survey are known to use consultants to manage a portion of the capital project workload and include:

- Georgia.
- Michigan.
- Missouri.
- New York.
- North Carolina.
- Pennsylvania.
- Texas.
- Washington.

The survey consisted of the following questions:

1. What percentage of the projects completed on the state highway system does your state DOT control in terms of funding and delivery?
2. For the projects under state DOT control, please indicate the overall percentage of state staff and the percentage of consultants that made up your agency's resource mix in the last year.
3. Is your agency subject to external limitations by oversight agencies on the use of specific types of resources to deliver capital projects?
4. Please describe your agency's use of the resources listed below in managing your capital program:
    - Staff overtime.
    - Limited-term appointments.
    - Retirees.
    - Volunteers.
    - Students.
    - Other resources.
5. In addition to the personnel-related resources identified in question 4, are there other resources or practices your agency uses to manage a changing workload?
6. Is your agency subject to collective bargaining agreements that limit your use of specific types of resources to deliver capital projects?
7. Please provide your agency's resource mix (percentage of state staff, consultants and other resources) for the last year for each of the task areas identified below.

- Project management.
- Surveying and mapping.
- Environmental studies.
- Preliminary engineering.
- Planning.
- Design.
- Right of way.
- Materials testing.
- Construction engineering. (This task area is limited to the tasks associated with construction administration and does not include the actual construction effort typically undertaken by contractors.)
- Construction inspection.

8. Have you encountered barriers in effectively managing workload with existing resources?
9. Please indicate the importance of each of the factors listed below in deciding to outsource a task or function within your capital program.
    - Lack of in-house staff.
    - Variations in workload.
    - Seasonal fluctuations.
    - Lack of state staff in remote areas.
    - Need for specialized skills.
    - Need for specialized equipment.
    - To meet expedited project delivery schedules.
    - Legal requirement or policy initiative.
    - To utilize unanticipated funding.
    - To obtain cost savings.
    - To identify innovative approaches or techniques.
    - Other factor.
10. Please indicate the importance of each of the factors listed below in deciding to utilize state staff to complete a task or function within your capital program.
    - Retain skills and expertise in-house.
    - To obtain cost savings.
    - Quality of in-house work superior to that of consultants.
    - Work performed more quickly in-house.
    - Legal restriction or policy initiative.
    - Skills or expertise not available in the private sector.
    - Liability concerns.
    - Other factor.
11. If your agency is using consultants to provide specialized skills or equipment, please describe the in-house skills or equipment that are unavailable or lacking.
12. Are there functions or tasks that have been deemed unacceptable for outsourcing?
13. Please provide details on any of your answers or additional comments.

Survey Summary

Four states responded to the survey: Georgia, Pennsylvania, Texas and Washington.

The survey gathered information in eight topic areas related to balancing workload and resources in capital programs:

- State control and resource mix for capital projects.
- Agency use of other resources to manage workload.
- Other practices to manage workload.
- Limitations in managing workload.
    - Collective bargaining agreements.
    - External limitations by oversight agencies.
    - Barriers in managing workload.
- Specialized skills or equipment provided by consultants.
- Tasks deemed unacceptable for outsourcing.
- Resource mix by task area.
- Factors in deciding to retain work in-house or outsource.

Key findings from the survey are summarized below. See page 40 of this report for the full text of survey responses.

State Control and Resource Mix for Capital Projects

Respondents indicated the percentage of capital projects the state DOT controls on the state highway system and the mix of state staff and consultants used to complete those projects. The table below summarizes responses.

Capital Projects on the State Highway System Controlled by the State DOT			
State	**% of Projects Controlled by State DOT**	**% of State Staff**	**% of Consultants**
Georgia	90	40	45*
Pennsylvania	100	20**	80**
Texas	92	50	50
Washington	100	45	55

* Local agencies complete the remaining 15 percent of work on state-DOT controlled projects.

** Percentage of dollars spent.

In Washington, consultants and state staff serve on blended teams on all projects under WSDOT control. The consultant provides general engineering consultant services and state staff colocate with the consultant to produce project designs.

WSDOT respondents noted that the level of effort expended in the agency's capital program affects the state staff/consultant mix. As funding applied to mega projects depletes WSDOT funds available for other projects, the need for consultants decreases. As new funding becomes available, consultant use increases, with the majority of new design work completed as a collaboration of consultants and state staff.

Agency Use of Other Resources to Manage Workload

Respondents were asked to identify how the following resource classes are used in managing their capital programs: staff overtime, limited-term appointments, retirees, volunteers and students.

- Of the five other resource classes, overtime was cited by all respondents as a factor in managing workload. However, none of the respondents reported use of a specific budgeted allocation for overtime.
    - Two agencies—Georgia and Texas DOTs—allow staff to earn comp time in lieu of paying overtime.
    - PennDOT approves and monitors overtime on a case-by-case basis.
    - TxDOT staff overtime is managed, monitored and controlled at the supervisor level and must be approved before use. Generally, the agency assumes no overtime in its projections of completing production work.
    - While there is no set percentage of overtime for WSDOT, as a general rule, overtime does not exceed 9 percent of the 150 billable hours per month used for workforce planning. Most staff overtime is limited and is most often schedule-driven and associated with the demands of delivering a project on time.
- Georgia and Washington State DOTs reported the use of limited-term appointments. Georgia DOT seldom makes such appointments, and WSDOT uses project positions on a limited basis to help maintain a stable workforce.
- Retirees may be approved to return to work at PennDOT as an annuitant. This resource class is limited to 95 days worked per calendar year and does not comprise a significant percentage of PennDOT employee staffing. Georgia DOT rarely makes use of retirees; TxDOT reported no use of retirees; and in Washington, state law prohibits the use of retirees.
- None of the respondents uses volunteers.
- PennDOT employs students as engineering interns, mostly over the summer. At TxDOT, student interns are used for some basic production work during summers and holidays. These activities do not have a significant impact on the agency's overall production.

Other Practices to Manage Workload

As the table below indicates, all respondents use other practices to manage workload to some degree.

Other Practices to Manage Workload	
Practice	State
Shift projects to later program cycles	Georgia, Pennsylvania, Texas
Modify delivery dates	Georgia, Pennsylvania, Texas
Share staff across districts/regions	Georgia, Pennsylvania, Texas, Washington
Cross-utilize staff across task areas	Pennsylvania, Texas, Washington
Provide staff with advanced project management training	Pennsylvania, Washington

Washington is the only respondent to report limited or no use of the following practices to manage workload:

- Shift projects to later program cycles.
- Modify delivery dates.

WSDOT makes a commitment to the Washington Legislature to deliver projects within a particular quarter. A month's delay that keeps the project's delivery date within the quarter originally estimated for delivery can be accommodated. However, it is unacceptable to move a project to the next quarter or later.

Limitations in Managing Workload

Collective Bargaining Agreements

Only PennDOT is subject to collective bargaining agreements that limit its use of specific types of resources to deliver capital projects. These collective bargaining agreements define overtime and staffing policies. Approval is required for the use of consultants to supplement staff to accomplish duties typically performed by nonmanagement staff.

External Limitations by Oversight Agencies

TxDOT is the only respondent reporting a formal limitation that affects the use of state resources in managing workload. The agency is subject to a legislative requirement that 35 percent of annual engineering services be awarded to consultant engineers.

While not a formal mandate, the state Legislature has encouraged greater use of design-build in Washington, which has led to an increase in the use of consultants. PennDOT is not subject to a formal legislative or policy limitation, but the department must negotiate with its union on a project-by-project basis to justify outsourcing a task.

Barriers in Managing Workload

When asked about barriers in effectively managing workload with existing resources, Georgia DOT noted that its current scheduling software does not link workload with resources. In Washington, the elimination of sovereign immunity of state government affects how WSDOT manages its resources.

In 1961, the Washington Legislature eliminated the sovereign immunity of state government with a statutory waiver of the immunity. This waiver continues to apply, and WSDOT employees are afforded no discretionary immunity for design engineering decision-making. WSDOT policies are afforded discretionary immunity for only those decisions made at the highest level of the department. WSDOT's liability for the negligent acts of its employees is covered through the State of Washington Self-Insurance Liability Account.

In light of its self-insured status, WSDOT is focused on providing clear guidance to the consultants it employs with the use of site-based state staff working with consulting firms to ensure that risks are understood and practices are consistent across the state with design engineering policies made at the highest level of the department. Lower consultant use in high-risk areas such as geotechnical services and structures is related in part to the department's self-insured status.

Specialized Skills or Equipment Provided by Consultants

Two respondents—Texas and Washington—obtain specialized skills or equipment from consultants.

- Consultants provide TxDOT with survey and mapping high-tech equipment, including ground penetrating radar and LIDAR. (LIDAR (***Li***ght ***D***etection ***a***nd ***R***anging) is an optical remote sensing technology that measures properties of scattered light to find the range and/or other information to a distant target.)
- Consultants perform real estate appraisals for WSDOT, and the communications and public outreach typically associated with environmental-related activities are outsourced.

Tasks Deemed Unacceptable for Outsourcing

Two respondents—Texas and Washington State DOTs—deem certain tasks unacceptable for outsourcing. In Texas, acquisition of right of way requires TxDOT staff to be the point of contact for property purchases and the eminent domain process. In Washington, the functions always retained in-house are tangentially related to the capital program and include legal tasks, accounting, payroll, human resources, auditing and property management.

Resource Mix by Task Area

The table on the next page summarizes the resource mix (percentage of state staff, consultants and other resources) used by respondents for the last year for a wide range of task areas.

PennDOT does not have this information readily available and did not respond to this survey question. For WSDOT, the percentage allocation of resources by task area varies by project type. Larger projects, design-build projects and larger corridor projects typically employ a greater percentage of consultants. In lieu of providing specific percentages, WSDOT provided an estimate of the range of state staff or consultant use (low, medium or high) associated with each task area.

Respondent Agencies' Resource Mix by Task Area				
Task Area	**State**	**Resource Type**		
		State Staff	**Consultant**	**Other Resources**
Project Management	Georgia	90	10	0
	Texas	100	0	0
	Washington	High	Low	0
Surveying and Mapping	Georgia	60	30	10
	Texas	10	90	0
	Washington	Low	High	0
Environmental Studies	Georgia	40	50	10
	Texas	50	50	0
	Washington	Low	High	0
Preliminary Engineering	Georgia	40	45	15
	Texas	50	50	0
	Washington	Low	High	0
Planning	Georgia	50	50	0
	Texas	50	50	0
	Washington	High	Low	0
Design	Georgia	40	45	15
	Texas	50	50	0
	Washington	Low	High	0
Right of Way	Georgia	40	40	20
	Texas	50	50	0
	Washington	High	Low	0
Materials Testing	Georgia	60	40	0
	Texas	10	90	0
	Washington	High	Low	0
Construction Engineering	Georgia	30	60	10
	Texas	98	2	0
	Washington	High	Low	0
Construction Inspection	Georgia	60	30	10
	Texas	98	2	0
	Washington	100	0	0

For Georgia and Texas DOTs, many task areas are fairly evenly split between state staff and consultants, including:

- Environmental studies.
- Preliminary engineering.
- Planning.
- Design.
- Right of way.

Task Areas with Concentration of State Staff

All three respondents reported high use of state staff to complete tasks associated with project management. In Texas, construction engineering and construction inspection are almost always completed with in-house staff.

The task areas with more pronounced differences in the use of state staff across respondents include:

- Surveying and mapping:
    - Georgia—60 percent.
    - Texas—10 percent.
    - Washington—Low.
- Materials testing:
    - Georgia—60 percent.
    - Texas—10 percent.
    - Washington—High.
- Construction engineering:
    - Georgia—30 percent.
    - Texas—98 percent.
    - Washington—High.

Task Areas with Concentration of Consultants

Texas reported the most heavily outsourced task areas, including:

- Surveying and mapping (90 percent).
- Materials testing (90 percent).

For Georgia DOT, construction engineering is the task area most often outsourced, at 60 percent.

In Washington, the following task areas have a high concentration of consultant efforts:

- Surveying and mapping.
- Environmental studies.
- Preliminary engineering.
- Design.

Factors in Deciding to Retain Work In-House or Outsource

We asked respondents to rate a variety of factors that may contribute to the decision to use state staff to complete a task or function within the agencies' capital programs. The table below provides an ordered list of factors included in the survey that reflects the rating average for each factor (5 = extremely important; 1 = not at all important). The higher the rating, the more important the factor was to respondents' decision-making in retaining work in-house.

Rating Factors in Deciding to Utilize State Staff	
Factor	**Rating Average**
Retain skills and expertise in-house	4.50
Legal restriction or policy initiative	3.75
To obtain cost savings	3.33
Liability concerns	3.33
Quality of in-house work superior to that of consultants	2.67
Work performed more quickly in-house	2.67
Skills or expertise not available in the private sector	2.33

PennDOT noted that the time required to procure a contract for consultants may also factor into the decision to use state staff in situations where quick turnaround is necessary and a consultant is not already under contract.

Similarly, we asked respondents to rate factors that contribute to the decision to outsource a task. Below is an ordered list of factors included in the survey that reflects the rating average for each factor (5 = extremely important; 1 = not at all important). The higher the rating, the more important the factor was to respondents' decision-making in outsourcing a task.

Rating Factors in Deciding to Retain Consultants	
Factor	**Rating Average**
To meet expedited project delivery schedules	4.75
Need for specialized equipment	4.33
Lack of in-house staff	4.25
Variations in workload	4.25
Legal requirement or policy initiative	4.25
Need for specialized skills	4.00
To utilize unanticipated funding	4.00

Rating Factors in Deciding to Retain Consultants	
Factor	**Rating Average**
To identify innovative approaches or techniques	3.75
To obtain cost savings	3.33
Seasonal fluctuations	2.50
Lack of state staff in remote areas	2.25

Survey Results

The full text of each survey response is provided below. For reference, we have included an abbreviated version of each question before the response; for the full question text, please see page 29 of this report.

Georgia

Contact: Genetha Rice-Singleton, State Program Delivery Engineer, Georgia Department of Transportation, (404) 631-1522, grice-singleton@dot.ga.gov.

1. **Percentage of projects controlled by state DOT:** 90 percent.
2. **Percentage for state DOT-controlled projects:**

   State staff: 40 percent.

   Consultants: 45 percent.

   Local agencies: 15 percent.
3. **External limitations on resources by oversight agencies?** Yes. Federal Highway Administration is involved with more than 70% of our projects. There are no other external limitations imposed on Georgia DOT's capital program.
4. **Describe use of resources:**

4a. *Staff overtime:* Overtime as needed to complete critical assignments. Overtime is not included in the agency's budget. Project Managers can earn comp time (no funds involved); this is a common practice.

4b. *Limited-term appointments:* Seldom do we make limited-term appointments.

4c. *Retirees:* Rarely do we seek the assistance of retirees.

4d. *Volunteers:* N/A

4e. *Students*: N/A

4f. *Other*: None.

5. **Other resources or practices used?**

   Shift projects to later program cycles

   Modify delivery dates

   Share staff across districts/regions
6. **Subject to limitations of collective bargaining agreements?** No.

7. **Resource mix by task area:**

   Note: The "other resources" noted below include local agencies.

Task Area	*State Staff*	*Consultants*	*Other Resources*
Project management	90	10	0
Surveying and mapping	60	30	10
Environmental studies	40	50	10
Preliminary engineering	40	45	15
Planning	50	50	0
Design	40	45	15
Right of way	40	40	20
Materials testing	60	40	0
Construction engineering	30	60	10
Construction inspection	60	30	10

8. **Barriers in managing workload with existing resources?** Yes. The current scheduling software does not link workload with resources.

9. **Rate factors in deciding to outsource a task or function: (1 = not at all important; 5 = extremely important)**

Factor	*Rating*
Lack of in-house staff	3
Variations in workload	3
Seasonal fluctuations	4
Lack of state staff in remote areas	3
Need for specialized skills	3
Need for specialized equipment	N/A
To meet expedited project delivery schedules	5
Legal requirement or policy initiative	4
To utilize unanticipated funding	3
To obtain cost savings	3
To identify innovative approaches or techniques	4
Other factor	N/A

10. **Rate factors listed in deciding to utilize state staff: (1 = not at all important; 5 = extremely important)**

Factor	*Rating*
Retain skills and expertise in-house	4
To obtain cost savings	4
Quality of in-house work superior to that of consultants	4
Work performed more quickly in-house	4
Legal restriction or policy initiative	4
Skills or expertise not available in the private sector	4

Liability concerns	4
Other factor	3 [not described by respondent]

11. **Skills or equipment requiring consultants:** [No response.]
12. **Functions or tasks unacceptable for outsourcing:** No.
13. **Details or comments:** [No response.]

Pennsylvania

Contact: J. Michael Long, Chief, Contract Management, Pennsylvania Department of Transportation, (717) 787-7894, johlong@pa.gov.

1. **Percentage of projects controlled by state DOT:** 100 percent.
2. **Percentage for state DOT-controlled projects:**

   State staff: 20 percent (of dollars spent).

   Consultants: 80 percent (of dollars spent).
3. **External limitations on resources by oversight agencies?** Yes. Federal and state projects must follow federal and state regulations and requirements, respectively. PennDOT has a Stewardship and Oversight Agreement with the FHWA for project oversight. In addition, projects/permits are obtained from and coordinated with the Army Corps of Engineers, U.S. Fish & Wildlife, U.S. Coast Guard, Pennsylvania Department of Environmental Protection, and the Pennsylvania Fish and Boat Commission.

   There is no legislative or policy-related limit imposed upon us. We must negotiate with the union on a project-by-project basis to justify contracting work and not doing it with in-house staff. There is no limit as long as we can justify why the work cannot be done in-house.
4. **Describe use of resources:**

4a. *Staff overtime:* Overtime is used, but on a case-by-case approval basis. There is no programmatic percent increase applied nor a budgeted allocation for overtime. Overtime is only used as approved and is monitored. If necessary, something else would have to be cut in order to cover for overtime payments.

4b. *Limited-term appointments:* N/A

4c. *Retirees:* Retired personnel, on a case-by-case basis, may be approved to return as an annuitant. They are limited to 95 days worked per calendar year, and do not comprise a significant percentage of state employee staffing.

4d. *Volunteers:* N/A

4e. *Students*: Engineering interns are employed, predominantly over the summer.

4f. *Other*: [No response.]

5. **Other resources or practices used?**

   Shift projects to later program cycles
   Modify delivery dates
   Share staff across districts/regions
   Cross-utilize staff across task areas
   Provide staff with advanced project management training
6. **Subject to limitations of collective bargaining agreements?** Yes. There are collective bargaining agreements that define overtime and staffing policies. The use of consultants to

supplement staff in order to accomplish duties to be performed by nonmanagement staff must be approved.

7. **Resource mix by task area:** [Respondent did not complete this portion of the survey.]
8. **Barriers in managing workload with existing resources?** No.
9. **Rate factors in deciding to outsource a task or function: (1 = not at all important; 5 = extremely important)**

Factor	*Rating*
Lack of in-house staff	5
Variations in workload	4
Seasonal fluctuations	1
Lack of state staff in remote areas	1
Need for specialized skills	3
Need for specialized equipment	3
To meet expedited project delivery schedules	5
Legal requirement or policy initiative	4
To utilize unanticipated funding	4
To obtain cost savings	N/A
To identify innovative approaches or techniques	4
Other factor	[No response.]

10. **Rate factors listed in deciding to utilize state staff: (1 = not at all important; 5 = extremely important)**

Factor	*Rating*
Retain skills and expertise in-house	5
To obtain cost savings	N/A
Quality of in-house work superior to that of consultants	N/A
Work performed more quickly in-house	N/A
Legal restriction or policy initiative	4
Skills or expertise not available in the private sector	N/A
Liability concerns	N/A
Other factor	[No response.]

Description of other factor: The time required to procure and obtain a contract for consultants may factor into the decision, if quick turnaround is necessary and there is no one already under contract.

11. **Skills or equipment requiring consultants:** [No response.]
12. **Functions or tasks unacceptable for outsourcing:** No.
13. **Details or comments:** [No response.]

Texas

Contact: Lynn Isaak, Director, Project Management Office, Texas Department of Transportation, (512) 463-3800, lynn.isaak@txdot.gov.

1. **Percentage of projects controlled by state DOT:** 92 percent.
2. **Percentage for state DOT-controlled projects:**

   State staff: 50 percent.

   Consultants: 50 percent.
3. **External limitations on resources by oversight agencies?** Currently, the only requirement is that 35 percent of the annual engineering services be awarded to consultant engineers.
4. **Describe use of resources:**

4a. *Staff overtime:* Staff overtime is managed monitored and controlled at the supervisor level and approved prior to overtime is allowed. As a general rule, we assume no overtime in our projections of completing our production work.

TxDOT does not set aside a specific amount or percentage of its overall allocation for overtime. TxDOT has a strict policy on how overtime can be paid. Typically, managers allow workers to work extra and they earn comp time which allows employees one year to take off the time earned and no overtime is paid out.

4b. *Limited-term appointments:* N/A

4c. *Retirees:* N/A

4d. *Volunteers:* N/A

4e. *Students*: I'm aware of student interns in our Travel Section only, which is a nonproduction area of the agency. We do have paid summer/holiday interns which may perform some basic production work, but that is limited and not considered to impact the agency's production.

4f. *Other*: [No response.]

5. **Other resources or practices used?**

   Shift projects to later program cycles
   Modify delivery dates
   Share staff across districts/regions
   Cross-utilize staff across task areas
6. **Subject to limitations of collective bargaining agreements?** No.
7. **Resource mix by task area:**

Task Area	*State Staff*	*Consultants*	*Other Resources*
Project management	100	0	0
Surveying and mapping	10	90	0
Environmental studies	50	50	0
Preliminary engineering	50	50	0
Planning	50	50	0
Design	50	50	0
Right of way	50	50	0
Materials testing	10	90	0

Construction engineering	98	2	0
Construction inspection	98	2	0

8. **Barriers in managing workload with existing resources?** Yes. We work with our consultants to manage our workload which is above our in-house resources.
9. **Rate factors in deciding to outsource a task or function: (1 = not at all important; 5 = extremely important)**

Factor	***Rating***
Lack of in-house staff	5
Variations in workload	5
Seasonal fluctuations	2
Lack of state staff in remote areas	1
Need for specialized skills	5
Need for specialized equipment	5
To meet expedited project delivery schedules	5
Legal requirement or policy initiative	4
To utilize unanticipated funding	5
To obtain cost savings	3
To identify innovative approaches or techniques	4
Other factor	[No response.]

10. **Rate factors listed in deciding to utilize state staff: (1 = not at all important; 5 = extremely important)**

Factor	***Rating***
Retain skills and expertise in-house	5
To obtain cost savings	5
Quality of in-house work superior to that of consultants	1
Work performed more quickly in-house	1
Legal restriction or policy initiative	5
Skills or expertise not available in the private sector	1
Liability concerns	1
Other factor	[No response.]

11. **Skills or equipment requiring consultants:** Ground penetrating radar, LIDAR - survey and mapping high-tech equipment.
12. **Functions or tasks unacceptable for outsourcing:** Yes. Right of way acquisition where it's a requirement to have an agency person be the point of contact for property purchases and eminent domain.
13. **Details or comments:** [No response.]

Washington

Contacts: Pat Morin, Operations Manager, Office of Capital Program Development & Management, Washington State Department of Transportation, (360) 705-7141, MorinP@wsdot.wa.gov; Kyle McKeon, Technical Services and Business Manager, Development Division, Washington State Department of Transportation, (360) 705-7458, mckeonk@wsdot.wa.gov.

Note: Representatives from Washington State DOT elected to participate in an interview rather than completing the online survey. The results of that interview are summarized in the responses below.

1. **Percentage of projects controlled by state DOT:** 100%. The state even controls work that it contracts out to consultants; see the response to question 8.

2. **Percentage for state DOT-controlled projects:**

   State staff: 45 percent.

   Consultants: 55 percent.

   While the department's raw data indicates the distribution of resources indicated above, the respondents note that percentages vary based on the level of effort expended in the program. Consultants and state staff serve on blended teams on all projects under WSDOT control. The consultant provides general engineering consultant services and state staff colocate with the consultant to produce project designs. As funding applied to mega projects depletes funds available for other projects, the need for consultants decreases. As new funding becomes available, consultant use increases, with the majority of new design work completed as a collaboration of consultants and state staff.

   Going forward, the department is getting smaller, moving from a staff of 3,100 to a core staff of approximately 2,200 that will ensure sufficient expertise is retained in-house to oversee the work of consultants. Concurrently, the number of on-call consultant contracts is increasing to ensure that consultants are available in all task areas associated with delivering capital projects. When a need arises, the department contacts three or four of the on-call consultants to request second tier proposals, which are reviewed to identify the best value for the state.

3. **External limitations on resources by oversight agencies?** WSDOT has a Federal-Aid Highway Program Stewardship and Oversight Agreement with the FHWA for project oversight.

   While not a formal mandate, the Washington Legislature has encouraged greater use of design-build. This emphasis, coupled with the challenge to become smaller and more flexible while retaining the department's core competencies, has led to an increase in the use of consultants.

   There is no threshold or limit on the state's use of consultants to deliver capital projects. While Washington state maintenance agencies are precluded from contracting out work typically performed by state forces, a similar limitation is not in place for the design and construction tasks associated with delivering capital projects on the state highway system.

4. **Describe use of resources:**

4a. *Staff overtime:* There is no set percentage of overtime, but as a general rule, overtime does not exceed 9 percent of the 150 billable hours per month used for workforce planning. Some functions (construction oversight, for example) may require overtime that nears or exceeds the 9 percent mark, though most staff overtime is limited and is most often schedule-driven and associated with the demands of delivering a project on time.

4b. *Limited-term appointments:* Project positions are used on a limited basis to help keep the

workforce stable.

4c. *Retirees:* State law prohibits the use of retirees.

4d. *Volunteers:* N/A

4e. *Students*: N/A

4f. *Other*: N/A

5. **Other resources or practices used?**

Shift projects to later program cycles. The department does not delay project schedule commitments made to the state Legislature to balance workload and resources.

Modify delivery dates. The department makes a commitment to the Washington Legislature to deliver projects within a particular quarter. A month's delay that keeps the project's delivery date within the quarter originally estimated for delivery can be accommodated. However, moving the project to the next quarter or later is not acceptable.

Share staff across districts/regions. Core staff is retained in all DOT regions through an effective program of sharing staff and resources. Agency data and documents are shared on servers to aid staff in moving among region offices to complete projects. Online meeting software and other worksharing practices allow both state staff and consultants to work collaboratively and remotely.

Cross-utilize staff across task areas. A built-in redundancy in the department's core staff allows it to get smaller and become more efficient. Cross-training is critical.

Provide staff with advanced project management training. The department recently implemented an online training tool that is accessible to staff via the desktop. New elearning modules are in development to augment the training program.

6. **Subject to limitations of collective bargaining agreements?** No.

7. **Resource mix by task area:** The percentage allocation of resources by task area varies by project type—the size of the project, whether it is design-build or design-bid-build, and the size of the corridor. Larger projects, design-build projects, and larger corridor projects typically employ a greater percentage of consultants. The expanded use of consultants is accompanied by a strong ownership of the DOT when employing consultants across all task areas. See below for an estimate of the range of state staff or consultant use (low, medium or high) associated with each task area.

Task Area	***State Staff***	***Consultants***	***Other Resources***
Project management	High	Low	N/A
Surveying and mapping	Low	High	N/A
Environmental studies	Low	High	N/A
Preliminary engineering	Low	High	N/A
Planning	High	Low	N/A
Design	Low	High	N/A
Right of way	High	Low (will change)	N/A
Materials testing	High	Low	N/A
Construction engineering	High	Low	N/A
Construction inspection	100%	None	N/A

8. **Barriers in managing workload with existing resources?** Yes. For example, consultants are

needed for real estate appraisal given the high volume of work and dwindling internal resources. Communications and public outreach associated with environmental activities are also routinely outsourced.

In 1961, the Washington Legislature eliminated the sovereign immunity of state government with a statutory waiver of the immunity. This waiver continues to apply, and WSDOT employees are afforded no discretionary immunity for design engineering decision-making. WSDOT policies are afforded discretionary immunity only for decisions made at the highest level of the department. WSDOT's liability for the negligent acts of its employees is covered through the State of Washington Self-Insurance Liability Account.

In light of its self-insured status, the department is focused on providing clear guidance to the consultants it employs with the use of site-based state staff working with consulting firms to ensure that the risks are understood and practices are consistent across the state with design engineering policies made at the highest level of the department. Lower consultant use in high-risk areas such as geotechnical services and structures is related in part to the department's self-insured status, though there is an uptick in the use of consultants on bridge preservation projects.

9. **Rate factors in deciding to outsource a task or function: (1 = not at all important; 5 = extremely important)**

Factor	*Rating*
Lack of in-house staff	4
Variations in workload	5
Seasonal fluctuations	3
Lack of state staff in remote areas	4
Need for specialized skills	5
Need for specialized equipment	5
To meet expedited project delivery schedules	4
Legal requirement or policy initiative	5
To utilize unanticipated funding	4
To obtain cost savings	4
To identify innovative approaches or techniques	3
Other factor	None

10. **Rate factors listed in deciding to utilize state staff: (1 = not at all important; 5 = extremely important)**

Factor	*Rating*
Retain skills and expertise in-house	4
To obtain cost savings	1
Quality of in-house work superior to that of consultants	3
Work performed more quickly in-house	3
Legal restriction or policy initiative	2
Skills or expertise not available in the private sector	2
Liability concerns	5
Other factor	None

11. **Skills or equipment requiring consultants:** Real estate appraisals; and communications and public outreach typically associated with environmental-related activities.
12. **Functions or tasks unacceptable for outsourcing:** Legal tasks (the department contracts with the state attorney general's office); accounting; payroll; human resources; auditing; and property management. While these functions are not outsourced, the respondents note that some functions are being centralized within the department in response to reductions in internal resources.
13. **Details or comments:** [No response.]