

NCHRP

SYNTHESIS 313

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

State DOT Outsourcing and Private-Sector Utilization

A Synthesis of Highway Practice

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NCHRP SYNTHESIS 313

State DOT Outsourcing and Private-Sector Utilization

A Synthesis of Highway Practice

CONSULTANT

THOMAS R. WARNE
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SUBJECT AREAS

Planning and Administration

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WASHINGTON, D.C.
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Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

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The members of the technical committee selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and, while they have been accepted as appropriate by the technical committee, they are not necessarily those of the Transportation Research Board, the National Research Council, the American Association of State Highway and Transportation Officials, or the Federal Highway Administration of the U.S. Department of Transportation.

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FOREWORD

*By Staff
Transportation
Research Board*

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, “Synthesis of Information Related to Highway Problems,” searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

The synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This report of the Transportation Research Board will be of interest to state departments of transportation (DOTs), as well as to other transportation professionals and the public who seek to leverage their work forces by outsourcing key activities. The report examines the current practices in outsourcing, what decisions are involved in deciding when to outsource, procuring and administering outsourced services, what are the most commonly outsourced activities, and determining the effectiveness of outsourcing. This report is an update of *NCHRP Synthesis 246: Outsourcing of State Highway Facilities and Services*, which provided a comprehensive look at the status of outsourcing as it existed in 1997, and the data compiled for this synthesis are compared with that of the earlier synthesis, where appropriate.

The information for this effort was derived in part from a survey questionnaire distributed to all 50 states and the District of Columbia. Replies to the survey came from 38 states and the District of Columbia. Information was also derived from a review of the relevant literature, which focused primarily on the engineering and design elements outsourced by state DOTs.

A panel of experts in the subject area guided the work of organizing and evaluating the collected data and reviewed the final synthesis report. A consultant was engaged to collect and synthesize the information and to write this report. Both the consultant and the members of the oversight panel are acknowledged on the title page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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and Thomas E. Stephens, Director, Nevada Department of Transportation.

This study was managed by Crawford F. Jencks, Manager, National Cooperative Highway Research Program and Jon Williams, Manager, Synthesis Studies, who worked with the consultant, the Topic Panel, and the Project 20-5 Committee in the development and review of the report. Assistance in project scope development was provided by Donna Vlasak, Senior Program Officer. Don Tippman was responsible for editing and production. Cheryl Keith assisted in meeting logistics and distribution of the questionnaire and draft reports.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance are appreciated.

STATE DOT OUTSOURCING AND PRIVATE-SECTOR UTILIZATION

SUMMARY

The topic of outsourcing services by state departments of transportation (DOTs) is one of much interest and consideration. Capital programs in the states continue to grow at record levels thanks to the Transportation Equity Act for the 21st Century and various state initiatives. Demands on state work forces have never been greater. Consequently, state DOTs are looking for ways to leverage their work forces by outsourcing key activities to deliver products and services to their customers. With limited resources and ever-increasing demands for services, the DOTs are endeavoring to optimize their outsourcing activities. In 1997, *NCHRP Synthesis Report 246: Outsourcing of State Highway Facilities and Services* was prepared to capture the nature of outsourcing at that time. This report is an update of that effort and represents the most current knowledge on the subject.

The literature review found many studies and analyses of outsourcing activities in the state DOTs. Some are concerned with policy issues and conclude that decisions to outsource are focused on staff constraints or the need for specialized skills or equipment. Other studies focus on the trend toward public-private partnerships and how some DOTs have addressed their transportation challenges by using such partnerships. There are many published studies and reports by auditors, state DOTs, third parties, and associations that have attempted to quantify the cost-effectiveness of outsourcing engineering services. Many methodologies are presented, but none appear to be the defining statement on whether or not the outsourcing of engineering services is cost-effective. The focus of the literature is primarily on the engineering and design elements that are outsourced by state DOTs.

There was a strong response to the survey conducted as part of this study. From the data, it is clear that the level of outsourcing has grown in the 5 years since the publication of *NCHRP Synthesis 246* and will grow, albeit at a slower pace, in the next 2 years. The most growth is occurring among the Design activities, although strong growth patterns are manifested in Right-of-Way, Maintenance, Operations, and Planning activities.

One area of great interest is how DOTs make the decision to outsource. The report shows there are occasions when either the legislative or executive branches of state government mandate outsourcing directly, although more commonly they act to limit or reduce the number of state employees, resulting in a de facto mandate to outsource. In most cases, the decision to outsource is unique to the state DOT and the specific activity. In response to the survey questionnaire, the DOTs identified staff constraints and specialty skills and equipment as the principal factors influencing the decision to outsource, with cost-effectiveness seldom cited as a reason to outsource.

Substantial variations occur among the states and the activities outsourced when it comes to procuring these services. The type of contractor, method of procurement, and payment basis are all functions of the unique characteristics of the outsourced activity.

Determining if the outsourcing is effective or successful depends on the goals and objectives of the effort. If the schedule is of paramount importance, then a contractor that delivers on that schedule has been successful. In some cases, legal issues arise and a contractor that complies with such requirements is successful. If a project is complex and requires special skills or equipment, then a contractor that offers these and completes the project has been successful. Ultimately, effectiveness or success is defined by the agency outsourcing the activity in question.

There is great commonality of attributes among activities within specific groups sampled. For example, those activities involving Design will exhibit many similarities, as will those concerned with Maintenance. The type of activity and the nature of the work drives how it will be outsourced.

Outsourcing services by state DOTs will continue to be an important component of their program delivery. Staff constraints and the need for specialty skills or equipment will fuel this growth for the foreseeable future. Correspondingly, states may continue to refine their processes to the benefit of their customers.

INTRODUCTION

BACKGROUND

For many years, outsourcing by state departments of transportation (DOTs) has been a subject of great interest in both the public and private sectors. In the public sector, it has offered a means of program and service delivery that complements that which is provided in-house. Outsourced services have developed into a substantial market share of private-sector business practice, with some companies providing a wide array of services and others offering specialty services to public agencies.

Two major factors appear to be driving the current trends to outsource. The first is the overall growth in state highway programs. The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998, providing states with an average funding increase of more than 44% in their federal programs. Ultimately, TEA-21 took the annual national appropriations level to \$30 billion, when just a few years before it was less than \$20 billion—reflecting an actual increase of more than 50% from previous funding levels. The second factor affecting outsourcing by state DOTs is the current status of their work forces. Results from a survey of state DOTs conducted last year showed that 80% have either the same or declining staffing levels (Warne 2001). Having more available money with the same or fewer people to deliver the program ultimately results in the need for state DOTs to rely on the private sector for delivering services to the public.

Outsourcing includes a variety of activities, which will be detailed in this report. These services range from litter removal and other mundane but necessary maintenance activities to the most sophisticated engineering and computer services. It goes beyond engineering services, even including the logical activities associated with technology implementation in an agency's information technology arena.

In 1997, the NCHRP published *NCHRP Synthesis 246: Outsourcing of State Highway Facilities and Services*. David Witheford, an experienced transportation professional with an extensive background in the subject of outsourcing services to the private sector, performed this work. This synthesis provides a comprehensive look at the status of outsourcing in the state DOTs, as it existed then. Many of Witheford's findings will be referenced in this report because of their relevance and value in examining trends and shifts in practice.

As mentioned previously, TEA-21 was a historic transportation bill that provided a significant boost to the capital program for each state. Other efforts within the states during the same time period have also added to the available funding. Examples of alternate funding sources include state initiatives such as the Utah Centennial Highway Fund, which created a \$2.8 billion pool of funds needed to build capacity-increasing projects throughout the state, and Florida, which recently launched an economic development program, infusing hundreds of millions of dollars into its highway program.

Other examples of funding mechanisms, over and above the levels provided by TEA-21, include two national programs. The Grant Anticipation Revenue Vehicle was established by Congress as a financing tool for states to bond against future federal revenues, which would then be used to pay certain debt-related expenses. This tool was used extensively in New Mexico to advance its NM-44 reconstruction program. The second program offered by Congress was based on the Transportation Infrastructure Finance and Innovation Act, in which DOTs were offered credit assistance through a variety of means that would allow them to advance major transportation projects. Both tools gave DOTs the ability to finance projects in advance of their scheduled construction dates. Ultimately, they become relevant to the discussion of outsourcing, because they have an impact on the overall size of a state's program.

Combined, the additional funds have led to two situations. First, the need to outsource engineering services increased as elected officials' expectations of delivery increased with the new money provided for state DOT projects. Officials were eager to show constituents that projects were being built with these new financing sources. Second (and perhaps more important to the discussion of outsourcing), state budgets for adding full-time employees to undertake administrative and maintenance activities did not simultaneously increase by the same 44%.

Furthermore, a misunderstanding can occur with newly completed transportation projects. Many elected officials and citizens believe that once a major project opens to traffic, there is no cost for use or maintenance of the facility until some future point in the aging process. However, such is not the case. Projects become maintenance issues as soon as they are completed, requiring expenditures by the state DOT from noncapital improvement funds. Landscaping

must be maintained, lighting bills paid, litter removed, painted delineation freshened, snow removed, and so forth. Such expenses begin to accrue immediately, and pavement maintenance begins within a few years. Thus, expenditures on the capital side of the highway funding ledger ultimately result in increased spending on the maintenance side.

Some outsourcing initiatives have their genesis from within the state DOTs, whereas others come from external sources. Limited resources in personnel, equipment, or money often generate internal initiatives. For example, a state may decide to outsource the landscaping operations along the highway shoulders. Such a decision could be made owing to the high cost of owning and maintaining the mowers. On the other hand, some states have gone through externally mandated outsourcing by direction from their executive or legislative branches or indirectly through personnel reduction. If a state DOT has a limited staff, it must turn to the private sector to accomplish its mission. The Florida DOT is an example of this phenomenon, because it experienced a 25% reduction in staff during a recent 3-year period. South Dakota and Iowa have also experienced similar reductions.

Regardless of the reason, the trend is toward ever-increasing levels of outsourcing. With so much interest in the status of outsourcing in the states, DOT leaders determined that an updated study, similar to that undertaken for *NCHRP Synthesis 246*, be completed.

PROJECT SCOPE AND OBJECTIVES

The purpose of this report is to quickly and effectively update *NCHRP Synthesis 246*. Additionally, it will provide state DOTs with the most up-to-date information available on outsourcing and use of the private sector. It is anticipated that this report will give the states valuable insights into current outsourcing practices and an understanding of national trends.

This report was designed to take advantage of the data from *NCHRP Synthesis 246* and coordinate that information with current findings. Ultimately, the result is a comprehensive review of the practice of outsourcing in state DOTs over two different periods.

NCHRP Synthesis 246 offered insights into the growing area of public-private partnerships. Examples of some activities within the states were cited. It was anticipated that the current study would reveal new and important information on this growing segment of the outsourcing market. However, in the 5 years since the publication of *NCHRP Synthesis 246*, the lines between traditional outsourcing and public-private partnerships have blurred to the point

that states are making less of a distinction between the two. Thus, in the state responses, there is no differentiation between either type of outsourcing.

STUDY PROCEDURES

Information for this project was partially acquired by means of a thorough review of the available literature on the subject of outsourcing. This review covered almost 15 years, but focused particularly on the last 5 years, the time period since the publication of *NCHRP Synthesis 246*. That report held a complete compendium of the available literature so that no attempt was made to recreate the review conducted by Witheford (1997). A summary of the literature reviewed for this updated report is found in chapter two.

To achieve project objectives, a survey was prepared and distributed to each state DOT. Care was taken in drafting this document so that the original data collected for the earlier synthesis would be valuable for comparing and reviewing any trends or anomalies that might surface. In addition, questions were added to this new survey to ascertain further nuances about outsourcing relative to policy issues, which may currently be influencing such state efforts.

The review provided in this report includes a number of issues related to the outsourcing process.

- Types of contractors used,
- Prequalification procedures,
- Contract management processes,
- Selection processes, and
- Payment methodologies.

In addition, the following was covered: how these processes have changed in the last 5 years, anticipated changes in the next 2 years, and factors that influence an agency to outsource a particular activity. Each of these will be presented later in this report and compared, where appropriate, to the data gathered in *NCHRP Synthesis 246*.

The volume of information sought from the states was substantial. In total, the survey document exceeded 50 pages. A specialized fill-in-the-blank and check-the-box format was used to speed the completion of the different survey elements. In addition, the survey was divided into distinct parts. The first part was intended to be completed by an individual with a broad public policy view of outsourcing. The second part comprised the seven activity groups of outsourcing as established in the previous report: Administration, Construction, Design, Maintenance, Operations, Planning, and Right-of-Way. Within these groups,

individual activities as noted in the earlier report were continued in this effort, for the purposes of uniformity and comparison. A copy of the survey questionnaire can be found in Appendix A. The Construction activity group did not include the capital program for each state, but rather consisted of construction management and inspection and testing activities.

The survey was sent to the TRB representatives in each of the 50 state DOTs and the District of Columbia. These individuals then distributed the activity group surveys to respective units within their agency. For example, the outsourcing items found under the Maintenance activity group were generally sent to the maintenance division within the agency. Hence, the work required by any single individual or division was not overwhelming.

SURVEY RESPONSE RATE

Most completed surveys were returned directly to the contractor, although some states compiled them and returned them as a group. In all, 38 states, the District of Columbia, and associate members responded to some portion of the survey. In some cases, states responded to the first part and all seven of the activity groups in the second part, whereas others completed and returned various categories from the activity groups.

Nearly 500 responses were received from the second part of the survey, concerning the seven activity groups. Information about categories received from specific states can be found in Appendix B. All groups had sufficient response rates to allow for analysis and conclusions.

It should be noted that virtually all states outsource some activities within their work programs. In some areas, such as Design, all DOTs outsource some amount of the work. However, in both quantity and approach, the process of outsourcing and the determination of what to outsource is clearly unique to each DOT.

SYNTHESIS ORGANIZATION

This synthesis report is organized to allow for valuable comparative analysis with *NCHRP Synthesis 246*. Some tables and data from the earlier synthesis are included as appropriate, and a set of four tables from that report are included for comparison purposes and can be found in Appendix C. The following is a brief summary of each chapter and its content.

- Chapter one includes a review of the purpose of this report and an overview of the outsourcing issue. It provides a foundation for the discussion presented in the remaining chapters. A short discussion of the study process is also included, and the relationship of this effort to *NCHRP Synthesis 246* is established.
- Chapter two presents a summary of the literature. The findings were reviewed for relevancy and content for this report.
- Chapter three captures the survey results as reported by the state DOTs. Comparisons with *NCHRP Synthesis 246* are presented as appropriate.
- Chapter four reviews the factors considered in the decision-making process that a state DOT goes through to establish an outsourcing program.
- Chapter five examines the process of procuring outsourced services and the various attributes of such efforts.
- Chapter six examines the measures that state DOTs use to determine the effectiveness and success of their outsourced programs.
- Chapter seven describes important trends and attributes among the most frequently outsourced activities within each of the activity groups.
- Chapter eight summarizes the findings.

Appendix A is the survey questionnaire, Appendix B lists the states responding to the survey and which parts of the survey the responses cover, Appendix C presents relevant tables from *NCHRP Synthesis 246* and other tables pertinent to the current study for the purposes of comparison, and Appendix D provides responses to selected survey questions.

LITERATURE REVIEW

The literature review conducted for this synthesis examined the array of papers, reports, audits, and other related documents on the subject of outsourcing. The work performed by Witheford in preparing *NCHRP Synthesis 246: Outsourcing of State Highway Facilities and Services* was extensive and the current project made no attempt to repeat that effort. Instead, the literature review focused on more recent documents.

The literature was found to contain much information and many analyses concerning state outsourcing practices. Although not every work reviewed will be noted or referenced here, major points and significant works will be cited. A complete listing of additional sources reviewed is contained in the bibliography at the end of this report.

Outsourcing studies and literature can be divided into a number of categories. Some consider the various activities being outsourced, and others review the practices and their effectiveness. Other works look at the policy issues associated with outsourcing. The most commonly covered area of this topic concerns the outsourcing of engineering services and its cost-effectiveness.

PUBLIC–PRIVATE PARTNERSHIPS

Public–private partnerships have been the subject of much of the literature in the years since the publication of *NCHRP Synthesis 246*. Many studies have focused on how current practices in outsourcing can be improved and how the relationships between public–private partners can be more profitable for both parties.

In a resource paper prepared for the TRB conference on Transportation Finance for the 21st Century, Stephen Lockwood (1997) defines public–private partnerships as “a change in roles and relationships based on a new mix of complementary public and private resources (expertise, technology, finance) pooled toward a common objective—while still achieving the partners’ respective separate objectives.” He then lists five “models” for these partnerships.

1. Traditional free roads with conventional funding and development encompassing traditional major road development;
2. Advanced free roads with innovative finance and turnkey project delivery as in large road reconstruction projects such as I-15 in Salt Lake City;

3. Innovative public toll roads like the Transportation Corridor Agency toll roads in Orange County, California;
4. Nonprofit community association developer toll roads as used in some public–private partnership projects in Arizona, Minnesota, South Carolina, Virginia, and Washington; and
5. Private/developer-sponsored toll roads as used for the Dulles Greenway in Virginia and SR-91 in Orange County, California.

Zhang and Kumaraswamy (2001) listed the necessary elements for successful public–private partnerships. A suitable legal foundation is necessary to make partnerships possible, but it cannot be overregulated. Also, a workable procurement process and a coordinating and supportive authority are needed to guarantee that both parties will meet financial goals and that funds will be available for future projects. The next two elements are marketability and affordability. They ensure that the private partners are able to take the risks involved in the partnership and that users, through tolls and tariffs, can afford to use the finished project.

Another important aspect of such partnerships is the selection of the most suitable concessionaire, through examination of the financial and technical proposals. Finally, Zhang and Kumaraswamy advocate adjustment of the public attitude: “The government’s perspective needs to shift from a regulatory stance and the somewhat judgmental role in traditional procurement routes to the proactive, more liberal, and dynamic outlook needed for public–private partnership scenarios.”

In a state-of-the-industry scan sponsored by AASHTO, researchers also looked at public–private partnerships. They noted that DOTs are using partnering in the following areas: environmental streamlining, road maintenance, intelligent transportation system (ITS) development, and planning. Specifically, the uses that DOTs find for public–private partnerships fall into the categories of project development, program delivery, planning or planning-related activities, and long-term relationship building. DOTs use these partnerships to solve problems, increase efficiency, and implement programs that cross agency or jurisdictional lines (Ford 2001).

According to Ashley et al. (1998), some of the pitfalls of public–private partnerships include unreliable traffic

predictions on toll roads and political uncertainty over time. The researchers concluded that projects were successful when partners could adapt to change in political and economic conditions. They advocated the use of a Project Scoring Table to outline the decisions that must be made among the partners, where each partner describes its interests in the following areas: political clearance, public-private structure, project scope, environmental clearance, construction risk, operational risk, financing package, economic viability, and developer financial involvement. Then the public and private partners can discuss the similarities and differences to better understand each other.

Giglio and Ankner (1998) listed the responsibilities of each party in the partnership. The public sector is responsible for the high-risk work of project development, environmental assessment, community outreach, and condemnation. The private sector is responsible for efficiency and quality. Both sectors share in profitability. The authors also listed roadblocks to working public-private partnerships; these include a lack of experience, institutional barriers, and legislative and political barriers.

According to Karen Hedlund in *Financing of Public-Private Partnerships* (2001), current tax law discourages public-private partnerships. Hedlund says, "private financing, construction, ownership and operation is subject to a significant cost penalty that discourages the utilization of private-sector efficiencies and risk taking in public projects, since private developers are extremely limited in their ability to tap the benefits and efficiencies of tax-exempt financing." Many states have proposed or completed public-private projects, including Arizona, California, Minnesota, New Jersey, Oregon, South Carolina, Texas, Virginia, and Washington. These types of projects are now common in some foreign countries, including Argentina, Australia, Brazil, Canada, Chile, China, France, Greece, Hungary, Indonesia, Israel, Italy, Portugal, South Africa, and Spain (Hedlund 2001).

OUTSOURCING

Studies of the outsourcing of engineering services, including analyzing the effectiveness of this practice, have been carried out since the early 1980s, and continue to be undertaken up to the present day. These studies were initiated by state DOTs, state legislatures, or by third parties, such as national or state industry associations. Some were probably "agenda driven," initiated to prove a certain predetermined result. However, it appears many were attempting an honest assessment of outsourcing engineering services in their particular locale. It is worth noting that the vast majority of the studies were directed to a specific state DOT rather than to the national view of outsourcing. Thus, variation in factors occurs from one state to another, for example, with

issues raised in a Montana study not necessarily relevant in New York.

The *NCHRP Synthesis 246* study (1997) found that one-third of the functions in a state DOT were outsourced, but that only 20% were totally outsourced. Reasons for outsourcing were most frequently related to either increased workloads or decreased staffing levels. For maintenance, reasons were frequently related to cost. The study also found that a majority of respondents expected levels of outsourcing to increase in the future. Much variation was found among states in areas such as outsourcing procedures, pre-award and prequalification processes, use of alternative bids, and value engineering. The most common benefits cited by respondents were the ability to supplement in-house staffing levels in meeting workloads and schedules, the ability to use specialized skills or equipment available in the private sector, and cost savings (Witthof 1997).

In a study produced by the National Association of State Highway and Transportation Unions, researchers explored the loss of technical expertise in state DOTs as a result of the contracting out of more work. The report also discusses the cost of outsourcing and the loss of accountability, because states are unable to apply quality control concerning consultants once the work has been contracted out (Kusnet 2002).

Randall Owen (2001) discusses the competition between a public-sector organization and a private-sector organization in a bid for vehicle maintenance in the city of Charlotte, North Carolina. The public-sector organization won the bid by incorporating private-sector practices into its organization. Owen advocates the use of competition to improve public-sector organization.

Transportation Research Board

For at least 15 years, the National Research Council, through TRB, has been involved in reviewing and analyzing the concept of outsourcing. Six studies sponsored by TRB were reviewed for this synthesis. The TRB studies focused on the policy issues pertaining to the use of private firms for preliminary engineering as opposed to the relative cost-effectiveness of this practice.

The first study in 1988 concluded, "The key to an adequate consultant management process is a capable agency staff. The importance of continual upgrading of in-house capability through internal and external training methods cannot be overemphasized" (Sternback 1988). More recently, a study done through NCHRP reviewed the topic of outsourcing with the goal of improving the management of state DOTs. The results revealed that the surveys and

internal study teams who have previously studied this question have come to conclusions based on personal judgment and insufficient data. The authors also noted that more study is really needed before drawing any major conclusions about outsourcing and its effectiveness (Hancher and Werkmeister 2001).

Legislative Audits

Another category of studies available on the subject of outsourcing engineering services pertains to those performed through a legislative audit format. These studies vary in their findings on the issues of cost-effectiveness, the quality of work performed by the private sector, and the relative success of outsourcing programs. Indeed, they seem almost equally balanced on either side of these issues.

An early legislative audit performed in Wisconsin found no cost difference between consultant-designed and in-house-designed projects. This same study also found the quality of work performed to be essentially the same (*An Evaluation . . .* 1990). A 1994 legislative audit performed on the Connecticut DOT concluded that outside consultants were more expensive than in-house personnel where projects had a construction value of less than \$5 million (*Analysis . . .* 1994). A legislative audit in Montana found that hourly costs for outsourced engineers were approximately 69% higher than for in-house employees, although the quality of consultant and in-house plans was comparable. Some outsourced projects were actually less expensive despite the Montana DOT's significant hourly rate advantage (Porter 1996). Finally, a study initiated by the Mississippi DOT (MDOT) in February 1998 noted, "Examining a set of comparative highway and bridge projects, we could find no substantial difference in the cost to MDOT in designing a project in-house versus by the private sector, either in actual total costs or in design costs as a percentage of construction costs" (Cameron and Donly 1998).

Many of the studies reviewed raise questions about the accuracy of the data used to perform the required analysis. For example, an audit report conducted on the North Carolina DOT (NCDOT) in 1992 concluded that, "We were unable to perform a comparison between the full cost of completing an engineering project in-house and contracting out a similar project because sufficient accounting data [are] not available" (Renfrow 1992). Additionally, according to this audit, "Interviews with Department personnel revealed that when the time budget for a project has been achieved, additional time on the project is usually charged to another project which has budget time remaining. This incorrect recording of project time distorts the information within the time management system and invalidates any analysis of the system's information" (Renfrow 1992). This situation is not unique to the NCDOT. A

legislative audit performed on the Texas DOT (TxDOT) outsourcing program concluded that the department's cost data had little value in evaluating the cost comparison between in-house and outsource engineering services (Alwin 1997). In addition, a 1997 audit in Wisconsin noted errors in coding hours worked on projects and found that some projects showed zero hours reported by state employees when they had actually worked on the project (*Management . . .* 1997). A comparative analysis by an internal DOT team in Missouri arrived at some project charges simply by polling district personnel for their opinion on the matter (*Design Cost . . .* 1992).

Outsourcing Costs

The studies reviewed for this synthesis include many attempts to ascertain the true value of the overhead burden borne by the state DOTs to make a fair and appropriate comparison of costs. There are differences of opinion about how to account for these costs. In addition, questions arise concerning utilization rates, how to account for non-project-related time for state employees in overhead, which management expenses can be distributed to projects by means of indirect overhead charges, proper accounting of insurance, utility and building expenses, and a variety of other factors. Ultimately, little agreement exists on these approaches, nor does any single approach surface as the defining model for this report.

Some of the research has examined management practices within state DOTs and has been critical of these activities. There were two audits performed on the Virginia DOT (VDOT). In the first audit performed in 1998 it was noted that, "Despite the fact that consultants are an increasingly significant mechanism through which VDOT accomplishes its work, the department does not adequately maintain and track meaningful consultant data to enable it to make sound decisions on consultant use" (*Review . . .* 1998). This report goes on to say that without such management systems in place, VDOT is in no position to determine the effectiveness of its outsourcing program. Another management issue was raised in other studies concerning the cost-estimating process for negotiating with selected consultants. An audit conducted in Delaware found that state employees were not using an independent written cost estimate before starting negotiations with a selected consultant (*Final Report* 1998). The same situation was noted in the 1997 Wisconsin audit, which found that state employees were not always following established procedures for estimating costs and negotiating contracts with consultants (*Management . . .* 1997).

This literature review has noted disparities between states concerning the actual cost of oversight for consultant engineering work. The Missouri study previously cited

polled state employees about the cost of oversight and other overhead charges related to preliminary engineering and concluded that in some cases it was approximately 30% (*Design Cost* . . . 1992). In North Carolina, NCDOT employees estimated their costs to supervise consultants to be approximately 5%, but the audit noted, “The time management system in place does not accurately capture employee time spent supervising consultant contracts. Therefore, we cannot accurately identify consultant supervision costs” (Renfrow 1992). Another study conducted in California concluded that California DOT employee charges accounted for 47.9% of all project costs for outsourced projects (Ashley et al. 1998).

For cost analysis of outsourcing versus in-house work, 80% of the studies done on the subject show that outsourcing of design work is more expensive than or as costly as in-house work. These studies varied as to the extent of the expense, claiming anywhere from 30% to 100%. Wilmot et al. (1999) did their cost comparison study for the Louisiana Department of Transportation and Development, adopting improved criteria, including using the same project to compare in-house and consultant design costs (instead of using similar projects). They performed a detailed analysis of overhead rates that are comparable between state and consultants, and measured comparative design costs as the ratio of in-house to consultant design costs, instead of the ratio of design to construction costs often used in past studies. Using these guidelines, the researchers found that the Louisiana Department of Transportation and Development had 20% higher costs for design work performed by consultants. The difference in cost was found to be mostly because of the increased cost of contract preparation and supervision of consultant designs.

Quality of Work

Questions have been raised over the years about the quality of the work performed by outsourced engineering services. The studies reviewed offer insight on this subject, including the early Wisconsin audit that reported, “We found no widespread evidence of poor consultant quality in contracted highway design projects” (*An Evaluation* . . . 1990). Additionally, the Montana audit performed in 1996 found that the quality of work performed by state personnel versus outside engineering firms was comparable (Porter 1996). In a 1987 study of outsourcing engineering by the TxDOT, the Center for Transportation Research concluded

there was no objective way to measure the quality of the work performed by consultants versus that of in-house-prepared plans (Ward 1987). Where an analysis was undertaken, the literature clearly indicates that consultant plans are at least equal to those produced in-house. Nowhere in the literature is there any indication of poor quality work on the part of private engineering firms performing work for state DOTs.

Level of Outsourcing

Some of the research reviewed focused on the level of outsourcing engineering services for state DOT projects. Some states outsource less than 10% of their program, whereas others outsource more than 75%. One report published in the *Professional Services Management Journal* attempted to determine an optimal level of outsourcing by comparing the cost of engineering with the total cost of construction for both in-house and outsourced projects. After reviewing 11 years of data from the FHWA, the authors concluded that states that contract out 50% to 70% of their engineering services have the lowest overall cost of engineering for their total program of projects. Those with less than 10% have the highest cost of engineering for their program (Fanning 1991).

The outsourcing of engineering services has been researched thoroughly over the years, and there has been much focus on the cost elements of this activity. However, two recent studies found that states primarily decide to outsource because of staffing constraints, increasing workloads, schedule considerations, or unique project requirements. It was noted that decisions to outsource are made with sensitivity to cost, but with recognition that there is probably no other way to deliver the projects (Witthford 1997, 1999).

The available literature is skewed toward outsourcing engineering services, with most of the other areas of outsourcing virtually neglected. In addition, the engineering services area is mostly studied from the cost comparison viewpoint and not with a view towards examining the quality of work performed. *NCHRP Synthesis 246* and this report probably represent the most comprehensive works on the subject of outsourcing with a broad look at the policy issues, procurement methods, satisfaction levels, quality of work performed, and program approaches. Coupled with the existing literature, these two NCHRP reports provide valuable insights into the practices of outsourcing in the states.

CURRENT PRACTICES IN OUTSOURCING HIGHWAY ACTIVITIES

This synthesis report focuses on the current outsourcing practices of state DOTs. A comparative review of the current data with the data from *NCHRP Synthesis 246* was undertaken to determine if there were any significant trends. In each subsequent chapter where data are reviewed, the current data will be presented and then compared with the earlier work as appropriate.

The two-part survey was sent to all 50 states and the District of Columbia, and 38 transportation agencies responded. The first part of the survey was designed to sample policy issues relating to outsourcing in the states. This chapter will review the survey results of the second part of the survey, which covered the following seven activity groups of outsourcing:

- Administration,
- Construction,
- Design,
- Maintenance,
- Operations,
- Planning, and
- Right-of-Way.

The original Witheford document (1997) referenced Construction Management, which in the current activity group will be noted as Construction. The activities within this group have not changed, and there is no substantive difference in the data collection process. Within the activity groups, the survey queried the states on outsourcing efforts relating to 31 activities as identified in *NCHRP Synthesis 246*. Not all states engage in outsourcing in all the major categories, nor do they all outsource in each of the subcategories. A complete listing of the seven activity groups and their respective activities is presented in Appendix A.

The questions relating to the activity groups of the survey were directed at the actual practice of outsourcing specific activities within a state DOT. For each outsourced activity, such as traffic surveys (found in the Planning activity group), a series of questions was posed to assess the nature and effectiveness of that particular activity. The following information was requested in each activity:

- Nature of the activity outsourced,
- Year that outsourcing began,
- Percentage of this activity outsourced,
- Whether the amount of outsourcing has changed during the last 5 years,
- Whether the amount of outsourcing would change in the next 2 years,
- Annual dollar volume outsourced,
- Types of contractors used,
- Nature of pre-award procedures,
- Nature of the selection process,
- Method of payment,
- Factors influencing the decision to outsource,
- Advantages of outsourcing this activity,
- Disadvantages of outsourcing this activity, and
- Overall satisfaction with outsourcing.

By evaluating the responses to these questions, it is possible to assess the characteristics of each outsourced activity and the effectiveness of that effort.

INITIATION OF OUTSOURCING

The first question posed to the DOTs concerned the decade in which the outsourcing activity began. Table 1 shows the breakdown by decade and by activity group. It should be noted that the amounts included in the table represent all

TABLE 1
DECADE OUTSOURCING BEGAN

Activity Group	1950–59	1960–69	1970–79	1980–89	1990–99	2000–02
Administration	0	1	6	3	21	11
Construction	3	1	2	8	9	5
Design	4	6	16	21	14	8
Maintenance	16	9	24	23	33	2
Operations	13	5	6	13	27	7
Planning	4	7	9	22	31	5
Right-of-way	7	10	16	21	31	11
Total Activities	47	39	79	111	166	49

the responses for a given activity group but do not necessarily represent the number of states responding. For example, in the area of Administration, there are 21 responses shown for the 1990s. This number reflects that a total of 21 activities were reported to have started during that time. However, there were actually 16 states reporting these 21 activities. Of interest is the sharp increase in outsourcing activities in the 1990s. With 49 newly outsourced activities already reported for that decade, the state DOTs are moving toward an even higher level of outsourcing in the future. This appears to be a reflection of policy direction, which will be discussed later in this report.

Perhaps more important than when the activities began to be contracted out is the information on trends that was obtained by the next four questions posed in the survey.

Tables 2–5 provide an insight into how much contracting out is being done by activity, by percent and level, plus both a 5-year “look back” and a 2-year “look ahead” into the amount of outsourcing that will be done.

PERCENTAGE OF ACTIVITIES OUTSOURCED

Table 2 contains information relating to the proportion by which a particular activity is outsourced. For example, some states outsource a major portion of their ITS activity. Again, the numbers presented in the table are a reflection of the total number of activities reported and are not a total of the states responding on a particular activity. Thus, it is possible for one state to have more than one activity shown in a given table. For example, one state may outsource

TABLE 2
PERCENTAGE OF ACTIVITIES OUTSOURCED

Activity Group	0–19%	20–39%	40–59%	60–79%	80–99%	100%
Administration	7	8	10	3	9	6
Construction	10	4	4	4	4	2
Design	19	18	15	11	8	3
Maintenance	29	14	15	15	25	11
Operations	14	5	6	7	22	23
Planning	7	6	12	8	27	12
Right-of-Way	23	25	11	8	21	9
Total Activities	109	80	73	56	116	66

TABLE 3
PERCENTAGE OF ACTIVITIES OUTSOURCED (1996 vs. 2002)

	0–19%		20–39%		40–59%		60–79%		80–99%		100%	
	1996	2002	1996	1996	1996	2002	1996	2002	1996	2002	1996	2002
Administration	4	7	6	8	7	10	1	3	4	9	1	6
Construction	14	10	3	4	3	4	3	4	1	4	0	2
Design	29	19	11	18	9	15	8	11	10	8	1	3
Maintenance	52	29	10	14	16	15	12	15	14	25	10	11
Operations	13	14	7	5	3	6	2	7	10	22	8	23
Planning	8	7	6	6	5	12	4	8	11	27	3	12
Right-of-Way	9	23	9	25	7	11	3	8	6	21	0	9
Other	6	—	4	—	0	—	2	—	6	—	15	—
Total Activities	135	109	56	80	50	73	35	56	62	116	38	66

TABLE 4
CHANGE IN LEVEL OF OUTSOURCING ACTIVITY OVER A 5-YEAR PERIOD,
1997–2001

Activity Group	Increased	Decreased	Same
Administration	23	8	15
Construction	19	1	8
Design	55	2	16
Maintenance	45	7	57
Operations	30	1	42
Planning	39	4	39
Right-of-Way	62	1	32
Total Activities	273 (54%)	24 (5%)	209 (41%)

TABLE 5
PREDICTED CHANGE IN LEVEL OF OUTSOURCING ACTIVITIES,
2002–2004

Activity Group	Increased	Decreased	Same
Administration	7	10	27
Construction	13	4	11
Design	18	16	34
Maintenance	32	6	71
Operations	15	4	50
Planning	24	7	51
Right-of-Way	39	10	46
Total Activities	148 (30%)	57 (11%)	290 (59%)

training and database management and may do so at two different levels. That situation would be shown in Table 2 as two different entries under the Administration activity group in the appropriate columns.

Some trends worth noting emerge from the data in this table. Only 66 of the 495 activities reported were 100% outsourced; representing 13% of the activities in which the states have decided to completely outsource the activity. Of these 66 activities, more than one-third were in the Operations activity group, and 6 of those were in the area of ITS. The following two conclusions may be drawn: (1) The states seem reluctant to give away all of an activity, with the exception of a trend in the ITS arena; and (2) If the activity requires expertise not likely to become common within the agency, then the decision may be to outsource the activity completely. On the other hand, if the state plans to develop the expertise in-house, then it would be less likely to outsource 100% of the work. It also should be noted that ITS represents a specialty skill set that might be difficult to establish within the state employment system of a DOT.

In examining data from *NCHRP Synthesis 246* and comparing it with the information gathered for this report, two findings become clear. Table 3 shows the relative percent values outsourced in each activity group for each of the studies. In both cases, the two most predominant categories are the 0% to 19% and 80% to 99% ranges. Additionally, the values in the other columns appear to stay relatively constant other than the increase already noted in the 100% column in this study. Comparison of the values for both studies across the entire table shows that there is clearly an upward trend in the amount of outsourcing being performed. That trend also reflects the policy shifts occurring in the various states.

CHANGES IN OUTSOURCING PRACTICES

One of the objectives of this study was to examine outsourcing practices in the states and to determine patterns or trends that might indicate the future of these activities. Two new questions were added to the survey to obtain such

information. The first one attempted to take a look back toward the time when *NCHRP Synthesis 246* was completed, to identify what has happened since then. The second question attempted to have the states predict, 2 years into the future, what will be happening in outsourcing in their state.

Table 4 shows the 5-year look back at state outsourcing activities. The data in this table show outsourcing in the states as having increased over the last 5 years. Indeed, only a scant 5% of the activities saw a decrease during this 5-year period. Meanwhile, 54% of the activities increased their level of outsourcing. By examining the number of activities that increased versus those that stayed the same, it may be noted that Design is the activity with the highest percentage increase in the last 5 years, whereas it also has the greatest difference between the “increasing” and “staying the same” categories. This result is probably a reflection of the increasing workload, which occurred in the outsourcing of design services due to the passage of the TEA-21.

Table 5 shows the predictions of survey respondents concerning the future of outsourcing in their states from 2002 to 2004. Some interesting facts emerge from these data and from comparing them with that found in Table 4. First, although the predicted number of those increasing activities clearly leads those that are declining, approximately 11% of the respondents did foresee a general decline in outsourcing. There was no clear trend in the survey data; rather, the decline was in isolated cases from different states. Examples of where there was a predicted decline included relocation, acquisitions, location, and traffic studies. In total, outsourcing in 59% of the activities will stay the same, whereas 30% will increase. The Administration activity group is the only one where an overall decline is anticipated in the next two years.

A comparative review of both tables indicates that there is an upward trend toward an increase in outsourcing, but that the trend was much steeper for the last 5 years than predicted for the next 2 years. Some activities, which were increasing in the past, are now declining or staying the same. Others currently staying the same will be declining in the future.

TABLE 6
ANNUAL EXPENDITURES (\$) FOR OUTSOURCED ACTIVITIES

Activity Group	0–99,000	100,000– 499,000	500,000– 999,000	1,000,000– 1,999,000	2,000,000– 4,999,000	5,000,000– 9,999,000	10,000,000+
Administration	12	23	1	1	2	1	2
Construction	4	9	2	2	3	3	3
Design	3	10	1	6	16	10	25
Maintenance	16	15	13	16	17	13	18
Operations	2	11	13	15	11	12	11
Planning	15	26	10	14	10	2	1
Right-of-Way	16	39	8	12	8	4	0
Total Activities	68 (14%)	133 (27%)	48 (10%)	66 (14%)	67 (14%)	45 (9%)	60 (12%)

Notes: All values are in 2002 dollars.

ANNUAL VOLUME OF OUTSOURCING

The annual volume of contracted-out activities was also measured in the survey. Table 6 reflects the values based on the activities reported and the dollar amounts outsourced on an annual basis. Right-of-Way has the most activities outsourced in the \$100,000 to \$499,000 range, followed by Planning and Administration. Not surprisingly, the numbers in Administration decline considerably after the \$499,000 level. In the upper ranges, there is a clear distinction between Design, Maintenance, and Operations for all three activity groups starting at \$2 million and moving higher. Some of the DOTs with activities rising above the \$10 million threshold are Maryland and West Virginia with their construction inspection programs, Washington State with its design efforts, and Florida with its materials testing activity.

Table C2 in Appendix C is from *NCHRP Synthesis 246* and can be compared with Table 6 to contrast the changes from 1996 through 2002. Caution should be exercised in this comparison, because the levels of funding from both reports were surveyed as ranges. Thus, direct comparison of the data from both tables should be done with the recognition that no adjustment for inflation, or its impact on the range boundaries, or other factors is possible given the manner in which the data are reported.

However, some comparison of the results from the current study with those of the earlier synthesis yields observations that are significant. In the \$10 million and above category, three activity groups had no reported activities: Administration, Planning, and Right-of-Way. In the current report, all activities except Right-of-Way show activity at the \$10 million and above level. In addition, Design has eclipsed Maintenance as the category with the highest volume of activity since the original study. Operations, hardly a strong area in the earlier report, is currently a much more significant player in the outsourcing world, owing largely to the amount of work outsourced in the ITS arena.

PREQUALIFICATION

In Table 7, the states' information reflects their patterns in whether or not they prequalify contractors. Here there is a

clear trend towards prequalification overall, but in some of the activity groups there is a fairly even split. For example, in Administration, the activities are almost equally divided, whereas in Right-of-Way, the majority of the providers of outsourced services are prequalified.

TABLE 7
PREQUALIFICATION OF CONTRACTORS

Activity Group	Prequalified?	
	Yes	No
Administration	23	20
Construction	11	11
Design	44	20
Maintenance	51	53
Operations	60	13
Planning	48	27
Right-of-Way	72	18
Total Activities	309 (66%)	162 (34%)

TABLE 8
HOW OUTSOURCED CONTRACTS ARE MANAGED

Activity Group	Central Management	Functional Unit	Both
Administration	11	5	24
Construction	10	3	13
Design	27	27	14
Maintenance	58	27	22
Operations	42	13	17
Planning	27	27	21
Right-of-Way	19	56	22
Total Activities	194 (40%)	158 (33%)	133 (27%)

CONTRACT MANAGEMENT

Management of outsourced contracts was another area sampled in the survey of the DOTs. The question was intended to determine which part of the state organization managed the contract and administered the provider. The data contained in Table 8 show results for all seven activity groups. In this case, the results are split between the three options with no single management location overwhelmingly predominant. The method selected for contract administration in the states depends on several factors, including the type of contract, organizational structure of the DOT (e.g., centralized or decentralized), and size of contract. No management method is used exclusively by a state for all of its outsourced activities.

CHAPTER FOUR

DECIDING TO OUTSOURCE

One of the major issues facing state DOTs is deciding when to outsource. Some activities are presented as a clear business case, such as highway construction projects, whereas others are less obvious, such as training activities. Ultimately, the decision to outsource becomes one unique to each state and its policies and circumstances.

Questions in both parts of the survey addressed the reasons behind the outsourcing decision in the states. The first part concentrated on specific policy issues and included a wider view of the outsourcing process in a given DOT. The second part concentrated on the reasons for outsourcing a particular activity.

DECISIONS BASED ON POLICY

The first two questions on the survey were intended to determine if actual policy issues drove the decision to outsource or whether other considerations resulted in a particular activity's being turned over to the private sector. In most cases, DOTs responded that no policy decisions influenced a widespread use of outsourcing.

South Carolina responded that it had specific legislation requiring the state to do more maintenance work through outsourcing processes. All other narrative responses from the states reflected no overt policy leading to a significant effort to outsource major portions of a state DOTs workload. Although the Florida DOT did not respond to this part of the survey directly, it is widely known that the department is undergoing significant outsourcing as a consequence of policy direction from its executive branch.

DECISIONS BASED ON OTHER FACTORS

Narrative responses to the first part of the survey netted additional information relating to the outsourcing decision. This information demonstrates that, in the absence of policy direction, other factors exert an influence.

The Connecticut DOT reported that its decision to contract out work was based on the following factors:

- Available staffing,
- Construction cost threshold—more than \$5 million favors contracting out,
- Complexity of the work/time line, and

- Specialized expertise.

Employees from Illinois indicated that they contract out most of their engineering services. This decision was driven by the lack of available resources, a need for outside expertise or equipment, and the need to meet specific time frames or achieve economic advantages.

In Tennessee, a lack of in-house staff, a lack of in-house expertise, and cost and time frames for accomplishing a project were all forces leading the DOT to outsource, even though it had no specific policy mandating that. Iowa identified in-house expertise and in-house workload as two factors in its decision.

The narrative in the survey was designed as a snapshot of the policy view toward outsourcing. A review of these responses makes it clear that several factors are consistently mentioned. The major factors influencing states to outsource activities traditionally done in-house are

- Lack of resources,
- Lack of specific skills or expertise,
- Meeting a schedule, and
- Saving money.

DECISIONS BASED ON A SPECIFIC ACTIVITY

The second part of the survey was designed to highlight information about specific outsourced activities to determine trends and characteristics. This section differs from the previous discussion of survey results, which focused on outsourcing from a policy viewpoint. Each of the 31 activities called for a response to a question about factors that led to the outsourcing of that particular activity. However, both parts of the survey were relevant to the topic of influences, because they help to reveal whether high-level or agencywide issues are involved or whether the factors that led to outsourcing were more activity specific.

Table 9 contains results for the activities queried. For some activities there were multiple responses, and for others there was no response at all. The reader should understand these data limitations and that there is not necessarily a one-to-one correlation between activities and the factors reported.

Some interesting observations can be made as the data are reviewed. First, although there seemed to be little

TABLE 9
FACTORS INFLUENCING THE DECISION TO OUTSOURCE (2002 vs. 1996)

Activity Group	Factors					
	Legal Requirement	Policy Direction	Staff Constraints	Cost Comparisons	Specialty Skills or Equipment	Other
Administration	7	10	32	6	28	0
Construction	1	6	24	1	12	1
Design	6	9	63	1	35	3
Maintenance	15	37	70	21	67	4
Operations	10	20	52	11	41	1
Planning	3	23	65	3	54	4
Right-of-Way	13	29	83	9	30	3
Total Activities	55	134	389	52	267	16
% Reported in 2002	6	15	42	6	29	2
% Reported in 1996	4	22	41	8	24	1

evidence of specific policy directives to outsource, for 15% of the activities, respondents felt that policy directives were involved. Alternatively, these data may be interpreted to mean that although agencywide directives were not involved, at a certain level in the agency, policies impacted specific activities.

Three areas were clearly less influential in making the decision to outsource these activities: legal requirements (6%), cost comparisons (6%), and other (2%). Even if their total of 14% were combined with the 15% for policy direction, the result would not represent even one-third of the activities surveyed.

The two most common factors influencing the decision to outsource were staff constraints (42%) and specialty skills (29%), which combine for a total of 71%. This outcome is not surprising when compared with information gathered in the narrative responses from the first part of the survey.

Some variations occur among specific activity groups. In all responses, staff constraints was the reason most frequently given for outsourcing. The percentage of activities within each of the activity groups that were influenced toward outsourcing by staff constraints ranged from a low of 31% for Maintenance to a high of 54% for Design. The second most frequently mentioned influence on outsourcing was specialty skills or equipment.

The subject of much of the literature reviewed for this report concerned state agencies' attempts to perform cost comparisons of in-house engineering work versus that performed through outsourcing methods. Great effort was made in these studies to review overhead rates, in-house and private labor rates, labor utilization rates, and other factors, to determine the cost-effectiveness of outsourcing.

Despite of these substantial studies to prove or disprove the cost-effectiveness of outsourcing engineering services, states are not making outsourcing decisions in Design based on cost. The data show cost comparisons ranking

just above other as the reason for outsourcing in activities reported. This dichotomy between the focus of the literature on cost and the actual reported frequency in the survey data is noteworthy. Most of the literature and studies are generated by outside organizations having a singular viewpoint of the decision to outsource: cost. On the other hand, the states must deal with an array of complexities including staff constraints, schedules, skill requirements, and workload in making their decision. Such responses from the states are an excellent reflection of the multidimensional nature of the decision to outsource.

TRENDS IN OUTSOURCING DECISION MAKING

In the original surveys for *NCHRP Synthesis 246*, DOTs were asked to identify factors influencing their decision to outsource. "Workload, described in various terms such as staff constraints or scheduling, appeared most often" (Witthoford 1997). A second most-often-mentioned factor in making the decision to outsource was the need for specialized skills. The factor of cost-effectiveness appeared in 14 of the 81 responses, or 17% of the time. Next came considerations such as quality, the need for a third party, or political pressure.

In comparing results from the earlier synthesis to those from this study, some similarities as well as some differences can be observed. The earlier survey results are presented in Table C4. Staff constraints and specialty skills remained the most often cited reasons for outsourcing, with a combined percentage of nearly 64%. Nevertheless, the consistency with which both these factors are mentioned as leading the decision-making process is significant. In the Witthoford study, policy direction was reported in 22% of the cases for outsourced activities, whereas data acquired for the current report revealed a value of 15%.

Also noteworthy is that cost-effectiveness ranked third in the earlier study, but now ranks fifth. In addition, although originally 8% of the DOTs cited cost-effectiveness as a reason for outsourcing, this number has now shrunk to

6%. The downward trend is significant for two reasons: first, because of the amount of the decline—a loss of two-thirds—and second, because this change occurred in such a short period of time between 1996 and 2002. The factor of cost-effectiveness is declining in importance to the DOTs in their basic decision to outsource selected activities.

The data from this survey reflect a strong tendency by DOTs to outsource as a result of staffing constraints. What is not clear from the survey responses is the cause and effect relationship between increased outsourcing and state staffing levels. Although it was not specifically sampled in the survey, that lack of adequate staff appears to be the

precipitating situation causing more outsourcing, as opposed to outsourcing's resulting in the need for less staff. The overall impact on staffing, new skill sets, management practices, and other ripple effects of outsourcing was not investigated as part of this synthesis report.

The discussion about why states outsource has been going on for many years. Studies have examined and will continue to examine the issue of cost-effectiveness. Nevertheless, to fully understand why a state chooses to outsource certain activities more than it does others, research must look beyond cost and review some of the other factors discussed in this report.

PROCURING AND ADMINISTERING OUTSOURCED SERVICES

Apart from examining the reasons for outsourcing, another purpose of this study was to identify the methods by which DOTs obtain services when they decide to outsource. The number of survey responses from the DOTs was gratifying, with nearly 500 individual outsourced activities reported on within the seven activity groups. The data volume has provided much valuable information about the types of contractors most frequently used for a particular service, method of procurement, how the payment process is structured, and management of the contract. This chapter examines the results of these responses.

TYPES OF CONTRACTORS

The survey data show that a wide variety of contractors provide services for the state DOTs. In concert with what had been undertaken for the preparation of *NCHRP Synthesis 246*, the survey offered the states six choices of contractors for each of the activities reported on.

- General Contractor,
- Specialty Contractor,
- Consultant,
- Minority/Disadvantaged Firm,
- Another Public Agency, and
- Other.

The raw data in Table 10 show the distribution of activities among different types of contractors. A summation of all activities reveals that the vast majority (82%) of outsourcing goes to General Contractors, Specialty Contractors, and Consultants. Perhaps the most interesting of the data elements in the table is the relatively high number of

outsourced activities actually going to Another Public Agency. At 8%, this represents a surprisingly sizeable portion of outsourced work. Valuable insights from these data can be gained from looking at the specific numbers for each category of contractor and relating them to the activities. For example, General Contractors were used in 14% of the activities outsourced. However, only one activity in Administration and two in Construction were reported to have used this type of contractor to perform their services. Only two Planning activities used a General Contractor and only six in the Right-of-Way activity group did. However, in the areas of Maintenance and Operations, General Contractors ranked second behind Specialty Contractors in the number of activities that were outsourced. The major point to be gleaned from this information is that the type of contractor used is very specific to the type of activity and that certain activities are more suited for a particular contractor type.

Two of the most routinely used providers of outsourced services are Consultants, with 37% of the activities, and Specialty Contractors, with 31%. Each has broad penetration in the outsourcing market among state DOTs except for certain categories. That is, consultants have a single reported role in the area of Maintenance, and Specialty Contractors have only a small share of the Design and Construction activity groups.

In considering the types of activities outsourced, it is clear why Specialty Contractor ranks high in many areas but lower in others. As presented in the previous chapter, one of the reasons that DOTs outsource is their need for specialized skills or equipment, which logically implies the need for a Specialty Contractor. In addition, the nature of

TABLE 10
TYPE OF CONTRACTORS (1996 vs. 2002)

Activity Group	General Contractor	Specialty Contractor	Consultant	Minority Contractor	Another Public Agency	Other
Administration	2	12	13	2	7	1
Construction	3	5	20	2	4	0
Design	10	9	59	4	1	1
Maintenance	57	62	5	6	8	2
Operations	18	32	6	2	0	0
Planning	4	12	19	0	12	6
Right-of-Way	1	19	18	0	0	0
Other	9	15	9	6	2	4
Total Activities	104	166	149	22	34	14
% Reported in 1996	21	34	30	5	7	3
% Reported in 2002	14	31	37	7	8	3

the services provided by Consultants makes their suitability for Maintenance activities very low.

The most common activity group for Consultants was Design. Within the Design activity group were a number of areas wherein this type of firm did a large portion of the outsourced work. In order of frequency, Consultants were used most often in

- Environmental impact studies,
- Engineering/design,
- Plans and specifications, and
- Locations.

There may have been some overlap in responses relating to engineering/design as well as plans and specifications. The original study examined plans and specifications only and not engineering/design. However, in this current study, it was felt that there were some engineering/design activities, such as geotechnical studies, drainage studies, and others that were not fully captured in the description given by plans and specifications. Analysis of the particular data must be done in that context.

For Specialty Contractors, the most commonly outsourced activities were found in Maintenance. The activities most often using this type of contractor were

- Roadside,
- Bridges,
- Traffic signals, and
- Traffic signs.

The activities under Another Public Agency that were outsourced by state DOTs merit further attention. For example, the Administration activity group received 12 responses, with the most commonly cited activities including training and database management. It is clear that other public agencies are also involved in Planning (21 activities cited) and Maintenance (14 activities cited). The most common activities under each of these activity groups were as follows:

- Planning
 - Traffic surveys,
 - Nonhighway activities,
 - Traffic studies, and
 - Research.
- Maintenance
 - Traffic signals,
 - Roadside maintenance, and
 - Traffic signs.

Table 10 also shows results from *NCHRP Synthesis 246* relating to the frequency of use for different contractor types. Note that the ranking for each type of contractor has not changed, nor has there been a significant change in

frequency for any contractor types. Ultimately, it is the type of activity that influences the type of contractor selected for a particular outsourced service.

SELECTION METHODOLOGY

The selection methodology for a particular activity was also sampled in this study. With a wide variety of activities being outsourced and a number of methods available for this procurement, the intent was to determine trends in that significant aspect of outsourcing. The survey presented the DOTs with five choices for selection method.

- Low bid—Selection is based on price alone.
- Negotiated agreement—This method is a hybrid between the consultant and sole source processes; however, it occurs often enough as to merit its own category.
- Consultant—This method is based on the federal legislation often referred to as the Brooks Act, which requires that engineering services be procured based on qualifications and not on price. From this act came the principle of Qualifications Based Selection (QBS), which is used in most states to select consulting services.
- Sole source—This method is used when a specific vendor or service provider is desired. The vendor usually offers a very specific skill or knowledge that may be unique and not readily available from other vendors. Generally, a laborious process is employed for procuring services in this method because of strict procurement codes in the states.
- Other—This method pertains to any other procurement method not specifically mentioned in the other four categories.

Table 11 shows the data gathered for the *NCHRP Synthesis 246* study in aggregate format. Four choices (including “other”) were given to the DOTs regarding the selection method used. The table also shows the data gathered as part of this study, which added a fifth category of selection method, consultant. With many contracts going through a QBS process, it appeared that this additional category would be relevant to the overall selection methodology.

A review and comparison of the data from both studies show consistency between the two in the selection methods used by the DOTs. For example, a majority of the procurements are done through low bid, negotiated agreement, and consultant in this study, as well as low bid and negotiated agreement in the earlier study. In both cases, sole source and other are cited less frequently.

The analysis performed for selection method is similar to that performed for type of contractor review. Again,

TABLE 11
CONTRACTOR SELECTION METHOD (1996 vs. 2002)

Activity Group	Low Bid	Negotiated Agreement	Consultant	Sole Source	Other
Administration	9	16	20	14	2
Construction	7	5	15	2	2
Design	4	36	40	3	3
Maintenance	92	15	0	4	5
Operations	55	16	7	3	7
Planning	5	40	38	19	7
Right-of-Way	33	51	15	13	15
Total Activities	205	179	135	58	41
% Reported in 1996	43	45	5	7	—
% Reported in 2002	33	29	22	9	7

which selection method to use is determined by the type of activity being outsourced. For example, the low bid method is used very heavily in the Maintenance activity group, where activities such as grass cutting, litter removal, and others are more conducive to a straight evaluation by price. On the other hand, activities in the Administration activity group such as database management and staff programs are based more on value and deliverability and less on price, thus showing a tendency toward the consultant method.

In the case of the consultant selection methods, including QBS, the most frequently cited activities were in the Planning and Design activity groups, with some distribution in Administration, Construction, Operations, and Right-of-Way. Historically, sole source procurements are used judiciously in state DOTs. This is confirmed in both this study and the work performed for the earlier synthesis. The Planning activity group showed the highest frequency of sole source procurement, although the most frequently outsourced activities were procured using negotiated agreement. Therefore, even in the activity group in which sole source is the most prevalent method, the most frequently outsourced activities do not use this procurement method. This situation further confirms the conclusion that sole source is reserved for very specific circumstances and is a distant fourth as a method of procurement. From the survey results, it was found that the area of training within the Administrative activity group was the activity that was most often procured using the sole source method.

PAYMENT METHODS

Payment for services is another attribute of outsourcing that differs from activity to activity. For the purposes of both the previous synthesis and this study, the following five payment methods were examined within the scope of each of the 31 activities surveyed:

- **Unit price**—Payment is made to the contractor based on an agreed upon price per unit of work performed. For example, this may be payment for 1 mi of litter pickup or a payment per right-of-way appraisal performed.

- **Lump sum**—This is a method of compensating the contractor for a defined amount of work. Final payment is agreed upon as a fixed amount, and no other compensation is offered or available.
- **Cost plus**—This method establishes an agreed upon process in accounting for the direct costs of performing the outsourced work. Also, a modifier is established to account for overhead expenses, profit, and other indirect costs.
- **Hourly rate**—This method consists of an agreed upon hourly rate combining direct costs, indirect costs, and profit as a unit that has been condensed to an hourly rate to be charged for the work performed. No other charges or costs are considered, because everything is included at the hourly rate.
- **Other**—Other methods of payment exist; however, they are generally hybrids of the previous categories.

The survey results for payment method are found in Table 12. The two most common methods of payment for outsourced services are unit price and lump sum. These two methods combined account for more than 62% of the 495 activities reported on by the states. To a lesser extent, cost plus and hourly rate were also used with a combined frequency of 35%.

An examination of the data reveals that most activity groups use a variety of methods for payment. The type of activity appears to be the most important predictor of payment method. For example, in the Maintenance activity group are activities more commonly procured using a low bid method, whose price and payment structure follows the unit price format. In the Design activity group, the most frequently outsourced activities use cost plus, with the exception of design/build, where the payment method is lump sum. This finding reflects that different procurement methods are used in the design/build segment of outsourced activities.

By a wide margin, the Operations activity group has unit price as its most common form of payment. An examination of the most frequently outsourced activities in Operations

TABLE 12
CONTRACTOR PAYMENT METHOD

Activity Group	Unit Price	Lump Sum	Cost Plus	Hourly Rate	Other
Administration	17	20	7	20	3
Construction	9	4	12	8	2
Design	5	24	43	11	5
Maintenance	80	22	3	19	4
Operations	54	14	9	4	4
Planning	15	44	31	20	3
Right-of-Way	53	29	6	22	1
Total Activities	233 (37%)	157 (25%)	111 (18%)	104 (17%)	22 (3%)

(pavement markings, signal installation, and ITS) indicates why this is so. All of these activities lend themselves to a unit price format for payment.

The Design and Planning activity groups have the broadest cross section of payment methods among the seven groups. Although hourly rate and unit price rank third and fourth for both activity groups, it is useful to ob-

serve that some activities within those groups still use the two methods. However, the activities paid for by using these two methods rank very low in frequency among the overall list of outsourced activities in each group. As with the other facets of outsourcing reviewed in this survey, payment method reflects trends in the states. The type of activity being outsourced continues to influence the payment method used.

EFFECTIVENESS OF OUTSOURCING

The effectiveness of outsourcing is the subject of much discussion and consideration in public transportation. However, the challenge of determining effectiveness lies in how it is defined. Definitions vary from DOT to DOT and may be different within activity groups depending on the activity being outsourced. Some examples of effectiveness measures are

- Cost-effectiveness,
- Schedule constraints,
- Product delivery,
- Compliance with legal requirements, and
- Fulfilling legislative or executive intent.

Although not all of these definitions are relevant to each activity being outsourced, each is a possible element in the decision about whether an activity has been successfully or effectively outsourced.

COST-EFFECTIVENESS

Even within these definitions, variations arise in the interpretation of effectiveness. For example, it might be suggested that if the cost-effectiveness concept were used to measure success, then it would be achieved only if the outsourced activity were to cost less than it would if provided by in-house employees. That may not always be the case.

This study shows at least two approaches to examining outsourcing and evaluating cost-effectiveness. The first considers the cost of outsourced versus in-house services in terms of an immediate or “current cost.” In this case, direct costs of labor, equipment, and overhead between the private sector and in-house resources are considered. The two values are compared and a conclusion is reached.

A second approach to cost-effectiveness goes beyond the current cost associated with outsourcing and examines the life-cycle cost of the decision. The life-cycle approach considers expenses associated with the current cost of both private and public efforts and then adds in long-term costs incurred by both approaches. In the public-sector case, costs associated with labor and overhead continue to accrue as long as those resources (employees and equipment) are a part of the organization. For outsourced services, once the task is completed, then the private company, its employees, and equipment go away. Many would propose

that the only way to make a valid case on the cost-effectiveness of outsourcing is to use the life-cycle approach.

A discussion of cost-effectiveness goes beyond the basic analysis of direct and indirect costs of private versus public delivery of products and services. Perhaps the most significant cost for delivery of a project relates to the delivery deadline. For example, if there is a project requiring engineering/design work, a DOT will have to decide whether to perform the work in-house or outsource it to an engineering firm. Direct analysis of costs may show that this type of design work could be performed for less money by in-house staff, but that work might be delayed because of a heavy project backlog. When such a project is delayed, additional costs must be considered. For example, there can be an inflation increase to the construction costs and also a relative increase in design costs. All together, they represent larger cost factors than the small incremental increases that might be incurred with outsourced engineering/design. The argument that the public sector is cheaper and should therefore perform all activities loses its validity if state forces are unable to perform the work for some period because of workload constraints.

SCHEDULE CONSTRAINTS

Many states cited staffing issues as a reason to outsource agency activities. DOT comments often reflected a need to complete projects within a given time, but also frustration that in-house resources were not adequate. Not having the luxury of sufficient time, they turn to outsourcing to achieve the goal of delivering a product or service. Therefore, schedule constraints, although not always mentioned, are implied in a response relating to staffing shortages. If an agency defines success as adhering to certain time lines, then an outsourced activity delivering within those time lines could be considered a success.

PRODUCT DELIVERY

Product delivery is another area commonly mentioned among survey responses. Some DOTs are under pressure to deliver products and services for which they are not equipped. For example, some DOTs are unable to accommodate networking or database activities incident to information technology functions. As a result, they then out-

source these activities. Some of the activities in the Operations activity group, such as those dealing with ITS, also fall within this scenario. Effectiveness of the activity is gauged by the success of the private contractor in accomplishing a task the state was unable to perform.

LEGAL REQUIREMENTS

Sometimes legal requirements motivate DOTs to outsource; therefore, a new definition of success emerges in those states. For example, in South Carolina, legislation has mandated an increasing amount of privatization in maintenance operations. In Washington, Arizona, and Utah, statutory limits exist on the amount of work maintenance forces can perform. Anything exceeding that amount must be outsourced. In defining effectiveness in these situations, compliance with the law and successful product delivery become major considerations for evaluating success.

LEGISLATIVE OR EXECUTIVE INTENT

Fulfilling legislative or executive intent is another measure of effectiveness in evaluating outsourced activities. For example, the Florida DOT was recently required by the governor to achieve a 25% reduction in staff over a 3-year period. With new funding from TEA-21 and state sources, the DOT has had to increase the amount of outsourcing. In addition to increasing the number of firms hired directly to complete Florida's work, the DOT has undertaken the largest design/build program in the country. Design/build, using a team consisting of a contractor and an engineer, has thus been used to deal effectively with one major consequence of executive intent. Other states such as South Dakota and Iowa have undergone similar staff reductions, resulting in increased outsourcing to accommodate their workloads.

SATISFACTION WITH OUTSOURCING

This project and the results from *NCHRP Synthesis 246* indicate varying levels of satisfaction with outsourced activities. In both surveys, respondents were asked if they were satisfied with their outsourcing efforts. In *NCHRP Synthesis 246*, the vast majority responded in the affirmative. Responses from DOTs to this project survey included states' satisfaction with the outsourced activity. Table 13 includes a summary of the satisfaction ratings for all seven activity groups and their principal activities, using a numerical score of from 1 to 10, with 10 signifying the highest level of satisfaction. No numerical data were collected

ranking satisfaction for the earlier synthesis, therefore, no comparisons will be made here.

TABLE 13
SATISFACTION LEVELS WITH OUTSOURCED
ACTIVITIES

Satisfaction Levels	Rating
Administration	7.69
Construction	6.75
Design	7.05
Maintenance	7.55
Operations	7.55
Planning	7.19
Right-of-Way	6.61
Average	7.20

A review of the activity groups shows that Administration, Maintenance, and Operations ranked higher than the other groups in this evaluation. On the other hand, Construction and Right-of-Way were ranked last, with average ratings of 6.75 and 6.61, respectively, out of a possible 10. The average of all ratings reported was 7.20.

The data reveal high and low scores for each activity. No activity received a low satisfaction rating of 1, although a few activities recorded a rating of 10. The highest rated activity was staff programs, with an average of 9.0. The lowest rated activity was relocation in the Right-of-Way activity group, at 5.57. Database management was the second lowest, with a rating of 6.0. A complete listing of each activity within the seven activity groups is provided in Appendix C.

For two activity groups, Maintenance and Operations, states reported using primarily low bid as the basis for selection. In the industry there are arguments for and against the use of the low bid method. Those in favor cite the ability to receive the most competitive price, the avoidance of any procurement problems and favoritism, and a long history of successes. Groups opposed to the low bid method feel that the owner receives more value when not always constrained to the low bidder, and that the low bid environment encourages mediocrity. The survey data reflect high levels of state satisfaction with the use of low bids in these two categories than for all other activity groups, with the exception of Administration. The results of this survey do support the arguments made by those in favor of the low bid method of selection.

Throughout the DOT survey responses there is a strong trend toward future outsourcing owing to staff constraints and the need for specialized skills or equipment. Contrasted with the average ratings reflected for most of the activities, it is clear that overwhelming satisfaction is not a driving force behind the decision to outsource.

MOST COMMONLY OUTSOURCED ACTIVITIES AND THEIR ATTRIBUTES

This study attempted to obtain the most comprehensive collection of data possible relating to the subject of outsourcing. State transportation agencies detailed nearly 500 activities, providing a wealth of information about outsourcing, both by state and collectively. The information was reviewed for trends, common themes, and characteristics, and to present additional insight. This chapter summarizes these trends, themes, and characteristics.

APPROACH

For the purposes of this chapter it was necessary to separate each activity group and review their individual activities. Data were sorted to determine which activities were most often outsourced. Not all activity groups had the same number of responses, nor were they all the same in terms of the number of activities emerging as most common. Therefore, in some cases, observations showed two activities in one activity group, whereas other groups yielded up to seven. Each activity group is then shown with the most frequently outsourced activities, with conclusions offered as appropriate.

ADMINISTRATION

The following three specific activities emerged from a review of the survey responses:

- Training,
- Staff programs, and
- Database management.

In all, 16 DOTs reported outsourcing these activities, representing 42% of the responding states. The aggregate of all survey responses revealed a number of consistent characteristics, which will be presented here. This pattern of review will follow for each of the seven activity groups. The volume of contracting out depends on the type of service. Training is on the high end (40–59%), whereas database management is split between the low end (0–19%) and the high end (40–59%), depending on the state responding. The dollar value of outsourced work performed under these private contracts is between \$100,000 and \$499,000, and states anticipate that this level would remain about the same for the next 2 years.

Relative uniformity exists in the contracting process and provider type for activities within the Administrative activity

group. For example, services are generally provided by a consultant that has gone through a form of consultant selection process, such as QBS. In addition, management is done both by local units (a district or region) and the central agency office. The method of payment for both staff programs and database management is done on an hourly basis, reflecting what could be concluded as both an inability to define scope and the need for flexibility in staffing levels for these services. On the other hand, payment for training activities is made by lump sum, indicating what could be concluded as the ability to define a specific deliverable and time frame to the point of reducing pricing complexities.

CONSTRUCTION

The Construction activity group has two activities, construction engineering and materials testing, emerging as the most commonly outsourced among the DOTs.

A total of 24 DOTs outsource one or both of these activities, representing 63% of all DOTs responding to the survey. For construction engineering, the dominant amount outsourced was in the 0% to 19% range, which probably reflects that most DOTs continue to assign field inspection and engineering work to their own employees. The dollar amount mentioned most consistently was between \$100,000 and \$499,000 in annual volume; however, several states are outsourcing more than \$1 million annually in this area. DOTs foresee that this activity will increase in volume in the next 2 years.

From the survey responses it was determined that construction engineering most often is done by a consultant that has been prequalified and is paid by a cost plus contract. The most common reason cited for outsourcing construction engineering is staff constraints.

In examining materials testing it was found that a higher percentage of work is contracted out (60–79%), but that the annual dollar amount is approximately the same. DOTs anticipate that these amounts will remain about the same for the next 2 years. Other important characteristics of materials testing are that it is usually performed by a consultant that may be paid hourly and that was selected by either low bid or through a consultant process. Again, the most frequently cited reason for outsourcing this activity is staff constraints.

DESIGN

The Design activity group has many and varied responses and much diversity among the activities that were reported on. The seven most often cited were

- Surveying and mapping,
- Location studies,
- Plans and specifications,
- Environmental impact studies,
- Design/build,
- Program management, and
- Engineering/design.

A total of 14 DOTs reported outsourcing one or more of these activities. The amount of outsourcing varies by activity with design/build and program management on the low end at 0% to 19% and environmental impact studies on the opposite end, with some reports as high as 80% to 99%. Except for design/build and engineering/design, the DOTs anticipate the level of outsourcing to remain about the same for the next 2 years for the Design activity group.

A distinct difference between the Design activity group and the others is the dollar amounts involved. Three of the seven predominant activities reported by the DOTs, environmental impact studies, design/build, and engineering/design, showed annual amounts in excess of \$10 million, although the design/build numbers may be skewed because they are inseparable from the construction or capital work associated with the projects involved. Nevertheless, the significance in volume for all three should be noted.

In the Design activity group the most frequently reported activities are performed by consultants that had been prequalified. Hiring would be through the consultant or negotiated agreement method, with the exception of the design/build activity, which would generally be awarded through a low bid. Again, the combining of both design and construction in the design/build area causes this anomaly in the results. Such contracts are also unique in that they are most likely to be paid as cost plus, whereas such is not the case with most of the other regularly outsourced activities.

The reason repeatedly cited for outsourcing activities in the Design activity group is staff constraints, with some mention of policy directive for design/build.

MAINTENANCE

The Maintenance activity group includes the following six activities that were mentioned with high frequency:

- Roadway surface,
- Roadside,

- Drainage,
- Bridges,
- Traffic signals, and
- Traffic signs.

A review of the basic characteristics of these activities reveals considerable homogeneity. For example, they all report their expected future level of outsourcing to be about the same as it is now. All activities are performed by either general contractors or specialty contractors. Their contracts are awarded based on a low bid and they are paid by unit price. Reasons for outsourcing in the Maintenance activity group are specialty skills or equipment and staff constraints.

In several other characteristics these activities did differ from one to another. For example, they are about evenly split on whether or not the potential contractors would be prequalified. The percentage of work outsourced varied from activity to activity, with roadway surface in the 80% to 99% range and drainage, traffic signals, and traffic signs in the 0% to 19% range. The others fell in between these two values. Annual volumes also varied considerably, from drainage, showing a \$0 to \$99,000 annual amount, to roadway surface, with an amount of more than \$10 million.

OPERATIONS

The following six activities are frequently mentioned in the survey responses with regard to Operations:

- Pavement markings,
- Signal installation,
- Sign installation,
- ITS,
- Toll collection, and
- Traffic information services.

The grouping of ITS (80–99%), toll collection (100%), and traffic information services (100%) represents the activities with the highest percentage outsourced among all the groups in the survey. However, even though the percentage outsourced is high for these three activities, dollar volumes are relatively low, with the exception of a report on ITS outsourcing from Arizona, where the annual amount reported was in excess of \$10 million.

Substantial consistency exists among these six activities in terms of other features. For example, they all use specialty contractors, they all go through a prequalification process, unit price is the method of payment, and the reasons for outsourcing these activities fall into two categories, staff constraints and the need for specialty skills or equipment. In addition, the DOTs anticipate the level of outsourcing in the Operations activity group as remaining approximately the same over the next 2 years.

PLANNING

The Planning activity group received more than 20 responses. Review showed that the following four activities are the most frequently outsourced among the states.

- Traffic surveys,
- Nonhighway studies,
- Traffic studies, and
- Research.

Each of these activities is outsourced in the 80% to 99% range and at dollar levels of \$100,000 to \$499,000 for the first three and \$1 million to \$1.99 million for research. In all cases, consultants are used to provide these services, and their selection is either through a negotiated agreement or consultant process. The most commonly stated reasons for outsourcing these activities are staff constraints and specialty skills or equipment.

These activities within the Planning activity group reflect the most variation in payment method of any of the groups. Depending on the activity, the method of payment could be unit price, cost plus, or lump sum.

RIGHT-OF-WAY

The final activity group considered is Right-of-Way. Facing higher program dollar amounts and consequential demands for service, DOT right-of-way sections are increasingly turning to outsourcing. The three activities most often reported by the DOTs are

- Appraisals,
- Acquisitions, and
- Relocation.

Appraisals had the highest percentage outsourced, at 80% to 99%, whereas the other two, acquisitions and relocations, were reported at 0% to 19% and 20% to 39%,

respectively. All three have annual dollar volumes of less than \$499,000. DOTs anticipate that outsourcing of acquisitions and relocation will increase in the next 2 years, whereas appraisals are expected to stay about the same.

In all cases, the most common means of providing these services is through a consultant that has been prequalified and that is being paid by the unit price method. The only reason reported for outsourcing these three activities is staff constraints. The selection method is by negotiated agreement, although in some cases for appraisals it is by low bid.

OBSERVATIONS

The following observations may be made from data received from the DOTs on all seven activity groups and the most frequently outsourced activities. First, the consistency within the activity groups reflects many commonalities among the individual activities. Second, the methods of selection and payment have great similarity for specific activities from DOT to DOT. Clear patterns exist in almost all the activity groups in areas such as the type of contractor selected and whether or not the contractor is prequalified. Probably most striking among all seven activity groups are the responses from the DOTs pertaining to influencing factors for deciding to outsource these common activities. The results of both studies reflect that the principal reasons for outsourcing these activities were staff constraints and the need for specialty skills or equipment. None of the other influencing factors mentioned in responses to this survey are given for the activities most often outsourced.

There is much to learn and understand from these activity groups and these outsourcing activities. The public sector can model programs based on the successes reported. For the private sector, there is significant value in knowing how these programs are established and in understanding their characteristics.

CONCLUSIONS

The passage of the Transportation Equity Act for the 21st Century (TEA-21) increased state capital improvement expenditures by an average of 44% in basic programs and to more than 50% if RABA (Revenue Aligned Budget Authority—a complex mechanism tying highway funding to fuel tax receipts) adjustments are included. This new federal money, coupled with additional state revenues, has increased state highway program funding to record levels. With growing expenditures comes a relative increase in all other programs within a state department of transportation (DOT). The ability of DOTs to contract with the private sector for specific activities allows them to address this ever-increasing demand on in-house resources.

This project report is an update of *NCHRP Synthesis 246: Outsourcing of State Highway Facilities and Services*. Trends identified in the 1997 study are further confirmed by the results of this project: state DOTs continue to use outsourcing as an integral tool for delivering products and services to their citizens.

Several trends emerged from reviewing the data compiled for this study. First, and perhaps most fundamental, is that 95% of all the activities sampled grew or stayed at the same high levels during the last 5 years. In addition, 89% are anticipated to continue at the same or increasing levels in the next 2 years.

DOTs outsource a variety of activities, ranging from the simplest of tasks, such as litter removal, to the most complex computer or engineering activity. The lack of sufficient staff and the right combination of skills are the predominant forces motivating states to outsource. Cost-effectiveness was infrequently mentioned as a reason for outsourcing.

Past studies and reports have focused on a variety of the attributes of outsourcing, including policy issues and cost-

effectiveness. Many efforts have attempted to compare the cost of outsourced engineering to in-house efforts. However, no study emerges as the defining work on the subject of cost-effectiveness. What is most evident from these published reports is the complexity of comparing in-house costs and outsourced expenses, as well as the lack of sufficiently accurate data from which to draw definitive conclusions.

Each DOT attempts to secure the most advantageous business relationship with the private sector through a variety of tools, including prequalification, specific selection processes, contracting methodology, and the method of payment. The data reflect that the means and methods for selecting and managing a private contractor are unique to the activity being outsourced. On the other hand, there is a high level of correlation among similar activities in their attributes and the practices used by the DOTs to secure and administer these services.

Measuring the effectiveness of outsourcing efforts is done in a variety of ways. The reported overall satisfaction across the seven activity groups was 7.2 on a scale of 1 to 10 (with 10 being very satisfied), ranging from 6.61 to 7.69. Other measures of effectiveness come in the form of successful program delivery, fulfilling schedule commitments, an ability to bring complex projects to fruition, and meeting legal requirements. As each of these elements is achieved, the DOTs can define the activity as successful. Ultimately, effectiveness is defined by each agency and is often related to the unique circumstances in a given state.

Outsourcing will continue to be a part of state DOT efforts to deliver projects and services to their constituencies. These practices will continue to mature and improve as they become more common and routine in the day-to-day business practice in the DOTs.

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APPENDIX A

Survey Questionnaire

PART 1

SECTION ONE—DETERMINING WHETHER TO CONTRACT

1. Are some activities contracted out because of legal or policy requirements? If so, please describe the activities and nature of the requirements.
2. What other considerations either force or encourage a decision to contract out?
3. What cost comparison analyses are used in the decision process and what items are typically included? (Please provide sample forms if used.)
4. Are other standard procedures used to determine whether to contract out an activity? Please describe and/or provide sample forms.
5. What factors or considerations, if any, work against a decision to contract out an activity?
6. Do current policies or legislation suggest that a greater amount of contracting out of highway services will occur in the future?

SECTION TWO—CONTRACTING PROCEDURES

PRE-AWARD STAGE

1. Please check methods by which contract services are obtained:
 - a. Low bid
 - b. Negotiate fee
 - c. Sole source
 - d. Other (please describe)
2. How are risk sharing and/or liability questions resolved in the contracting process?
3. If alternative bids or value engineering proposals by contractors are permitted, please describe any related restrictions, criteria, and specifications that apply.
4. What incentives/disincentives (e.g., liquidated damages) are typically part of contract time controls?

POST-AWARD STAGE

1. Does the location (i.e., central administration or functional division) of contract management (e.g., management of change orders, claim evaluation, payments, incentives/disincentive, etc.) vary according to the type of contract (e.g., low bid, negotiated fee, etc.) or nature of activity being contacted? Please give examples.
2. Is contract monitoring (inspection, sampling, testing, other quality assurance) performed by functional divisions or other departmental units? Please describe.

3. What procedures exist to deal with inadequate performance, lack or responsiveness, or delays in completion by contractors? Who implements them? Please describe.
4. Which departmental units are responsible for contract completion and acceptance procedures, and administration of guarantees and warranties?
5. Are procedures for contractor performance evaluation formalized? (Please provide sample forms if used.)
6. How are such evaluation reports subsequently used, as in pre-qualification procedures, for example?

SECTION THREE—EVALUATION OF CONTRACTING PROGRAMS

1. Is the Department satisfied with results obtained from contracted services? (1 is not satisfied, 10 is totally satisfied.)
2. Please identify the general benefits from contracting out that typically ensue to the following groups:
 - a. To the Department
 - b. To the contracting industry
 - c. To the general public
3. Are some contracted activities more successful at providing benefits than others? If so, which?
4. Does the type of contractor chosen (e.g., general, specialty, minority, another public agency, nonprofit private organization, etc.) affect the success achieved? If so, which choices provide the greatest benefits?
5. Does the contracting method used (e.g., low bid, sole source, negotiated fee, etc.) influence the levels of success achieved? If so, which methods produce the greatest benefits?
6. What problems have been experienced as a result of contracting out highway services? Can problems be related to any of the following influences?

The type of activity contracted? If so, which?

The type of contractor chosen? If so, which?

The selected contracting method? If so, which?

The contract management procedures? If so, which?
7. Are cost-effectiveness or cost/benefit analyses used to compare the success of contracting programs with in-house performance of the same tasks? Can examples of such comparative studies be provided?
8. Have studies evaluated the impact of contracting out on the size and makeup of departmental staffs? Are such findings available?

SECTION FOUR—PUBLIC–PRIVATE PARTNERSHIPS AND OTHER SPECIAL CASES

1. Does special legislation exist to facilitate the development of public–private partnerships?
2. Please identify any projects that might be characterized as public–private partnerships (e.g., private toll roads, turnkey projects, joint development, etc.).
3. Can detailed information or reference material be provided for review?

4. Does the state provide contracted services to the private sector in any partnerships?

PART 2

ACTIVITIES

Each of the activities in the following list was surveyed using the survey document beginning on the following page.

Administration

- Training
- Staff Programs
- Database Management
- Other

Construction

- Construction Engineering/Inspection
- Materials Testing
- Other

Design

- Surveying and Mapping
- Location Studies
- Engineering/Design
- Environmental Impact Studies
- Design/Build (program management)
- Program Management (non-Design/Build)
- Other

Maintenance

- Roadway Surfaces
- Shoulders
- Roadside
- Drainage
- Bridges
- Traffic Signals
- Traffic Signs
- Other

Operations

- Pavement Markings
- Sign Installation
- Signal Installation
- Intelligent Transportation Systems
- Traffic Information Services
- Toll Collection
- Other

Planning

- Non-Highway Studies
- Traffic Surveys
- Traffic Studies
- Research Projects
- Other

Right-of-Way

- Appraisals
- Acquisitions
- Relocations
- Other

PART 2**SURVEY DOCUMENT**

- a. Please describe the activities outsourced.

- b. Year begun:

1950s	1960s	1970s	1980s	1990s	2000s

- c. Percent contracted:

0–19%	20–39%	40–59%	60–79%	80–99%	100%

- d. Has the amount of outsourcing done for this activity changed in the last 5 years?

Increased	Decreased	Stayed the same

- e. Will the amount of outsourcing done for this activity change in the next 2 years?

Increase	Decrease	Stay the same

- f. Annual volume:

\$0–\$99 (000s)	\$100–\$499 (000s)	\$500–\$999 (000s)	\$1–\$1.99 (million)	\$2–\$4.99 (million)	\$5–\$9.99 (million)	\$10+ (million)

- g. Contract with:

General contractor	Specialty contractor	Consultant	Minority or disadvantaged contractor	Another public agency	Other

- h. Are contractors pre-qualified? Yes ____ No ____

- i. Are pre-award procedures handled by central management or by the functional unit normally involved in the activity?

- a. Central management ____
 b. Functional unit ____
 c. Both ____

APPENDIX B

States Responding to the Survey

Survey Respondents	Part 1	Administration	Construction	Design	Maintenance	Operations	Planning	Right-of-Way
Arizona	x	x	x		x	x	x	x
Arkansas								x
Colorado		x					x	x
Connecticut	x	x	x	x	x		x	x
Delaware		x	x		x			
Dist. of Columbia					x		x	
Florida	x	x	x	x			x	x
Hawaii	x	x						
Illinois	x			x	x	x		x
Indiana			x	x	x			x
Iowa	x		x	x	x	x	x	x
Kansas	x		x		x			x
Kentucky		x	x				x	x
Louisiana			x					
Maine			x	x		x	x	x
Maryland			x	x	x			x
Massachusetts	x	x	x		x		x	x
Michigan					x			x
Minnesota			x			x		x
Mississippi			x		x		x	
Missouri	x	x	x	x	x	x	x	x
Montana	x	x			x			x
Nebraska			x					
Nevada			x	x			x	
New Hampshire		x	x			x	x	x
New Jersey			x				x	x
North Dakota			x			x	x	x
Ohio		x						
Oregon					x	x		
Rhode Island					x	x	x	
South Carolina	x	x		x		x		x
South Dakota							x	
Tennessee	x	x		x	x	x	x	x
Texas			x	x	x	x		x
Utah	x	x			x		x	x
Vermont		x			x	x		x
Washington		x	x	x	x	x	x	x
West Virginia		x	x		x		x	x
Wyoming			x	x		x	x	x

Notes: Data do not indicate whether or not a state outsourced an activity, only which states responded to the survey document and which part they responded to. A total of 38 states and the District of Columbia responded.

APPENDIX C

Past and Current Findings

The following four tables from *NCHRP Synthesis 246: Outsourcing of State Highway Facilities and Services* (1997), C1–C4, are included for comparative purposes.

TABLE C1
INCEPTION OF OUTSOURCING, RESPONSES BY ACTIVITY GROUP

Activity Group	Before 1950	1950s	1960s	1970s	1980s	1990s
Administration	0	1	1	6	10	5
Planning	3	0	11	6	9	11
Design	3	8	12	15	15	10
Right-of-Way	2	3	8	3	7	8
Construction Management	0	1	5	1	10	9
Operations	2	5	4	13	14	14
Maintenance	0	1	9	44	32	16
Other	1	1	3	4	15	10
Total	11	20	53	92	112	83

Notes: Original Table 3 in *NCHRP Synthesis 246*.

TABLE C2
DOLLAR AMOUNTS OUTSOURCED, RESPONSES BY ACTIVITY

	Dollars (\$)						
Activity Group	0–99,000	100,000–499,000	500,000–999,000	1 million–1.99 million	2 million–4.99 million	5 million–9.99 million	10+ million
Administration	3	12	3	4	1	0	0
Planning	2	13	9	7	6	2	0
Design	2	9	7	6	11	4	9
Right-of-Way	8	7	7	4	4	1	0
Construction Management	1	4	3	1	2	2	6
Operations	2	3	5	9	18	6	4
Maintenance	3	16	25	11	20	13	24
Other	1	11	6	4	5	1	4
Total	22	75	65	46	67	29	47

Notes: Original Table 6 in *NCHRP Synthesis 246*.

TABLE C3
CONTRACTOR PAYMENT METHOD, RESPONSES BY ACTIVITY

Activity Group	Unit Price	Lump Sum	Cost Plus	Hourly	Other
Administration	8	14	6	8	1
Planning	5	15	16	4	2
Design	10	36	52	13	2
Right-of-Way	18	11	8	18	1
Construction Management	8	4	14	11	0
Operations	32	15	11	3	0
Maintenance	82	39	12	17	0
Other	11	13	7	8	2
Total	174	147	126	82	8

Notes: Original Table 9 in *NCHRP Synthesis 246*.

TABLE C4
FACTORS INFLUENCING CONTRACT DECISION, RESPONSES BY ACTIVITY

Activity Group	Legal Requirements	Policy Directive	Staff Constraints	Cost Comparison	Specialized Skill	Other
Administration	5	13	23	7	19	1
Planning	0	9	30	5	22	1
Design	2	25	70	6	31	0
Right-of-Way	3	13	33	3	13	0
Construction Management	0	10	27	2	7	0
Operations	1	20	32	3	19	3
Maintenance	4	57	56	30	52	1
Other	11	12	21	4	12	3
Total	26	159	292	60	175	9

Notes: Original Table 10 in *NCHRP Synthesis 246*.

The following tables (C5–C11) from the current research give additional insight into the state of the outsourcing.

TABLE C5
ADMINISTRATION ACTIVITY SATISFACTION

Activity	Rating
Training	7.31
Staff Programs	9.00
Database Management	6.00
Other	8.46
Average	7.69

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

TABLE C6
CONSTRUCTION ACTIVITY SATISFACTION

Activity	Rating
Construction Engineering	6.09
Materials Testing	7.38
Other	6.78
Average	6.75

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

TABLE C7
DESIGN ACTIVITY SATISFACTION

Activity	Rating
Surveying and Mapping	6.90
Location Studies	6.89
Plans and Specifications	7.33
Environmental Impact Studies	6.64
Design/Build	7.60
Program Management	7.36
Engineering/Design	7.09
Other	6.60
Average	7.05

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

TABLE C8
MAINTENANCE ACTIVITY SATISFACTION

Activity	Rating
Roadway Surface	8.00
Roadside	7.13
Drainage	7.57
Bridges	8.12
Traffic Signals	7.00
Traffic Signs	7.25
Other	7.81
Average	7.55

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

TABLE C9
OPERATIONS ACTIVITY SATISFACTION

Activity	Rating
Pavement Markings	7.00
Signal Installation	7.36
Sign Installation	6.42
Intelligent Transportation System	7.15
Toll Collection	8.00
Traffic Information Services	8.75
Other	8.20
Average	7.55

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

TABLE C10
PLANNING ACTIVITY SATISFACTION

Activity	Rating
Traffic Surveys	7.00
Nonhighway Activities	7.14
Traffic Studies	6.88
Research	7.13
Other	7.78
Average	7.19

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

TABLE C11
RIGHT-OF-WAY ACTIVITY SATISFACTION

Activity	Rating
Appraisals	7.15
Acquisitions	6.42
Relocation	5.57
Other	7.28
Average	6.61

Notes: Ratings are on a scale of 1 to 10, with 1 = very dissatisfied and 10 = very satisfied.

The following tables (C12–C18) show which states currently outsource the various activities.

TABLE C12
STATES OUTSOURCING ADMINISTRATION ACTIVITIES

State	Training	Staff Programs	Database Management
Arizona	Y	Y	Y
Connecticut	Y		N
Florida	Y		
Hawaii	Y	Y	Y
Kentucky	Y		
Massachusetts	Y		Y
Missouri	Y	Y	Y
Montana	Y	Y	
Nevada	N		
New Hampshire	Y	N	N
Ohio	Y	N	
South Carolina	Y	N	N
Tennessee	Y	Y	Y
Utah	Y		
Vermont	Y		Y
Washington	Y	N	N
West Virginia	Y	Y	

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no.

TABLE C13
STATES OUTSOURCING CONSTRUCTION ACTIVITIES

State	Construction Engineering	Materials Testing
Florida	Y	Y
Indiana	Y	Y
Iowa	Y	
Kansas	Y	
Kentucky	Y	Y
Louisiana		N
Maine		
Maryland	Y	Y
Massachusetts		
Minnesota	Y	Y
Mississippi	Y	
Montana		Y
Nebraska	Y	
New Hampshire		Y
West Virginia	Y	

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no.

TABLE C14
STATES OUTSOURCING DESIGN ACTIVITIES

State	Surveying and Mapping	Location	Plans and Specifications	Environmental Impacts	Design/Build	Program Management	Engineering/Design
Connecticut				Y	N	Y	Y
Florida	N				Y	Y	Y
Illinois	Y	Y	Y	Y	N	Y	
Indiana	Y	N		N	Y		Y
Iowa	Y	Y		Y	N	N	Y
Maine	Y	Y	Y	Y	Y	Y	
Maryland	Y	Y		Y	Y	Y	Y
Missouri	Y	Y		Y	N	Y	Y
Nevada	Y			Y	N	N	Y
South Carolina	Y	Y	Y	Y	Y	Y	
Tennessee		Y		Y	N	N	Y
Texas		Y	Y	Y	Y	Y	Y
Washington		Y		Y	Y	Y	Y
Wyoming		Y		Y	N	Y	Y

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no.

TABLE C15
STATES OUTSOURCING MAINTENANCE ACTIVITIES

State	Roadway Surface	Roadside	Drainage	Bridges	Traffic Signals	Traffic Signs
Arizona	Y	Y	N	N	Y	N
Connecticut	Y	Y	Y	Y	Y	N
Delaware	Y	Y	Y	Y	N	N
Dist. of Columbia		Y		Y		
Illinois	Y	Y	Y	Y	Y	Y
Indiana	Y	Y	Y	Y	Y	N
Iowa	Y	Y	Y	Y	N	Y
Kansas		Y	N	Y	N	N
Massachusetts		Y				
Michigan					Y	
Mississippi	Y	Y	N	Y		
Missouri	Y	Y	Y	Y	N	
Montana	Y	Y	Y	Y	Y	N
Oregon	Y	Y	Y	Y	Y	Y
Rhode Island	Y	Y	Y	Y	N	N
Tennessee	Y	Y	Y	Y	Y	Y
Texas	Y	Y	Y	Y	Y	Y
Utah	Y	Y	Y	Y	N	Y
Vermont	Y	Y	Y	N	Y	N
Washington	Y	N	N	Y	N	N
West Virginia	Y	Y	Y	Y	Y	

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no.

TABLE C16
STATES OUTSOURCING OPERATIONS ACTIVITIES

State	Pavement Markings	Signal Installation	Sign Installation	ITS	Toll Collection	Traffic Information Services
Arizona	Y	Y	Y	Y	N	N
Connecticut		N	Y	Y	N	N
Illinois	Y	Y	Y	Y	Y	N
Iowa	Y	Y	Y	Y	N	N
Maine	Y	Y	Y	Y	N	N
Massachusetts	Y	Y	Y	Y	N	Y
Minnesota	Y	Y	N	Y	N	Y
Missouri	N	Y	Y	Y		N
New Hampshire	Y	Y	Y	Y	Y	N
North Dakota	Y	Y	Y	Y	N	Y
Oregon	Y	Y	Y	Y	N	N
Rhode Island		Y		Y	Y	Y
South Carolina	Y	Y	Y	Y	N	Y
Tennessee	Y		Y		N	Y
Texas	Y	Y	Y	Y		N
Vermont	Y	Y	Y	Y	N	Y
Washington	N	Y	Y	Y	N	N

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no; ITS = Intelligent Transportation Systems.

TABLE C17
STATES OUTSOURCING PLANNING ACTIVITIES

State	Traffic Surveys	Nonhighway Studies	Traffic Studies	Research
Arizona	Y	Y	Y	Y
Colorado	Y	Y		Y
Connecticut	N	Y		Y
Dist. of Columbia	Y	Y	Y	Y
Florida	Y	Y	Y	Y
Iowa	N	Y	Y	Y
Kentucky	Y	Y	Y	Y
Maine	Y	Y	Y	Y
Massachusetts	N	N	Y	Y
Mississippi	Y			
Missouri	Y	Y	N	Y
Nevada	N		Y	Y
New Hampshire	Y	Y	Y	
New Jersey	Y	Y	Y	N
North Dakota	N	Y	N	Y
Rhode Island	Y	Y	Y	
South Dakota	N		N	
Tennessee	Y	Y	Y	Y
Utah	Y			Y
Washington				Y
West Virginia	Y			Y
Wyoming	N	Y	N	N

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no.

TABLE C18
STATES OUTSOURCING RIGHT-OF-WAY ACTIVITIES

State	Appraisals	Acquisitions	Relocation
Arizona	Y	Y	N
Arkansas	Y	N	N
Colorado	Y	Y	Y
Connecticut	Y	N	N
Florida	Y	Y	Y
Illinois	Y	Y	Y
Indiana	Y	Y	N
Iowa	Y	Y	Y
Kansas	Y	Y	
Kentucky	Y	Y	Y
Maine	Y	Y	Y
Maryland	Y	Y	N
Massachusetts	Y	Y	Y
Michigan	Y	Y	Y
Minnesota	Y	Y	Y
Missouri	Y	Y	Y
Montana	Y	Y	Y
New Hampshire	Y	N	N
New Jersey	Y	N	Y
North Dakota	Y	Y	N
South Carolina	Y	Y	Y
Tennessee	Y	Y	Y
Texas	Y	Y	Y
Vermont	Y	N	N
Washington	Y	Y	N
West Virginia	Y	Y	Y
Wyoming	Y		

Notes: Responses to the question: Does your state outsource this activity? Y = yes; N = no.

APPENDIX D

Answers to Selected Questions from Part 1 of the Survey Questionnaire

SECTION ONE

Question 2. What other considerations either force or encourage a decision to contract out?

Iowa—In-house expertise and in-house staff work load.

Illinois—As a matter of practice the Illinois DOT contracts out all major highway construction and reconstruction. Only a limited amount of small or emergency projects are handled in-house. Likewise, the majority of the architectural engineering services for Phase One and Two are contracted out. A small amount of bridge and structure design work or in-house projects is handled by department staff. The review of consultant plans and most Phase Three (Project Supervision) is provided by in-house staff. Other operating-related contracts are contracted out as necessary. Considerations include lack of available resources, need for outside expertise, need for outside equipment and supplies to meet certain time frames, or economical advantages through the use of other state agencies, universities, and joint ventures or the employment of disadvantaged individuals or firms.

Connecticut—Magnitude and complexity of a project, staffing constraints, and specialized expertise and/or equipment requirements.

Tennessee—Lack of in-house staff, lack of in-house expertise, cost, and time frames required for accomplishment.

Maine—Resources: Unfunded mandates in the environmental area, the need to do more with less, increased complexity in the planning and public participation functions, combined with fixed internal resources, have impelled us to seek specialized expertise from consultants.

Massachusetts—Lack of available staffing, special expertise, large workload, to save money, lack of equipment, and need problems resolved quickly.

South Carolina—Utilization of existing forces and equipment, as well as in-house expertise for an activity. For some areas, such as legal services and communications, the volume and in-house expertise force outsourcing to meet demands.

Missouri—Criteria used by MoDOT included: (a) perception—in the minds of the general public, is this activity something MoDOT should be leading; (b) availability—how available would outside assistance be; (c) implementation—could the change be made easily; and (d) mission drive—how does this align with the Long-Range Transportation Direction and Strategic Plan.

Arizona—Work load, budget line items (financial), talent base/level—expertise, and time frame—commitments for need of project.

Utah—Work load and the need for expertise are the main factors.

Kansas—Lack of available manpower and special expertise.

Florida—We have also found that contract work can be just as, if not more, efficient in some areas (maintenance, as an example).

Hawaii—Lack of expertise, limited staffing, and time constraints.

Montana—Department staffing levels are inadequate to complete projects in a timely manner.

Arkansas—Staff work load, accelerated time schedule for project, and projects requiring specialized work.

Oregon—Internal capacity—Too much work, requires an alternative delivery method. Need to innovate—Expectations from legislature to deliver larger program (revenue increase and bonding) with no new staff.

Question 3. What cost comparison analyses are used in the decision process and what items are typically included? (please provide sample forms if used.)

Iowa—It is felt that work could be done more efficiently in-house and at a lower cost than by a consultant. So the primary reason to use a consultant is that we do not have enough staff to do the work and meet the schedule.

Illinois—Type of project: (a) reason desired services are not provided by existing resources, (b) financial analysis, (c) comparison of other projects similar in scope, and (d) tangible or intangible benefits, including cost.

Connecticut—Ability to do the work drives this decision.

Tennessee—General comparisons with in-house costs.

Maine—In some cases, it's not a matter of cost, but how can we get the job done as required, for a reasonable cost; that is, either augment our short-term capability, or postpone the work, at extra cost due to road deterioration, inflation, etc. Costs are tracked in terms of in-house and outsourced preliminary engineering/planning versus construction cost comparisons.

Massachusetts—None.

South Carolina—Engineering Direction memorandum MO4 for maintenance items.

Missouri—To determine the feasibility of outsourcing activities based on cost analyses, we review the list of various activities performed by the department, the department budget cost associated with the activity,

estimate total cost to provide the activity at MoDOT including personnel services and expense and equipment amounts, and estimate cost to outsource and the variance between outsourcing and doing the work internally.

Arizona—Usually based on need and there is no cost review.

Utah—An independent estimate is prepared, overall project cost, manpower limitations, consultant pools ensure qualifications, and unit prices are compared.

Florida—This depends on and varies with the type of work being contracted. Some items included are in-house: salaries and benefits; contract: salaries, overhead, and project management.

Hawaii—Normally cost analysis will be conducted, which includes the cost to hire more staff versus possible cost to contract out.

Montana—None in particular; staff and time are the main driving forces.

Arkansas—Not applicable.

Oregon—We are in a situation where there is more work than can be delivered by staff, so cost comparison is not a determining factor in the in-house versus outsource decision.

Question 4. Are other standard procedures used to determine whether to contract out an activity? Please describe and/or provide sample forms.

Iowa—No.

Connecticut—The decision to contract out engineering work is primarily made based on the following issues: (1) available staffing, (2) construction cost threshold—over \$5 million favors contracting out, (3) complexity of work/time line, and (4) specialized expertise.

Tennessee—None.

Maine—We don't have rigid procedures that factor out initiative and judgment. Project managers are given budgets and targets and use their judgment to weigh the various decision factors on a project-by-project basis.

Massachusetts—No.

South Carolina—For engineering services, a justification process must be followed.

Missouri—In addition to the analyses described in number 3 above, we also determine the following for activities that are being considered for outsourcing: (a) the number of FTE (full-time equivalent) positions performing all the activities within the area being considered for outsourcing and (b) the impact of eliminating the positions/FTE within the area being considered for outsourcing; that is, can they be used elsewhere in the agency.

Arizona—Review of work load versus program.

Utah—PPMS (EPM) processes 500 and 620 maximize UDOT resources and identify where consultants should be used to supplement staff.

Kansas—No agencywide set standards to make this determination.

Florida—No.

Hawaii—No.

Montana—Available staff and the construction schedule.

Arkansas—No.

Oregon—We are developing decision-making criteria to determine in-house or outsource project delivery.

Question 5. What factors or considerations, if any, work against a decision to contract out an activity?

Iowa—Funding.

Illinois—Lack of funds, available in-house resources including staff equipment and expertise, and number of similar projects that are currently being handled in-house.

Connecticut—Cost, time, ability, and union contracts.

Tennessee—Costs, legislative concerns over letting our people go (downsizing), and lack of staff and experience to administer outsourced contracts.

Maine—Maintaining the internal experience level on a variety of project types is a consideration for keeping certain projects in-house.

Massachusetts—(1) The ability to do the work cheaper without own forces, (2) desire to maintain quality through some sense of "ownership," and (3) laws prohibiting any new privatization work that will take jobs away from current public (state) employees.

South Carolina—Generally the same as 2A above.

Missouri—(a) We do not want to have any layoffs of employees due to outsourcing and (b) we do not want to cut anyone's salary because of being relocated to another position within the agency.

Arizona—Morale; financial.

Utah—UDOT must maintain the knowledge and expertise in-house to be able to review deliverables submitted by consultants. It takes time to conduct RPs and put companies under contract.

Kansas—Cost and overhead, the commitment of manpower to administer the contract, time line: getting the project off the ground.

Florida—Any time or cost controlling constraints.

Hawaii—Generally cost will be higher; time constraints and contract management.

Montana—None in particular.

Arkansas—Staff work needs.

Oregon—Collective bargaining language that prohibits outsourcing or makes it an administrative nightmare to do so.

Question 6. Do current policies or legislation suggest that a greater amount of contracting out of highway services will occur in the future?

Iowa—Not specifically; however, reduction of in-house staffing has an effect.

Illinois—No. Currently the highway construction program is handled by road and bridge contractors, with the exception of small or emergency projects. A large amount of architectural engineering design work is contracted out. The exceptions are some in-house bridge design and other professional services handled on a case-by-case basis.

Connecticut—Yes. Politically and economically it appears that contracting out is the wave of the future.

Tennessee—Maybe.

Maine—The pressure to do more with less and limit the size of government while taking positive steps to maintain a healthy business climate and economy tend to push toward more contracting out rather than less.

Massachusetts—Legislation—no; policy—perhaps, but not necessarily.

South Carolina—Yes.

Missouri—We will continually review our work load to ensure the proper amount of internal work versus contracting for efficient operation of the department.

Arizona—Not that I am aware of.

Utah—The current policy appears to be working.

Kansas—Contracting out of highway services in the future depends on the agency's work load.

Florida—Current legislation allows for design/build contracting, which results in more opportunities to contract out design services.

Hawaii—Yes. Limited staffing; legislation on privatization.

Montana—No.

Arkansas—No.

Oregon—Yes. Direction for ODOT Director and legislative "intent" clearly expect a higher amount of outsourcing; primarily on the project delivery side, not throughout the agency.

SECTION TWO

A. Pre-Award Stage

Question 2. How are risk-sharing and/or liability questions resolved in the contracting process?

Iowa—Contracts: state DOT is not responsible for consultant errors and omissions and includes an indemnification clause.

Illinois—Standard terms and conditions including statutory requirements, contractor/vendor disclosure, prequalification, bonding, warranty, liability, and insurance are all included either as standard terms, conditions, or certifications to document risk sharing and liability.

Connecticut—Liquidated Damages and Save Harmless Clauses are in project specifications and signed agreements to protect against liability issues.

Tennessee—Not explicitly addressed.

Massachusetts—Contract provisions, bonding or insurance requirements.

Arizona—Through prenegotiation partnering workshops (design).

Utah—Risk is shared with innovative contracting, but most projects leave the risk with the Department. Risk analysis up front. It is determined who is best able to bear the risk on each issue.

Florida—This is an area we are currently working on with both contractors and consultants. Consultants will soon be responsible for total contract package. Contractors, through QC2000, are more accountable now as well as in the areas of warranties, which we have used on a limited basis.

Hawaii—(a) Normally there are warranty clauses in contracts, (b) contract implementation is normally based on the satisfactory performance of the contractor. Work orders are issued before the contractor continues to provide services for the next phase, and (c) payment can only be made when contractor completes the work to the satisfaction of the state.

Montana—The article to the contract itself addresses these types of issues.

Abbreviations used without definition in TRB Publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation